Moody County
Pre-Disaster Mitigation Plan
2020-2025

Prepared by: First District Association of Local Governments

418 18th Ave NE
Watertown, SD 57201
Phone: 605-882-5115
Fax: 605-882-5049
www.1stdistrict.org

For: Federal Emergency Management Administration

TABLE OF CONTENTS

CHAPTER 1 – INTRODUCTION 1
- Introduction 1
- Authority for Pre-disaster Mitigation Plan 2
- Purpose 2
- Use of Plan 2
- Scope of Plan 3
- What is Hazard Mitigation 3
- Moody County Profile 4
  - Population 4
  - Social and Economic Description 7
  - Physical Description and Climate 7
  - Hydrology 8
  - Transportation and Utility Infrastructure 8
  - Medical and Emergency Services 9

CHAPTER 2 – PREREQUISITES 10
- Adoption by Local Governing Body 10
- Multi-jurisdictional Plan Participation 10

CHAPTER 3 – PLANNING PROCESS 13
- Background 13
- Documentation of Planning Process 14
  - Methodology 14
  - Planning Framework 14
  - Risk Identification & Assessment/Mitigation Strategy/Review of Plan 18

CHAPTER 4 – RISK ASSESSMENT 21
- Identification of Hazards 21
- Types of Natural Hazards in the PDM Jurisdiction Area 22
- Hazard Profile 26
  - Dam Failure 27
  - Drought 28
  - Wildfire 29
  - Flood 30
  - Hail 32
  - Lightning 33
  - Tornado 33
  - Extreme Temperatures 34
  - Thunderstorm and High Wind 36
  - Winter Storms 37
- Assessing Vulnerability: Overview 39
- Assessing Vulnerability: National Flood Insurance Program Compliance 44
- Assessing Vulnerability: Repetitive Loss Properties 45
- Assessing Vulnerability: Severe Repetitive Loss Properties 46
- Assessing Vulnerability: Identifying Structures 46
- Assessing Vulnerability: Community Capabilities 53
- Assessing Vulnerability: Estimating Potential Losses 57
  - Flooding 61
  - Tornado 61
- Assessing Vulnerability: Analyzing Development Trends 62
- Unique or Varied Risk Assessment 64
  - Colman 64

- Egan 66
- Flandreau 68
- Trent 70
- Ward 72
- Moody County 73

CHAPTER 5 – MITIGATION STRATEGY 83

- Mitigation Overview 83
- Implementation of Mitigation Actions 109

CHAPTER 6 – PLAN MAINTENANCE 110

- Monitoring, Evaluating, and Updating the Plan 110
- Continued Public Participation/Involvement 110
- Annual Reporting Procedures 111
- Five-Year PDM Review 111
- Plan Amendments 111
- Incorporation into Existing Planning Mechanisms 112
- Potential Funding Sources 112
- Federal 113
- Local 116
- Non-Governmental 116

LIST OF TABLES

- 1.1: Moody County Municipalities 4
- 1.2: Moody County Townships 5
- 2.1: Plan Participants 10
- 2.2: Dates of Plan Adoption by Jurisdiction 11
- 2.3: Record of Participation 12
- 3.1: Participation in Plan Development 15
- 3.2: Opportunities for Public Comment 17
- 3.3: Record of Review (Summary) 20
- 4.1: Significant Hazard Occurrences 2009-2019 21
- 4.2: Hazards Categorized by Likelihood of Occurrence 22
- 4.3: Presidential Disaster Declarations in South Dakota Including Moody County 27
- 4.4: Dam Locations in Moody County 27
- 4.5: Moody County 10-year Drought History 28
- 4.6: Moody County Structural, Vehicle and Outside (Wildfire) Department Responses 29
- 4.7: Moody County 10-year Flood History 30
- 4.8: Moody County 10-year Hail History 32
- 4.9: Moody County 10-year Lightning History 33
- 4.10: Moody County 10-year Tornado History 33
- 4.11: Moody County 10-year Extreme Temperatures History 35
- 4.12: Moody County 10-year Thunderstorms/High Wind History 36
- 4.13: Moody County 10-year Snow and Ice Storms History 38
- 4.14: Overall Summary of Vulnerability by Jurisdiction 40
- 4.15: Communities Participating in the National Flood Program, Moody County, SD 45
- 4.16: Moody County National Flood Insurance Program Statistics 46
- 4.17: Critical Infrastructure in Moody County 47
- 4.18: Administrative and Technical Capabilities 54
- 4.19: Capabilities of Growth Guidance Instruments 55

- 4.20: Moody County (Rural Area) Estimated Potential Dollar Losses to Vulnerable Structures 58
- 4.21: Colman Estimated Potential Dollar Losses to Vulnerable Structures 58
- 4.22: Egan Estimated Potential Dollar Losses to Vulnerable Structures 58
- 4.23: Flandreau Estimated Potential Dollar Losses to Vulnerable Structures 59
- 4.24: Trent Estimated Potential Dollar Losses to Vulnerable Structures 59
- 4.25: Ward Estimated Potential Dollar Losses to Vulnerable Structures 59
- 4.26: Moody County (Total) Estimated Potential Dollar Losses to Vulnerable Structures 60
- 4.27: Sioux Valley Energy Estimated Potential Dollar Losses to Vulnerable Structures 60
- 4.28: HAZUS-MH Base Flood (1 Percent Chance) Loss Estimation Results (2019) 61
- 4.29: Moody County Annualized Losses from Tornadoes 62
- 4.30: City of Colman Potential Floodplain Development – By Land Use Type 63
- 4.31: City of Egan Potential Floodplain Development – By Land Use Type 63
- 4.32: City of Flandreau Potential Floodplain Development – By Land Use Type 63
- 4.33: Town of Trent Potential Floodplain Development – By Land Use Type 64
- 5.1: Actions/Projects to Reduce Flood Risk through Policy Implementation 85
- 5.2: Actions/Projects to Change the Characteristics or Impacts of Flood Hazards 86
- 5.3: Actions/Projects to Reduce Loss Potential of Infrastructure to Flood Hazards 87
- 5.4: Actions/Projects to Reduce Severe Weather Risk through Policy Implementation 87
- 5.5: Actions/Projects to Change the Characteristics or Impacts of Severe Weather Hazards 88
- 5.6: Actions/Projects to Reduce Loss Potential of Infrastructure to Severe Weather Hazards 88
- 5.7: Actions/Projects to Reduce Fire and Drought Risk Through Policy Implementation 90
- 5.8: Actions/Projects to Reduce Loss Potential of Infrastructure to Fire and Drought Hazards 90
- 5.9: Actions/Projects to Change the Characteristics or Impacts of Fire and Drought Hazards 91
- 5.10: Technological Activities 91
- 5.11: Planning Activities 92
- 5.12: Administration/Coordination Activities 93
- 5.13: Proposed Mitigation Activities 96

LIST OF FIGURES

- 1.1: Political Map 6
- 4.1: Moody County Hazard Vulnerability Map 77
- 4.2: City of Colman Hazard Vulnerability Map 78
- 4.3: City of Egan Hazard Vulnerability Map 79
- 4.4: City of Flandreau Hazard Vulnerability Map 80
- 4.5: Town of Trent Hazard Vulnerability Map 81
- 4.6: Town of Ward Hazard Vulnerability Map 82
- 5.1: Moody County Potential Mitigation Project Map 103
- 5.2: City of Colman Potential Mitigation Project Map 104
- 5.3: City of Egan Potential Mitigation Project Map 105
- 5.4: City of Flandreau Potential Mitigation Project Map 106
- 5.5: Town of Trent Potential Mitigation Project Map 107
- 5.6: Town of Ward Potential Mitigation Project Map 108

APPENDIX 117

- Appendix A - Resolution of Adoption by Jurisdiction 118
- Appendix B - PDM Planning Team Agendas, Sign-in Sheets 126
- Appendix C - First Community Meeting and Sign in Sheets Jurisdiction..... 143
- Appendix D - Hazard Identification/vulnerability Worksheets by Jurisdiction 172
- Appendix E - Township Vulnerable and Potential Mitigation Project Site Maps..... 187
- Appendix F - Comprehensive Land Use Maps 200
- Appendix G - Review of 2007 PDM Mitigation Project Implementation..... 206
- Appendix H - References 208

CHAPTER 1
INTRODUCTION

INTRODUCTION

Moody County (County) is vulnerable to natural hazards that have the possibility of causing serious threat to the health, welfare, and security of our citizens. The cost of response and recovery, in terms of potential loss of life or loss of property, from potential disasters can be lessened when attention is turned to mitigating their impacts and effects before, they occur or re-occur.

This plan is an update of the Pre-Disaster Mitigation Plan (PDM) that was developed by the County in 2007 and updated in 2014. The document will serve as a strategic planning tool for use by the county and its communities in its efforts to mitigate against future disaster events. The plan identifies and analyzes the natural disasters that may occur in the County in order to understand the county's vulnerabilities and propose mitigation strategies that minimize future damage caused by those hazards. This knowledge will help identify solutions that can significantly reduce threat to life and property. The plan is based on the premise that hazard mitigation works. With increased attention to mitigating natural hazards, communities can do much to reduce threats to existing citizens and avoid creating new problems in the future. In addition, many mitigation actions can be implemented at minimal cost.

In the past 10 years, there have been 607 Major Presidential Disaster Declarations (all hazards) proclaimed in the United States, of those 607 declarations, 21 have occurred fully or partially within the state of South Dakota. With five of those declarations including Moody County, the County is no stranger to natural and man-made disasters. In order to prevent and reduce the cost that is incurred by businesses, citizens, and property owners from these disasters, the Moody County Pre-Disaster Mitigation Plan was developed. This plan identifies hazards that occur throughout Moody County and mitigation projects that will aid in preventing and reducing the effects of those disasters on the property and lives within. In addition, many mitigation actions can be implemented at minimal cost.

This is not an emergency response or emergency management plan. Certainly, the plan can be used to identify weaknesses and refocus emergency response planning. Enhanced emergency response planning is an important mitigation strategy. However, the focus of this plan is to support better decision making directed toward avoidance of future risks and the implementation of activities or projects that will eliminate or reduce the risk for those that may already have exposure to a natural hazard threat.

AUTHORITY FOR PRE-DISASTER MITIGATION PLAN

In October of 2000, the Disaster Mitigation Act (DMA2K) was signed to amend the 1988 Robert T. Stafford Disaster Relief and Emergency Assistance Act. Section 322 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a pre-disaster mitigation (PDM) plan in place that:

1. Identifies hazards and their associated risks and vulnerabilities;
2. Develops and prioritizes mitigation projects; and
3. Encourages cooperation and communication between all levels of government and the public.

The objective of this plan is to meet the hazard mitigation planning needs for the County and participating entities. Consistent with the Federal Emergency Management Agency's guidelines, this plan will review all possible activities related to disasters to reach efficient solutions, link hazard management policies to specific activities, educate and facilitate communication with the public, build public and political support for mitigation activities, and develop implementation and planning requirements for future hazard mitigation projects.

PURPOSE

The County PDM is a planning tool to be used by the County, as well as other local, state and federal units of government, in their efforts to fulfill federal, state, and local hazard mitigation planning responsibilities; to promote pre and post disaster mitigation measures, short/long range strategies that minimize suffering, loss of life, and damage to property resulting from hazardous or potentially hazardous conditions to which citizens and institutions within the county are exposed; and to eliminate or minimize conditions which would have an undesirable impact on our citizens, economy, environment, or the well-being of the County. This plan will aid city, township, and county agencies and officials in enhancing public awareness to the threat hazards have on property and life, and what can be done to help prevent or reduce the vulnerability and risk of each County jurisdiction.

USE OF PLAN

The plan will be used to help the county and communities and their elected and appointed officials:

- Plan, design and implement programs and projects that will help reduce their community's vulnerability to natural hazards.
- Facilitate inter-jurisdictional coordination and collaboration related to natural hazard mitigation planning and implementation.
- Develop or provide guidance for local emergency response planning.
- Be compliant with the Disaster Mitigation Act of 2000.

SCOPE OF PLAN

- Provide opportunities for public input and encourage participation and involvement regarding the mitigation plan.
- Identify hazards and vulnerabilities within the county and local jurisdictions.
- Combine risk assessments with public and emergency management ideas.
- Develop goals based on the identified hazards and risks.
- Review existing mitigation measures for gaps and establish projects to sufficiently fulfill the goals.
- Prioritize and evaluate each strategy/objective.
- Review other plans for cohesion and incorporation with the PDM.
- Establish guidelines for updating and monitoring the plan.
- Present the plan to the Moody County Commissioners and the participating communities within the county for adoption.

WHAT IS HAZARD MITIGATION?

Hazard mitigation is defined as any cost-effective action(s) that has the effect of reducing, limiting, or preventing vulnerability of people, property, and the environment to potentially damaging, harmful, or costly hazards. Hazard mitigation measures, which can be used to eliminate or minimize the risk to life and property, fall into three categories. First are those that keep the hazard away from people, property, and structures. Second are those that keep people, property, and structures away from the hazard. Third are those that do not address the hazard at all but rather reduce the impact of the hazard on the victims such as insurance. This mitigation plan has strategies that fall into all three categories.

Hazard mitigation measures must be practical, cost effective, and environmentally and politically acceptable. Actions taken to limit the vulnerability of society to hazards must not in themselves be more costly than the value of anticipated damages.

The primary focus of hazard mitigation actions must be at the point at which capital investment decisions are made and based on vulnerability. Capital investments, whether for homes, roads, public utilities, pipelines, power plants, or public works, determine to a large extent the nature and degree of hazard vulnerability of a community. Once a capital facility is in place, very few opportunities will present themselves over the useful life of the facility to correct any errors in location or construction with respect to hazard vulnerability. It is for these reasons that zoning and other ordinances, which manage development in high vulnerability areas, and building codes, which ensure that new buildings are built to withstand the damaging forces of hazards, are often the most useful mitigation approaches a jurisdiction can implement.

Previously, mitigation measures have been the most neglected programs within emergency management. Since the priority to implement mitigation activities is generally low in comparison to the perceived threat, some important mitigation measures take time to implement. Mitigation success can be achieved, however, if accurate information is portrayed through complete hazard identification and impact studies, followed by effective mitigation management. Hazard mitigation is the key to eliminating long-term risk to people and property in South Dakota from hazards and their effects. Preparedness for all hazards includes: response and recovery plans, training, development, management of resources, and mitigation of each jurisdictional hazard.

This plan evaluates the impacts, risks and vulnerabilities of natural hazards within the jurisdictional area of the entire county. The plan supports, provides assistance, identifies and describes mitigation projects for each of the local jurisdictions who participated in the plan update. The suggested actions and plan implementation for local governments could reduce the impact of future natural hazard occurrences. Lessening the impact of natural hazards can prevent such occurrences from becoming disastrous but will only be accomplished through coordinated partnership with emergency managers, political entities, public works officials, community planners and other dedicated individuals working to implement this program.

MOODY COUNTY PROFILE

Population

Moody County is in east-central South Dakota north of Minnehaha County, south of Brookings County and east of Lake County and immediately west of the Minnesota/South Dakota border. The county has a geographic area of 519 square miles and its 2018 Population Estimate (US Census) was 6,579, which averages to 12.5 persons per square mile. Approximately 19 percent of the population is older than age 65. Education levels of persons age 25 and older include 91 percent high school graduates and 21 percent with a bachelor's degree or higher.

Figure 1.1 contains a map of Moody County. The county seat is Flandreau, which is situated 7 miles east of Interstate 29 at the intersection of South Dakota Highway 13 and 32. Table 1.1 shows the population and number of housing units of the County's municipalities. Table 1.2 lists the sixteen County Townships and their respective population. The County has continued to experience population growth since 1960. This is due primarily to the county's proximity to Brookings, Madison, and Sioux Falls which serve as the governmental, employment and trade centers for the region along with growing Native American community within Moody County.

Table 1.1: Moody County Municipalities

Name	Population	Location	Elevation	Housing Units
Colman	582	43 58' 57' N 96 48' 52" W	1,680 feet	335
Egan	271	43 59' 57" N 96 38' 56" W	1,520 feet	143
Flandreau	2,325	44 02' 57" N 96 35 43" W	1,570 feet	1,187
Trent	232	43 54 22" N 96 39' 14" W	1,510 feet	147
Ward	50	44 9' 17" N 96 27' 37" W	1,740 feet	32
Unincorporated Areas	3,119			1,062
Moody County	6,579	43 58' 40" N 96 39' 50" W	1,565 feet	2,906

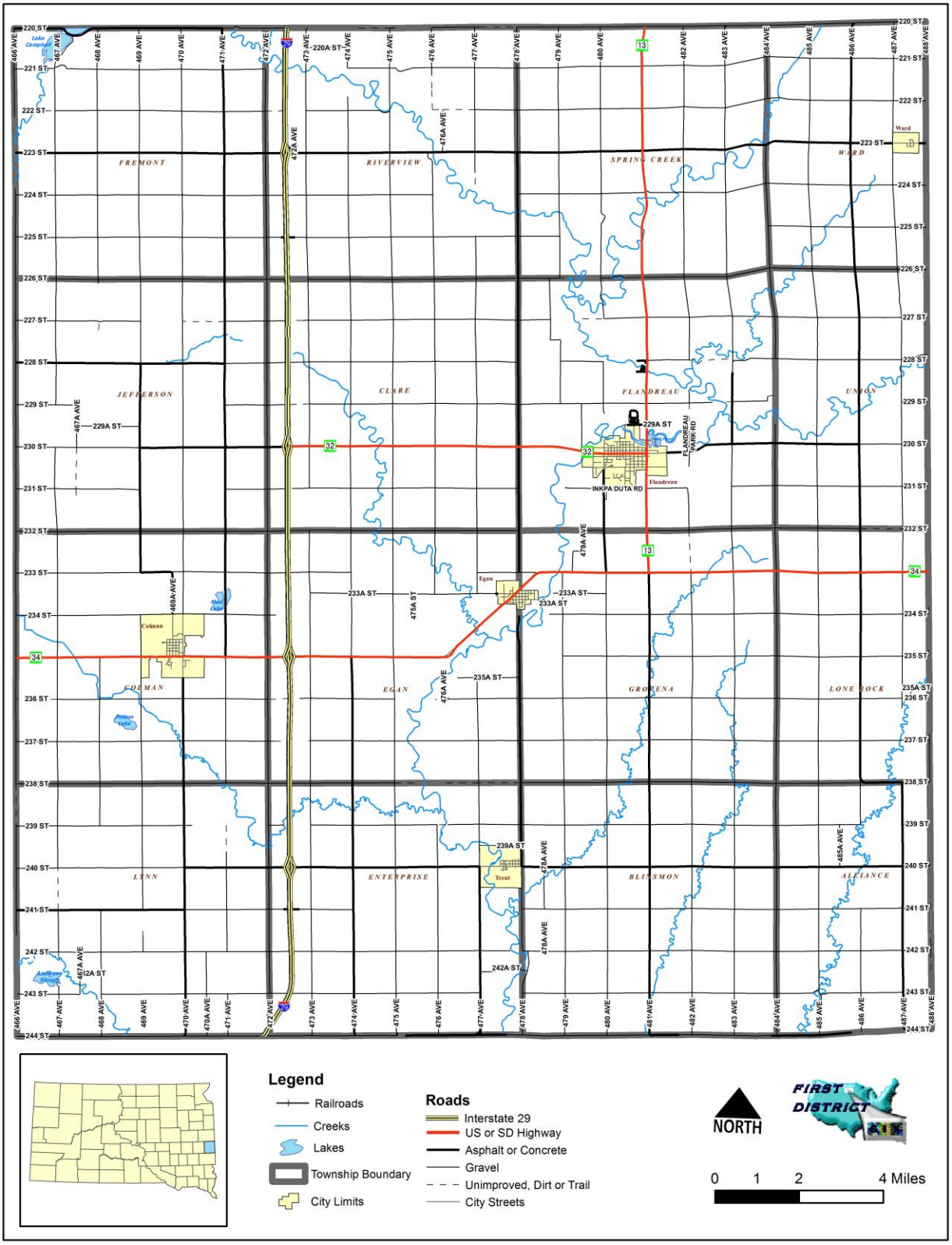
Source: 2018 Population Estimate and 2013-2017 Community Survey 5-Year Estimates (US Census), www.Lat-Long.com, www.usbeacon.com.

Table 1.2: Moody County Townships

Township	Population
Alliance	95
Blinsmon	207
Clare	151
Colman	204
Egan	201
Enterprise	267
Flandreau	372
Fremont	274
Grovena	173
Jefferson	160
Lone Rock	99
Lynn	287
Riverview	130
Spring Creek	125
Union	182
Ward	66

Source: 2010 Census

Figure 1.1: Political Map



Social and Economic Description

Moody County's economy is dependent upon the agricultural sector. Most non-agricultural employment is in education, health care, manufacturing, or service industries. The City of Flandreau is the governmental center for the County. The rural communities in the County serve as bedroom communities to Brookings and Sioux Falls and provide "small town" atmosphere to those residents. A large majority of residents commute to Brookings, Sioux Falls, Madison or other employment centers. Most of the communities have limited retail and service sectors, which provide basic needs to its residents.

The Flandreau Santee Sioux Reservation is also located in Moody County. Tribal property consists of over 3,000 acres of Tribal Trust and Tribal Fee lands.

Physical Description and Climate

Moody County is centrally located along the eastern boundary of the State, with the Big Sioux River running a north-south course through the entire county. The topography is generally smooth with few conspicuous topographical features. The western portion is characterized as having more rolling surfaces than the central or eastern portions. Moody County is located within the region generally classified as mild and dry continental or Steppe with four well-defined seasons. The weather can be quite changeable with large day to day temperature variations, particularly from the fall to the spring. Days with severe winter cold and summer heat are typical.

Normally the temperature is moderate until the beginning of July, after which short, hot periods are experienced until the end of August. The freeze-free period is the number of days between the average last occurrence of freezing temperatures in the spring and the average first occurrence of 32 degrees F or lower in the fall. The length of the freeze-free period approximates the length of the growing season which ranges from 130 days or more between May 21st and September 21st. Topography and local weather conditions can produce subfreezing temperatures at the ground surface while the air temperature a few feet above the ground remains above 32 degrees F.

Annual average precipitation is 26.6 inches, with over 75% of the precipitation falling from May through September. Precipitation can vary significantly from year to year, and location to location within a given year. The heaviest most intense precipitation often occurs with localized downpours associated with thunderstorms in June through August. Significant flash flooding can result from these downpours with over 3 inches of precipitation reported in a few events. Widespread heavy precipitation events of 1 to 2 inches can occur every few years and is most common from April through June and September through early November.

Average winter snowfall ranges up to 31.2 inches. The heaviest snowstorms often occur from late March through May or mid-October to mid-November. These storms can produce more than 12 inches of snow and are often made more severe as temperatures are warmer, and therefore the snow is heavier and more difficult to travel in and remove. These storms are often accompanied by high winds resulting in blizzard conditions. In spring these storms can coincide with the calving season resulting in livestock loss. Mid-winter snowstorms in general produce less than 6 inches of snow, but heavier amounts to 19 inches or more have occurred. Despite the generally lighter amounts and drier snow, high winds can result in blizzard conditions. Even without falling snow, in the colder conditions of mid-winter, high winds can pick up loose snow, resulting in local ground blizzards.

Severe thunderstorms are common from June into early September. Typically, the greatest hazards associated with these thunderstorms are very highs winds and large hail. Damage to structures and crops occurs every summer from these storms. Tornadoes have been reported but are relatively rare.

An important element of the climate in Moody County is the often-windy conditions. Average wind speeds range from 10 to 15 mph depending on the exposure of the location. The average and peak sustained winds tend to be stronger over higher more exposed terrain. The highest wind gusts often occur with thunderstorms during the summer, with gusts over 60 mph occurring every year. The highest sustained winds tend to occur in the spring and fall, with sustained winds over 40 mph occurring every year. Moody County reached straight line wind speeds in excess of 70 mph within the last ten years.

For the purposes of this hazard assessment and mitigation plan, weather is of interest when it threatens property or life and thus becomes a hazard. The National Weather Service (NWS) provides short-term forecasts of hazardous weather to the public. In addition to issuing tornado and severe thunderstorm watches, the NWS also produces regularly scheduled severe weather outlooks and updates on various forms of hazardous weather including heavy rain and winter storms.

Hydrology

The water drainage is concentrated entirely in the Big Sioux River Basin, which includes many smaller intermittent tributaries. Within Moody County there are 357.4 stream miles. Moody County is in the physiographic region of South Dakota known as the Prairie Coteau. In most places, the drop from the general upland to stream bottom is abrupt. This is most noticeable along the Big Sioux River where a drop ranging from 100 to 200 feet frequently occurs within a quarter or half-mile.

Transportation and Utility Infrastructure

Moody County's road network is composed of a total of 1,036 miles including federal and state highways, county roads, township roads, municipal street systems, and private roads. The rural road system performs two basic functions: (1) providing general mobility for the residents in rural areas, and (2) accommodating the movements of agricultural products to market. The rural transportation system was not designed to accommodate large volumes of traffic on a daily basis.

South Dakota Highways 32 and 34 are the main east-west routes through the county with Highway 13 being the main north-south route.

The County's road system includes 281 miles of roads. More specifically those roads are composed of 119 gravel road miles, 162 hard surface rural road miles, and 97 bridges, according to South Dakota Department of Transportation. In Moody County, the transportation choices are limited to mostly private automobiles traveling over state highways and county roads.

Moody County has one small airport located in Flandreau. The airport is used primarily by local pilots, crop sprayers, and other light aircraft. The airport does not have any nav-aid or flight service capabilities. There are no major railroads in the county.

The Big Sioux Community Water System serves the majority of all rural residences and communities of Colman, Egan, Trent and Ward. The City of Flandreau operates its own municipal water system. Regarding wastewater disposal, all of the municipalities within the County have municipal wastewater collection and treatment systems. Rural residences rely on individual septic tanks and drainfields. Electric power is provided to rural county residents and people in the communities by Otter Tail Power and Sioux Valley Energy. The City of Colman and Flandreau operate their own municipal power systems. MidAmerican Energy operates a natural gas transmission line through Moody County providing natural gas to businesses and residents in Flandreau. Telephone service is provided by Interstate Telephone Company (ITC), Wow!, Golden West, Century Link and Media Com. Cellular phone service is available in most parts of the county, but there are still places in the county where signals are weak.

Medical and Emergency Services

There is one hospital in Flandreau (Avera Flandreau Medical Center) that serves the needs of the surrounding area. Also, there are two long-term care facilities in the County: Edgewood Assisted Living and Riverview Healthcare Center, in Flandreau.

The County is governed by a five-member board of commissioners. The communities of Colman and Flandreau have their own police departments. The Moody County Sheriff and his deputies provide law enforcement throughout the county.

The Emergency 9-1-1 Center in Flandreau provides 911 services to the Moody County Sheriff's Department and other area agencies as well. Those agencies include:

- Moody County Ambulance Service
- Moody County Emergency Management
- Three volunteer fire departments (Flandreau, Colman, and Trent)
- South Dakota Highway Patrol

CHAPTER 2
PREREQUISITES

ADOPTION BY LOCAL GOVERNING BODY

The local governing body that oversees the update of the Moody County Pre-Disaster Mitigation Plan is the Moody County Board of Commissioners. The Commission has tasked the Moody County Emergency Management Office with the responsibility of ensuring that the PDM is compliant with Federal Emergency Management Agency (FEMA) Guidelines and corresponding regulations.

MULTI-JURISDICTIONAL PLAN PARTICIPATION

Requirement 201.6(c)(5). Local Mitigation Plan Review Tool – E1.
Requirement 201.6(c)(5). Local Mitigation Plan Review Tool – E2.

This plan is a multi-jurisdictional plan which serves the entire geographical area located within the boundaries of Moody County, South Dakota. The County has five incorporated municipalities. All of the incorporated municipalities located entirely within the County elected to participate in the planning process and the update of the existing PDM. Table 2.1 shows the participating local jurisdictions and includes the following utility providers:

Table 2.1: Plan Participants

Continuing Participants	Did Not Participate
Colman	All 16 Townships*
Egan	Big Sioux Community Water
Flandreau	Ottertail Power
Trent	
Ward	
Moody County	
Sioux Valley Energy	

*Townships reviewed hazard history and identified vulnerable infrastructure. Therefore, they are eligible to benefit from future mitigation projects identified by the County.

The townships are not direct participating entities in the plan because these entities are too small, both in population and in resources, to be capable of handling disaster needs on their own. The townships were invited to participate in the PDM update by the PDM Planning Team. First District Association of Local Governments met with township supervisors on February 26, 2020. Townships were asked to review and identify hazard risks, vulnerability, critical infrastructure, and mitigation projects. Eleven of the sixteen townships responded to the request.

The Moody County Commission and each of the listed participating entities will pass resolutions to adopt the updated PDM. The dates of adoption by resolution for each of the jurisdictions are summarized in Table 2.2.

Table 2.2: Dates of Plan Adoption by Jurisdiction

Jurisdiction	Date of Adoption
Moody County Commission	
Colman	
Egan	
Flandreau	
Trent	
Ward	
Sioux Valley Energy	

All the participating jurisdictions were involved in the plan update. Representatives from each municipality, the County, the Townships, local fire departments, utility providers, and local businesses were invited to the planning meetings. Those in attendance provided valuable perspective on the changes required for the plan. All representatives in attendance took part in the risk assessment exercise at the December 18th, 2019 meeting.

Representatives in attendance took information from the PDM planning meetings back to their respective councils/organizations and presented the progress of the plan update. First District staff traveled to each community and met with the local governing body to present community specific information regarding critical infrastructure, hazard vulnerability and identification information, and potential mitigation projects for the updated plan. Representatives of the PDM Team met with First District staff to provide feedback and oversight into the draft plan. Those participants identified in Table 2.1 that did not attend a PDM Planning Team meeting, participated in the planning process by reviewing information relevant to their communities and providing feedback by email or telephone conversations. A final meeting was held to make final comments and corrections and provide a motion to submit the plan to the State Office of Emergency Management. The local jurisdictions/organizations have also presented the Resolution of Adoption to their councils/boards and will pass the resolutions upon FEMA approval of the PDM update. The Resolutions are included in the Appendix.

Table 2.3 was derived to help define “participation” for the local jurisdictions who intend on adopting the plan. To be considered “participating”, each jurisdiction must have at least seven of the ten participation requirements fulfilled.

Table 2.3: Record of Participation

Nature of Participation	Colman	Egan	Flandreau	Trent	Ward	Moody County
Attended Meetings or work sessions (a minimum of 1 meeting will be considered satisfactory).	■	■	■	■	■	■
Submitted inventory and summary of reports and plans relevant to hazard mitigation.	■	■	■	■	■	■
Submitted the Risk Assessment Worksheet.	■	■	■	■	■	■
Submitted description of what is at risk (including local critical facilities and infrastructure at risk from specific Hazards worksheet)	■	■	■	■	■	■
Submitted a description or map of local land-use patterns (current and proposed/ expected).	■	■	■	■		■
Developed goals for the community.	■	■	■	■	■	■
Developed mitigation actions with an analysis/ explanation of why those actions were selected.	■	■	■	■	■	■
Prioritized actions emphasizing relative cost-effectiveness.	■	■	■	■	■	■
Reviewed and commented on draft Plan.						
Hosted opportunities for public involvement (allowed time for public comment at a minimum of 1 city council meeting after giving a status report on the progress of the PDM update)	■	■	■	■	■	■

CHAPTER 3
PLANNING PROCESS

BACKGROUND

The effort that led to the development of this plan is part of the larger, integrated approach to hazard mitigation planning in South Dakota that is led by the South Dakota Office of Emergency Management. Production of the plan was the ultimate responsibility of the Moody County Emergency Management Director, who served as the county's point of contact for all activities associated with this plan. Input was received from the PDM Planning Team that was put together by the Emergency Management Director and whose members are listed below in Table 3.1.

The plan itself was written by an outside contractor, First District Association of Local Governments (First District) of Watertown, South Dakota, one of the state's six regional planning entities. The office has an extensive amount of experience in producing various kinds of planning documents, including municipal ordinances, land use plans, and zoning ordinances, and it is an acknowledged leader in geographic information systems (GIS) technology in South Dakota. First District assisted the County in the development of the county's original PDM in 2007 plus the 2014 PDM plan update. The following staff members of the First District Association of Local Governments were involved in the production of 2020 plan update. Todd Kays, Executive Director, and Payton Schafers, Planner/Economic Development Officer, were the project managers of the plan with assistance from Tom Nealon, Planner. Kays, Nealon, and Schafers attended the PDM Planning Team meetings as the plan was being developed. Amy Arnold, Geographic Information Systems Planner, produced all the maps for the plan. Luke Muller, Planner, directed the floodplain risk analysis (see next section) and completed the county land cover analysis discussed in the previous chapter.

Additional research and information gathering were provided by Payton Schafers. Several other individuals at the state level provided additional support and information that was quite useful. They include:

- Marc Macy, South Dakota National Flood Insurance Program Coordinator – provided classification and information regarding value and number of flood insurance policies and claims, as well as guidance and direction as the plan was being developed.

- South Dakota State Fire Marshall Office – provided information on fire events in the county.

- Whitney Kilts, Department of Environment and Natural Resources, Dam Safety – provided information on dams located in the county.

- Greg Pollreisz, SD Department of Transportation – provided bridges and road mileage information for county.

DOCUMENTATION OF THE PLANNING PROCESS

Methodology

Mitigation planning is a process that communities use to identify policies, activities, and tools to implement mitigation actions. The process that was used to develop this plan consisted of the following steps:

- Planning Framework
- Risk Identification and Assessment
- Mitigation Strategy
- Review of Plan
- Plan Adoption and Maintenance

Planning Framework

The planning framework component identified five objectives:

- Develop Plan to Plan;
- Establish PDM Planning Team
- Define Scope of the Plan;
- Identify Governmental Entities/Stakeholders; and
- Establish PDM Planning Team

Prior to receiving funding public meetings were held at the Moody County Courthouse to inform the public about the required PDM update. Funding from FEMA and the South Dakota Office of Emergency Management to prepare the mitigation plan was awarded to the county in October 2019. Once funding was secured, the Moody County Emergency Management Director and the First District acted as the initial PDM Planning Team in order to discuss the strategy to be used to develop the plan. The first task was to identify those entities/stakeholders that would have direct and indirect interests in the update of the PDM.

Prior to the first public informational meeting, the Chairman of the Moody County Commissioners and Moody County Emergency Management Director wrote letters to all the stakeholders, community organizations, municipalities, townships, utility providers and emergency responders and concerned residents who might wish to volunteer their time and serve on a committee, and to those who would act as a resource for the PDM Planning Team. Emergency Managers in the adjoining counties were extended an invitation via email (see Appendix B). The letters included a brief description of the PDM. Public input was solicited via notices regarding the PDM planning process in local media outlets and via the Internet.

Each individual who was contacted for the PDM Planning Team had at least one of the following attributes to contribute to the planning process:

- Significant understanding of how hazards affect the county and participating jurisdictions.
- Substantial knowledge of the county's infrastructure system.
- Resources at their disposal to assist in the planning effort, such as maps or data on past hazard events.

Table 3.1 lists the PDM Planning Team members, and it includes their attendance at the planning meetings, all of which were open to the public, that were held as the plan was being developed. An agenda was sent out to the PDM Planning Team prior to each meeting, and the meeting minutes were sent to them afterward to keep everybody informed of what was discussed and any decisions that were made.

Table 3.1: Participation in Plan Development

Invited				Meeting Attendance		
Last Name	**First Name**	**Entity Represented**	**Job Title**	**Meeting 1**	**Meeting 2**	**Meeting 3**
Albers	Terry	Moody County Emergency Management	Emergency Director	■		
Blum	Marc	Moody County	Highway Superintendent			
Bonrud	Mark	City of Flandreau	Mayor			
Bruning	Carla	Moody County Commission	Chairman			
Damm	Jonathan	Town of Trent	Chairman of the Board			
Duncan	Brenda	City of Egan	Finance Officer	■		
Groos	Grant	City of Colman	Utilities			
Gulbranson	Merle	City of Colman	LEPC Chairman			
Handberg	Scott	Town of Ward	Mayor			
Hauglid	Michael	City of Colman	Finance Officer	■		
Jarrett	Martin	Big Sioux Water	Manager			
Kays	Todd	First District	Director	■		
Kuehl	Charity	Town of Ward	Finance Officer			
Landis	Jason	Colman Fire Department	Fire Chief			
Nealon	Tom	First District	Planner	■		
Nelson	Kimberly	Town of Trent	Finance Officer			
Nielson	Michele	Sioux Valley Energy	Manager of Engineering			
Pederson	Jeff	City of Flandreau	City Administrator	■		
Peters	Don	Flandreau Fire Department	Fire Chief			
Prokulevich	David	Moody County Ambulance	Director			
Schafers	Payton	First District	Planner			
Scherff	Tom	Trent Fire Department	Fire Chief			
Steinhour	John	City of Egan	Chairman of the Board			
Van Duyn	Gloria	City of Colman	Mayor			
Wellman	Troy	Moody County	Sheriff			
Williams	Chad	Sioux Valley Energy	Manager			

Leadership and guidance in the planning effort and at the planning meetings was provided by the First District staff and the Moody County Emergency Management Director. An agenda was distributed to each PDM Planning Team member prior to each meeting, but free-flowing discussion was always encouraged. When PDM Planning Team members had questions about a topic of discussion, either First District staff or the Emergency Management Director provided supporting information.

Generally speaking, the planning process associated with the plan's development was relaxed and informal. No subcommittees were formed, and all decisions were made by mutual consensus of the PDM Planning Team members - no votes were taken or motions made. Everyone's opinion was respected, nobody was discouraged from voicing their opinion, and no one was made to feel any less important than anyone else.

As the PDM Planning Team was being assembled, arrangements were made for the first PDM Planning Team meeting, which took place at the Moody County Courthouse in Flandreau on December 18th, 2019. An agenda was distributed to prospective PDM Planning Team members. The Appendix includes a copy of each meeting agenda, the signup sheet from each meeting, and the minutes from each meeting.

Those who attended the December 2020 meeting for the PDM update were asked to volunteer to serve on the PDM Planning Team. The PDM Planning Team was tasked with fostering coordination between the various entities involved; reviewing the drafts and providing comments after First District Association of Local Governments staff initiated changes to the existing plan. There were no external contributors such as contractors or private businesses, other than local utility providers. Each of the local jurisdictions had a member of their respective councils represent the municipalities in the plan.

The representatives from the municipalities were asked to share the progress of the plan at their council meetings and to ensure that those attending the council meetings were aware that they are invited to make comments on and participate in the process of updating the new plan. Comments provided by local residents at the city council and PDM Planning Team meetings were collected and incorporated into the plan. Representatives from jurisdictions who did not attend a PDM Planning Team meeting were informed of meeting outcomes and provided comment during the drafting stages and when the First District met with the local governing body.

The public was provided several opportunities to comment on the plan during the drafting stages at the PDM Planning Team Meetings and City Council Meetings. There were several work sessions and public hearings held to keep the public updated and involved in the plan. Primarily, public input included the involvement in hazard assessment and mitigation projects. Those who were most involved were the representatives of the PDM Planning Team and representatives from the municipalities. The municipalities put the PDM update on the agenda at their council meetings and allowed people to comment at the meetings. Table 3.2 identifies the location and date of each opportunity that was provided for the public to comment and how it was advertised.

The first meeting of the PDM Planning Team served to introduce the participants to the concept of mitigation planning; why the plan was being updated and how the process would proceed in the months to come (scheduling, assigning responsibilities, etc.). The meeting also included a review of the existing plan, which led to two important decisions. First, it was the consensus opinion of the PDM Planning Team that a comprehensive rewrite of the plan would be needed. The PDM Planning Team decided that:

- The 2014 PDM did not include all of the necessary requirements found in the Local Hazard Plan Review Tool (2011). Thus, to ensure that the updated plan included everything required by the plan review tool, the PDM Planning Team and community meetings used the plan review tool to guide the discussions. The 2014 PDM was then compared to the new plan review tool and any portion of the 2014 PDM that was not needed to fulfill the new crosswalk requirements was eliminated and deficiencies were noted as areas of focus.

- More information and data regarding the risk assessment was needed, more informative tables and maps would be helpful, and the mitigation strategy needed to be rethought.

- The risk identification and assessment as well as the identification of critical infrastructure and local municipal goals and objectives should be completed by the First District prior to the next meeting of the PDM Planning Team.

Table 3.2: Opportunities for Public Comment

Location of Opportunity	Date	Type of Participation			How Was Meeting Advertised	
		City Council or County Commission Meeting	PDM Meeting	Township Annual Meeting	Public Notice	Website
Colman	02/10/20	■			■	
Egan	01/15/20	■			■	
Flandreau	03/16/20	■			■	■
Trent	01/14/20	■			■	
Ward	02/10/20	■			■	
Moody County Townships	02/26/20			■	■	
Moody County	PDM Grant Application 2018					
	12/18/19		■		■	

Risk Identification & Assessment/Mitigation Strategy/Review of Plan
Requirement 201.6(c)(1). Local Mitigation Plan Review Tool – A1.
Requirement 201.6(b)(1). Local Mitigation Plan Review Tool – A3.
Requirement 201.6(b)(3). Local Mitigation Plan Review Tool – A4.
Requirement 201.6(d)(3). Local Mitigation Plan Review Tool – D3.

The Risk Identification and Assessment component identified three objectives: Collect and Organize Data, Develop GIS Data, and Analyze Data. The Mitigation Strategy component identified five objectives: Review Existing PDM and other plans, Formation of Goals/Objectives, Compile existing resources to accomplish goals/objectives, Public review of Goals/Objectives, and PDM Planning Team Review of goals/objectives. The Review of PDM component identified three objectives: Writing of PDM, Public Review of PDM, and PDM Planning Team Review of PDM.

Based upon the discussions and information provided at the first meeting, it was determined that the existing PDM Risk Assessment and Mitigation Strategies were sufficient and that an update and review of sections were needed. Before the second meeting, First District Staff revised or created the Introduction, Pre-requisites, Risk Assessment, Mitigation Strategy, and Plan Implementation components of the PDM. First District also met with each participating jurisdiction to review proposed mitigation actions, including estimated costs, responsibility and priority.

Prior to the second PDM Planning Team meeting, First District Staff met with the participating municipalities and the Moody County Townships at public noticed meetings to identify hazards and critical facilities, assess vulnerability, discuss development trends, and develop mitigation goals. Meeting dates are referenced in Table 3.2. Staff members/representatives from Moody County municipalities, Moody County Townships, and rural utility providers were asked to identify hazards and critical facilities, assess vulnerability, discuss development trends, and develop mitigation goals and review these items with each respective governing body (if applicable). First District staff also conducted research regarding the history of disaster events in the county, including events that had occurred since the original plan was developed.

First District also conducted a technical review of existing documents. This review incorporated existing plans, studies, reports, technical information, zoning and flood damage prevention ordinances into the PDM Update. It should be noted that most of the planning documents of each of the communities had been previously developed by the First District. However, the Town of Ward did not have such planning documents. Additionally, the 2014 PDM plan was used as a resource for the new plan because most of the natural hazard profile research had already been completed when it was drafted. In addition to the PDM, the First District reviewed several other existing documents including but not limited to the State of South Dakota Hazard Mitigation Plan, Moody County Hazardous Materials Plan, and Flood Insurance Rate Maps for the local jurisdictions. A summary of the technical review and incorporation of existing plans is included in Table 3.3.

The list of hazards that the PDM Planning Team decided to focus on is presented in Chapter 4. A profile of each of the hazards was begun at this meeting. The profile included information from each of the participating jurisdictions about how the hazard affected their community. Discussion also occurred regarding the existing strategies being used to mitigate each hazard, with a particular emphasis on the critical and essential facilities in each community.

The PDM Planning Team also dealt with the Mitigation Strategy at the December 2019 meeting. Formation of the strategy began with a review of the results of the risk assessment, which led to discussion about the goals to be achieved with the mitigation plan. The list of goals is included in Chapter 5.

On April 9th, a preliminary draft of the plan was posted on the First District website and the PDM team and adjoining county Emergency Managers were provided forty-five days to comment on the draft prior to the second and third PDM Team meetings held in May of 2020.

At the second PDM Team meeting, held on _____, Risk Identification/Assessment was discussed. The PDM Planning Team reviewed the updates prepared by the First District. This included first a review of the hazards identified in the State of South Dakota Hazard Mitigation Plan and that risk assessment portion of the existing 2014 PDM plan. First District staff also provided an overview of the information regarding critical facilities, risk identification, hazard vulnerability and mitigation goals identified by the County's municipalities.

At the meeting, the PDM Planning Team identified goals for the PDM Update and compared those goals to those identified in the 2014 PDM. In addition, the PDM Planning Team reviewed the list of proposed actions included in the previous mitigation plan and discussion followed about the progress that had been made on implementing the actions. Specific mitigation actions recently identified by the participating jurisdictions were also discussed.

The rest of the meeting was spent reviewing the priorities and the mitigation actions identified by the participating entities. There was also discussion on how the plan would be implemented. It was emphasized that cooperation between the county and the participating jurisdictions was especially important, and discussion occurred about how this could best be achieved. Representatives from the jurisdictions were made aware of the critical role they needed to play to ensure the success of the mitigation strategy, such as implementing specific mitigation actions. The Emergency Management Director emphasized the importance of ensuring that no local decisions be made or actions taken contrary to the goals of this plan. Also, responsible parties were identified for reporting on progress being made to implement the proposed mitigation actions, for evaluating the plan's overall effectiveness, and for getting the public more involved in the planning process.

At the end of the meeting the First District was instructed to conduct an internal review of the document. The updated draft plan was also to be posted on the First District Association of Local Governments and Moody County websites and notice was emailed to all of the participants and to the emergency managers in the neighboring counties of: Brookings, Lake, and Minnehaha.

The third and final meeting of the PDM Planning Team was subsequently held on _____ to review and discuss the final draft as amended based upon comments from the planning team and communities. At the meeting, the PDM Planning Team recommended that the plan be submitted to South Dakota Office of Emergency Management for their review and to FEMA. The final draft of the plan was again posted on the First District Association of Local Governments website and emailed to all of the participants.

Table 3.3: Record of Review (Summary)

Existing Program/Policy/Technical Documents	Local Jurisdiction						Referenced in Plan
	Colman	Egan	Flandreau	Trent	Ward	Moody County	
Comprehensive Plan	✓	✓	✓	✓	NA	✓	Appendix F
Capital Improvement Plan	NA	NA	✓	NA	NA	NA	Appendix C
Flood Damage Prevention Ordinance	✓	✓	✓	✓	NA	✓	Pg. 44-46
Economic Development Plan	NA	NA	NA	NA	NA	NA	Pg. 93-94
Local Emergency Operations Plan	C	C	C	C	C	✓	Pg. 18
Transportation Plan	C	C	C	C	C	✓	Pg. 8-9
Flood Insurance Studies or Engineering studies for streams	✓	✓	✓	✓	NA	✓	Pg. 44-46
Hazard Vulnerability Analysis (by the local Emergency Management Agency)	✓	✓	✓	✓	✓	✓	Pg. 21
Emergency Operations Plan	C	C	C	C	C	✓	Pg. 44
Zoning Ordinance	✓	✓	✓	✓	NA	✓	Pg. 54-55
Site Plan Review	✓	✓	✓	✓	NA	✓	Pg. 91
Subdivision Ordinance	✓	✓	✓	✓	NA	✓	Pg. 55
Drainage Ordinance	NA	NA	NA	NA	NA	✓	Pg. 55
Floodplain Ordinance	✓	✓	✓	✓	NA	✓	Pg. 55
Existing Land Use maps	✓	✓	✓	✓	NA	✓	Appendix F
State Hazard Mitigation Plan	✓	✓	✓	✓	✓	✓	All Chapters

NA The jurisdiction does not have this program/policy/technical document.

O The jurisdiction has the program/policy/technical document but did not review/incorporate it in the mitigation plan.

C The jurisdiction is regulated under the County's policy/program/technical document.

✓ The jurisdiction reviewed the program/policy/technical document.

CHAPTER 4
RISK ASSESSMENT

IDENTIFICATION OF HAZARDS

Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B1.

In this chapter, the hazards that were identified by the PDM Planning Team as having the most significance for the County are analyzed. As part of the analysis, various maps and tables were produced and are included within this chapter. The planning participants began the risk assessment process by reviewing the State of South Dakota Hazard Mitigation Plan. The PDM Planning Team also reviewed records of hazard events that have occurred in the county since 2000, relying primarily on the Spatial Hazard Events and Losses Database for the United States (SHELDUS), compiled by the University of South Carolina's Hazards and Vulnerability Research Institute and data from the National Climatic Data Center's Storm Events Database. A summary of the findings for significant hazard occurrences from the past ten years is provided below in Table 4.1: The PDM Planning Team also identified potential hazards by observing development patterns, interviews from towns and townships, public meetings, PDM work sessions, previous disaster declarations and research of the history of hazard occurrences located within the County.

Table 4.1: Significant Hazard Occurrences 2009-2019

Type of Hazard	# of Occurrences Since 2009	Source
Drought	10	NOAA & University of Nebraska-Lincoln
Wildfire/Forest Fire	47	NOAA & State Fire Marshall's Office
Flood	58	NOAA & SHELDUS
Hail	23	NOAA & SHELDUS
Lightning	2	NOAA & SHELDUS
Tornado	0	NOAA & SHELDUS
Temperature Extremes	17	NOAA & SHELDUS
Winter Storms	16	NOAA & SHELDUS
Thunderstorm and High Wind	34	NOAA & SHELDUS

Hazards were analyzed in terms of the hazard's probability of occurrence in the county. Representatives from each participating jurisdiction and the PDM Planning Team were asked to complete worksheets that categorized hazards by the likelihood of occurrence for either their specific geographical location, or for county-wide risks.

Every possible hazard or disaster was evaluated and placed into one of three separate columns depending on the likelihood of the disaster occurring in the PDM jurisdiction. Hazards that occur at least once a year or more were placed in the High Probability column; hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis were placed in the low probability column; and hazards or disasters that have never occurred in the area before and are unlikely to occur in the PDM jurisdiction any time in the future were placed in the Unlikely to Occur column. While man-made hazards were discussed briefly during the completion of the worksheets, the PDM Planning Team decided to eliminate man-made hazards from the PDM because those types of hazards are difficult to predict and assess due to wide variations in the types, frequencies, and locations. Types and scopes of manmade hazards are unlimited.

Due to the topographical features of the County and the nature of the natural hazards that affect the geographical area covered by this PDM, most areas of the county have similar likelihood of being affected by the natural hazards identified. Only the natural hazards from the High Probability and Low Probability Columns will be further evaluated throughout this plan, with an emphasis on the High Probability hazards. All hazards in the Unlikely to Occur column will not be further evaluated in the plan. Table 4.2 is an adjusted list of hazards produced from the FEMA worksheets completed by each participating jurisdiction and the PDM Planning Team.

Table 4.2: Hazards Categorized by Likelihood of Occurrence

High Probability	Low Probability	Unlikely to Occur
Extreme Cold	Drought	Ice Jam
Extreme Heat	Flood	Dam Failure
Freezing Rain/Sleet/Ice	Tornado	Earthquake*
Hail	Urban Fire	Subsidence
Heavy Rain/Snow	Wildfire	
Lightning		
Rapid Snow Melt		
Strong Winds		
Thunderstorm		

TYPES OF NATURAL HAZARDS IN THE PDM JURISDICTION AREA

Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B1.

Some descriptions of the natural hazards likely to occur in the County were taken directly from the 2014 Moody County PDM. Most of the descriptions were revised for better clarity. For the purpose of consistency throughout the plan, additional definitions were included to reflect all the hazards that have a chance of occurring in the area and all the hazards are alphabetized. For all the hazards identified, the probability of future occurrence is expected to be the same for all the jurisdictions covered in the PDM.

Blizzards are a snowstorm that lasts at least three hours with sustained wind speeds of thirty-five miles per hour (mph) or greater, visibility of less than one-quarter mile, temperatures lower than 20°F and white out conditions. Snow accumulations vary, but another contributing factor is loose snow existing on the ground which can get whipped up and aggravate the white out conditions. When such conditions arise, blizzard warnings or severe blizzard warnings are issued. Severe blizzard conditions exist when winds obtain speeds of at least forty-five mph plus a great density of falling or blowing snow and a temperature of 10°F or lower. At least one blizzard should occur each year in Moody County.

Drought is an extended period of months or years when a region notes a deficiency in its water supply. Generally, this occurs when a region receives consistently below average precipitation. It can have a substantial impact on the ecosystem and agriculture of the affected region. Although droughts can persist for several years, even a short, intense drought can cause significant damage and harm the local economy. This global phenomenon has a widespread impact on agriculture. The chance of drought events occurring annually is low.

Dam Failure Dams function to serve the needs of flood control, recreation, and water management. During a flood, a dam's ability to serve as a control agent may be challenged. An excessive amount of water may result in a dam breach, simply an overflowing. Dams that are old or unstable, dams that receive extreme amounts of water, or dams that get debris pile-up behind their face may result in dam failure, a cracking and/or breaking. Moody County has five (5) dams, with none of the dams having the potential to endanger lives or damage property. Dam failure was considered unlikely to occur by the PDM Planning Team and Communities, however, is detailed here because it was determined to be the most likely of the "Unlikely to Occur" hazards.

Earthquakes are a sudden rapid shaking of the earth caused by the shifting of rock beneath the earth's surface. Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and often cause landslides, flash floods, fires, avalanches, and tsunamis. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks and are followed by vibrations of gradually diminishing force called aftershocks. The underground point of origin of an earthquake is called its focus; the point on the surface directly above the focus is the epicenter. The Richter Scale measures earthquake intensity. The potential for an earthquake to occur in the County is less than 1% annually.

Extreme Cold What constitutes extreme cold and its effects can vary across different areas of the country. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered "extreme cold," however, Eastern South Dakota is prone to much more extreme temperatures than other areas in the country. Temperatures typically range between zero degrees Fahrenheit and 100 degrees Fahrenheit, so extreme cold could be defined in the Moody County PDM jurisdiction area as temperatures below zero. The Wind Chill Chart is used to measure extreme cold. At least one extreme cold event should occur each year.

Extreme Heat, also known as a Heat Wave, is a prolonged period of excessively hot weather, which may be accompanied by high humidity. There is no universal definition of a heat wave; the term is relative to the usual weather in the area. Temperatures in the County have a very wide range typically between 0 to 100 degrees Fahrenheit, therefore anything outside those ranges could be considered extreme. The term is applied both to routine weather variations and to extraordinary spells of heat which may occur only once a century. The Heat Index measures the impact of extreme heat on people and livestock.

Flooding is an overflow of water that submerges land, producing measurable property damage or forcing evacuation of people and vital resources. Floods can develop slowly as rivers swell during an extended period of rain, or during a warming trend following a heavy snow. Even a very small stream or dry creek bed can overflow and create flooding. Two different types of flooding hazards are present within the County.

1. Inundation flooding occurs most often in the spring. The greatest risks are realized typically during a rapid snowmelt, before ice is completely off all of the rivers.

2. Flash flooding is more typically realized during the summer months. This flooding is primarily localized, though enough rain can be produced to cause inundation flooding in areas along the Big Sioux River and its tributaries. Heavy, slow moving thunderstorms often produce large amounts of rain. The threat of flooding would be increased during times of high soil moisture.

National Flood Insurance Rate maps designate 100-year and 500-year floodplain zones. Areas subject to inundation by the 1-percent-annual-chance flood event are designated 100-year floodplain. Moderate risk areas within the 0.2-percent-annual-chance floodplain are designated 500-year floodplain. Moody County should anticipate having one flood event each year.

Freezing Rain/Ice occurs when temperatures drop below thirty degrees Fahrenheit and rain starts to fall. Freezing rain covers objects with ice, creating dangerous conditions due to slippery surfaces, platforms, sidewalks, roads, and highways. Sometimes ice is unnoticeable and is then referred to as black ice. Black ice creates dangerous conditions, especially for traffic. Additionally, a quarter inch of frozen rain can significantly damage trees, electrical wires, weaken structures, and other objects due to the additional weight bearing down on them.

Hail is formed through rising currents of air in a storm. These currents carry water droplets to a height at which they freeze and subsequently fall to earth as round ice particles. Hailstones usually consist mostly of water ice and measure between 5 and 150 millimeters in diameter, with the larger stones coming from severe and dangerous thunderstorms. The County has a 100% potential for hail occurring each year.

Heavy Rain is defined as precipitation falling with intensity in excess of 0.30 inches (0.762 cm) per hour. Short periods of intense rainfall can cause flash flooding while longer periods of widespread heavy rain can cause rivers to overflow. At least one heavy rain event will occur in the County annually.

Ice Jams occur when warm temperatures and heavy rain cause snow to melt rapidly. Snow melt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of the river. The ice layer often breaks into large chunks, which float downstream and often pile up near narrow passages and other obstructions, such as bridges and dams.

Landslide is a geological phenomenon which includes a wide range of ground movement, such as rock falls, deep failure of slopes and shallow debris flows, which can occur in offshore, coastal and onshore environments. Although the action of gravity is the primary driving force for a landslide to occur, there are other contributing factors build up specific sub-surface conditions that make the area/slope prone to failure, whereas the actual landslide often requires a trigger before being released.

Lightning results from a buildup of electrical charges that happens during the formation of a thunderstorm. The rapidly rising air within the cloud, combined with precipitation movement within the cloud, results in these charges. Giant sparks of electricity occur between the positive and negative charges both within the atmosphere and between the cloud and the ground. When the potential between the positive and negative charges becomes too great, there is a discharge of electricity, known as lightning. Lightning bolts reach temperatures near 50,000˚ F in a split second. The rapid heating and expansion, and cooling of air near the lightning bolt causes thunder. There is a 100% chance of lightning occurring in Moody County each year.

Severe Winter Storms deposit four or more inches of snow in a twelve-hour period or six inches of snow during a twenty-four-hour period. Such storms are generally classified into four categories with some taking the characteristics of several categories during distinct phases of the storm. These categories include freezing rain, sleet, snow, and blizzard. Generally winter storms can range from moderate snow to blizzard conditions and can occur between October and April. The months of May, June, July, August, and September could possibly see snow, though the chance of a storm is very minimal. Like summer storms, winter storms are considered a weather event not a natural hazard, and thus will not be evaluated as a natural hazard throughout this PDM.

Sleet does not generally cling to objects like freezing rain, but it does make the ground very slippery. This also increases the number of traffic accidents and personal injuries due to falls. Sleet can severely slow down operations within a community. Not only is there a danger of slipping, but with wind, sleet pellets become powerful projectiles that may damage structures, vehicles, or other objects.

Snow is a common occurrence throughout the County during the months from October to April. Average annual snowfall for the county is about thirty inches. Accumulations in dry years can be as little as five to ten inches, while wet years can see yearly totals up to eighty inches. Snow is a major contributing factor to flooding, primarily during the spring months of melting.

Strong winds are usually defined as winds over forty miles per hour, are not uncommon in the area. Winds over fifty miles per hour can be expected twice each summer. Strong winds can cause destruction of property and create safety hazards resulting from flying debris. Strong winds also include severe localized wind blasting down from thunderstorms. These downward blasts of air are categorized as either microbursts or macrobursts depending on the amount geographical area they cover. Microbursts cover an area less than 2.5 miles in diameter and macrobursts cover an area greater than 2.5 miles in diameter. Multiple strong wind events will occur in the County annually.

Subsidence is defined as the motion of a surface as it shifts downward relative to a datum. The opposite of subsidence is uplift, which results in an increase in elevation. There are several types of subsidence such as dissolution of limestone, mining-induced, faulting induced, isostatic rebound, extraction of natural gas, groundwater related, and seasonal effects.

Summer Storms are generally defined as atmospheric hazards resulting from changes in temperature and air pressure which cause thunderstorms that may cause hail, lightning, strong winds, and tornados. Summer storms are considered a weather event rather than a natural hazard; therefore, summer storms are not evaluated as a natural hazard throughout this PDM.

Thunderstorms are formed when moisture, rapidly rising warm air, and a lifting mechanism such as clashing warm and cold air masses combine. The three most dangerous items associated with thunderstorms are hail, lightning, and strong winds.

Tornados are violent windstorms that may occur singularly or in multiples as a result of severe thunderstorms. They develop when cool air overrides warm air, causing the warm air to rapidly rise. Many of these resulting vortices stay in the atmosphere, though touchdown can occur. The Fujita Tornado Damage Scale categorizes tornadoes based on their wind speed:

F0=winds less than 73 m/h
F1=winds 73-112 m/h
F2=winds 113-157 m/h
F3=winds 158-206 m/h
F4=winds 207-260 m/h
F5=winds 261-318 m/h
F6=winds greater than 318 m/h

Wildfires are uncontrolled conflagrations that spread freely through the environment. Other names such as brush fire, bushfire, forest fire, grass fire, hill fire, peat fire, vegetation fire, and wildfire may be used to describe the same phenomenon. A wildfire differs from the other fires by its extensive size; the speed at which it can spread out from its original source; its ability to change direction unexpectedly; and to jump gaps, such as roads, rivers and fire breaks.

Fires start when an ignition source is brought into contact with a combustible material that is subjected to sufficient heat and has an adequate supply of oxygen from the ambient air. Ignition may be triggered by natural sources such as a lightning strike or may be attributed to a human source such as "discarded cigarettes, sparks from equipment, and arched power lines. The Keetch-Byram Drought Index assesses the risk of fire due to drought. Multiple wildfires will occur in the County annually.

Climate Change is a long-term change in the earth's climate, especially a change due to an increase in the average atmospheric temperature. In particular, a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels. Rising temperatures may lead to more climate and weather hazards of greater intensity such as flooding, droughts, severe storms, and winter storms. Many scientists consider climate change a global phenomenon.

HAZARD PROFILE

Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B1.
Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B2.
Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B3.

It should be stated that most of the hazards identified in the previous section have the potential of occurring anywhere in the County. A brief section about the history of each hazard's occurrence in the county is provided. Table 4.3 below shows all of the Presidential Disaster Declarations that have involved the county. Information on previous occurrences – the location, the extent (i.e., magnitude or severity) of each hazard, and probability of future events (i.e., chance or occurrence) are listed individually by the type of hazard in the following tables.

Table 4.3: Presidential Disaster Declarations in South Dakota Including Moody County

Date	Disaster Dec #	Type	Total Damage	FEMA Disaster Relief Costs
4/18/1969	257	Flooding	$4,599,306	
6/11/1984	717	Severe Storms and Flooding		
7/2/1992	948	Flooding, Severe Storms, and Tornadoes		
7/19/1993	999	Severe Storms, Tornadoes and Flooding	$53,068,748	
5/26/1995	1052	Flooding	$35,649,349	
1/5/1996	1075	Severe Winter Storm	$13,085,649	
1/10/1997	1156	Severe Winter Storm and Blizzard	$19,455,263	
4/7/1997	1173	Severe Winter Storm and Severe Flooding	$87,069,429	
5/17/2001	1375	Severe Winter Storm and Flooding		$9,919,599
7/9/2008	1774	Severe Storm and Flooding		$4,716,310
5/13/2010	1915	Flooding		$21,781,678
11/2/10	1947	Severe Storm and Flooding		$1,079,973
5/13/2011	1984	Flooding		$52,124,070
6/7/2019	4440	Severe Winter Storm, Snowstorm, and Flooding	$45,736,036	$2,476,454

SOURCE: http://www.fema.gov/news/disasters.fema

While the PDM Planning Team reviewed all hazard occurrences that have been reported in the last 100 years, the list for some of the hazards was extremely long. The information provided in the tables is not a complete history report, but rather an overview of the hazard events which have occurred over the last ten years. The PDM Planning Team felt the hazard trend for the last ten years could be summarized in this section and decided to include any new occurrence that have taken place since the previous 2014 PDM was drafted.

DAM FAILURE

Dam breach or failure is of lesser concern for the citizens of the County than flooding. Moody County has a number of structures, which are not considered a risk to residents, but are used to control or regulate flow from one water body to another. The South Dakota Department of Environment and Natural Resources has identified five (5) dams in the County. They include: Jacobs Dam, Bauske Dam, Loiseau Dam, Paulson Dam, Warren Jackson Dam. Further, there is a spillway in the northern portion of Flandreau on the Sioux River, but is not high risk since there are no structures or people affected downstream.

4.4 Dam Locations in Moody County

Ownership Type	Location	Water Body
Private	NW1/4 SW1/4 5-T107N-R47W	Mud Creek - tributary
Private	SW1/4 NW1/4 8-T107N-R48W	Big Sioux River - tributary
Private	SW1/4 NE1/4 20-T107N-R48W	Big Sioux River - tributary
Private	SE1/4 SE1/4 31-T108N-R47W	Mud Creek - tributary
Private	SW1/4 NW1/4 2-T106N-R49W	Squaw Creek - tributary

DROUGHT

South Dakota's climate is characterized by cold winters and warm to hot summers. There is usually light moisture in the winter and marginal to adequate moisture for the growing season for crops in the eastern portion of the state. Semi-arid conditions prevail in the western portion. This combination of hot summers and limited precipitation in a semi-arid climatic region places South Dakota present a potential position of suffering a drought in any given year. The climatic conditions are such that a small departure in the normal precipitation during the hot peak growing period of July and August could produce a partial or total crop failure.

The fact South Dakota's economy is closely tied to agriculture only magnifies the potential loss which could be suffered by the state's economy during drought conditions. Roughly every fifty years a significant drought is experienced within the county, while many less severe droughts can occur at times every three years. Table 4.5 identifies the ten-year drought history for the County. Data regarding droughts is only available at the county level.

Table 4.5: Moody County 10-Year Drought History

Location	Date Start	Date End	Type
Moody County	10/11/11	02/14/12	Moderate Drought
Moody County	02/14/12	02/28/12	Severe Drought
Moody County	02/28/12	05/08/12	Moderate to Severe Drought
Moody County	07/10/12	07/17/12	Moderate Drought
Moody County	07/17/12	09/04/12	Severe Drought
Moody County	09/04/12	10/16/12	Severe Drought to Extreme Drought
Moody County	10/16/12	11/13/12	Extreme Drought
Moody County	11/13/12	4/16/13	Severe Drought to Extreme Drought
Moody County	04/16/13	5/28/13	Moderate Drought
Moody County	09/24/13	10/08/13	Moderate Drought

SOURCE: http://droughtmonitor.unl.edu; http://www.ncdc.noaa.gov/stormevents

Major Drought Occurrences:

- **1987-1990:** An abnormally low amount of precipitation in the summer of 1987 combined with a hot and dry summer during 1988, left South Dakota in dire straits. Agricultural income was down 0.8% and wheat price per bushel decreased significantly.

- **1930s:** During the infamous dust bowl years, Moody County was not spared a fair share of problems. Particularly dry summers were in 1934 and 1936.

- **1880s-1890s:** The years 1887, 1894-1896, 1898-1901 were very dry years. The National Weather Service has several fire danger informational items located on their website.

- **July 2012 to April 2013** - Drought conditions continued over all the area with below normal rainfall keeping soil conditions dry. Stress on crops continued even though August was less hot than July, with temperatures averaging only a little above normal. Crop damage was quite evident, though the amount of reduced yields and other damage which might become evident at harvest was uncertain. While reported water supply problems were not extreme, many local governments had water use restrictions in place. Drought was generally listed as severe to extreme for the area and was being compared to the worst of the dust bowl years, though not

yet over as long a time period. Below normal rainfall continued to aggravate existing long-term dry soil conditions, and stress on crops continued despite less hot weather than in July. Crop damage including certain reduced crop yields was very apparent, although the amount of yield reduction and other damage was still highly uncertain before harvest. Corn continued to be the crop suspected of enduring the most damage, with some recovery potential for soybeans in the less hot weather. The drought was also leading to local water use restrictions.

WILDFIRE

A strong possibility exists for simultaneous emergencies during droughts. Wildfires are the most common. While researching the hazard occurrences that have taken place in the County, it became evident that the information found on the NOAA and SHELDUS websites was incomplete. Therefore, other sources were contacted whenever possible. Specifically, NOAA had one occurrence listed for wildfires in the County, but the State Fire Marshal's Office (SFMO) was contacted to verify that information. That SFMO information is derived from the reports submitted by the local fire departments who respond to the fires. Representatives from the SFMO explained that since many of the fire departments in the County are Volunteer Fire Departments many times wildfires are extinguished, and reports are never filed with the State. Thus, the information provided by the SFMO is not entirely complete either. For the purpose of this PDM, we have used the numbers provided by the SFMO as a point of reference in determining the likelihood of a wildfire hazard occurrence within the jurisdiction. The information provided by SFMO identifies 47 structure fire responses, 46 vehicle fire responses, and 122 outside fire responses reported from 2009-2018. The cause of the outside fires is not listed, so it is not known for certain whether all or some of these fires resulted due to a natural hazard occurrence or as a result of human behavior. Additionally, SFMO provided information about the number of injuries and fatalities reported as a result of these fires. According to the records provided, from 2009 to 2018 one civilian injury, one civilian death, and zero fire service deaths or injuries were attributed to fires in Moody County.

Table 4.6 identifies the number of fire department responses to structural, vehicle and outside fires that have been experienced within the county. It should be noted that the number of responses does not necessarily mean that there were 20 outside (wildfire) fires as some fires required multiple departments to respond. The data compiled by the SMFO is not discriminate enough to determine whether a fire can be classified as an urban fire or wildfire.

Table 4.6:
Moody County Structural, Vehicle and Outside (Wildfire) Department Responses

Year	Structural Fires	Vehicle Fires	Outside Fires
2009	5	4	20
2010	6	5	14
2011	4	3	8
2012	8	0	16
2013	0	2	7
2014	5	7	8
2015	9	7	12
2016	2	11	11
2017	3	2	18

Year	Structural Fires	Vehicle Fires	Outside Fires
2018	5	5	8
Total	**47**	**46**	**122**

SOURCE: South Dakota State Fire Marshal Office

FLOOD

Flooding is a temporary overflow of water onto lands not normally covered by water producing measurable property damage or forcing evacuation of people and resources. Floods can result in injuries and even loss of life when quickly moving water is involved. Six inches of moving water is enough to sweep a vehicle off a road. Disruption of communication, transportation, electric service, and community services, along with contamination of water supplies and transportation accidents are very possible. Table 4.7 is a flood history in the County from 2010-2019.

Table 4.7: Moody County 10-year Flood History

Location or County	Date	Time	Property Damage
Flandreau	3/14/2010	6:00	0.00K
Flandreau	6/13/2010	6:00	0.00K
Flandreau	9/23/2010	6:00	100.00K
Flandreau	10/1/2010	0:00	0.00K
Colman	3/17/2011	6:00	0.00K
Colman	4/1/2011	0:00	200.00K
Flandreau	7/12/2011	6:00	0.00K
Flandreau	5/6/2012	6:00	0.00K
Colman	6/16/2014	18:25	50.00K
Flandreau	3/23/2018	04:00	0.00K
Colman	3/24/2018	08:00	0.00K
Flandreau	6/25/2018	18:00	0.00K
Flandreau	7/20/2018	06:00	0.00K
Colman	3/18/2019	02:00	0.00K
Flandreau	6/01/2019	00:00	0.00K
Flandreau	9/11/2019	11:30	350.00K
Colman	9/12/2019	03:30	5.00K

SOURCE: http://www.ncdc.noaa.gov/stormevents

Major Flood Occurrences:

- **General History:** Typically, the most significant damage comes from poor runoff and saturated ground. However, ground saturation, rising water in potholes, ditches, and sloughs represent a higher historic problem. Flooding occurs primarily in the Sioux River Basin. Flooding, as a natural hazard, has been a part of the county's conflict with nature throughout history. Moody County has this river traversing near the communities of Egan, Flandreau, and Trent. Several creeks feed into the river that can cause municipal flooding and township and county roads can be washed out. The spring flood danger period generally occurs during March and April. A wet fall, early freeze with saturated ground at the time of freezing, heavy

winter precipitation, and warm rains during and after spring thaw add to the seriousness of the spring flooding situation. Spring flooding along the Sioux River in Moody County is a yearly event in that the normal winter snow melt is likely to push the river beyond flood stage.

- **Colman –** During high water events, water backs up in the center of town near Main Street that affects businesses and area residents.

- **Egan, Flandreau and Trent –** The Sioux River affects the western edge of Trent and the eastern side of Egan. The main affect is agricultural land with no public facilities or residents in danger. Preventative measures are in place until water recedes. The City of Flandreau experiences flooding 1 mile east of town affecting a city park, golf course and some private residents. As with Egan and Trent, preventative measures are taken until the water recedes since this is generally a yearly event based on snow and rain amounts.

- **Moody County –** Roads, culverts, and bridges are periodically affected by flooding either by sloughs or roads and bridges on the Sioux River. Erosion along bridge abutments is a continual problem.

- **September 2010 –** Heavy rain, combined with saturated ground from a summer of record rainfall, caused moderate to major flooding of the Big Sioux River beginning on September 22nd, and continuing to the end of the month. Flooding of numerous roads much farmland, and some homes was reported. Widespread heavy rain, combined with saturated ground, caused a fairly rapid rise of the Big Sioux River to moderate to major flooding levels. Roads and numerous agricultural lands near the river were flooded. Several homes near the river were flooded, and several people were evacuated. Damage to homes and some roads was reported, although the known damage was thought to be a small part of the total damage.

- **March to April 2011** - Major flooding of the Big Sioux River, other streams, lakes, and general flooding, which began with a rapid March snowmelt, continued through April. Water levels, having fallen from March peaks, rose again at various times during the month, and were generally falling again by the end of the month. However, any fall of water levels was very slow. Widespread flooding of farmland continued. Many roads remained flooded with heavy road damage being reported in some areas. High water and groundwater levels resulting from record precipitation in the previous year was the main reason that improvement was so slow. Major flooding of the Big Sioux River, as well as flooding of lakes and lowlands in the county, continued through April, though small stream flooding abated and flooding in other areas such as the city of Flandreau abated some. Some farmland remained flooded, both near to and away from the Big Sioux River. A few roads remained closed by the flooding for part of the month. Water was covering some other roads, mainly from flooded lowlands. Some roads were damaged. High water and groundwater levels from record precipitation in the year 2010, a main reason the flooding onset was so fast in March, was also a main reason that the flooding subsided so slowly during April.

- **September 2019 -** Spurred by a period of excessive precipitation from September 10-12 that resulted in 5 to 10 inches of rainfall in the middle to upper reaches of the Big Sioux River Basin and 2 to 5 inches from Sioux Falls downstream, extreme rises

occurred mid-month, with many basin locations reaching record stages. Recreational usage of the Big Sioux River, Split Rock Creek and Skunk Creek (in Moody, Minnehaha, Lincoln and Union counties) was banned for much of the remainder of the month. After excessive two-day rainfall during September 10-12 (6.57 inches near Aurora, 6.55 inches 3 miles west southwest of Brookings, 6.27 inches 8 miles south of Brookings), the Big Sioux River near Brookings (gage site BRKS2) reached the second highest stage on record of 5.39 feet above flood stage on September 13. Numerous county roads and bridges were inundated, with a few farm outbuildings engulfed in water. Agricultural flooding was extensive.

HAIL

Table 4.8 indicates twenty (20) hail occurrences by location throughout the county since 2010. However, the information provided by the NOAA and SHELDUS websites was incomplete due to inconsistent reporting of damage after such hazards occurred. Obviously, with such a high number of occurrences it is reasonable to expect that at least some property or crop damage was sustained in the communities during some of the occurrences, even though the damage may not have been reported or recorded. It is possible that such damage was not reported because it was believed to be insignificant at the time, or because those responsible for reporting such information did not report to the proper agencies. One event in July of 2010 reported $25,000 in property damage. Since 2010 there have been 14 events with hail of at least one inch in diameter, including 1 event with hail exceeding 1.75 inches in diameter.

Table 4.8: Moody County 10-year Hail History

Location or County	Date	Time	Type	Magnitude	Property Damage
Flandreau	7/17/2010	19:37	Hail	1.50 in.	25.0K
Flandreau Municipal Airport	9/14/2010	23:30	Hail	1.00 in.	0.00K
Lone Tree	9/22/2010	17:26	Hail	1.50 in.	0.00K
Flandreau	3/19/2012	12:24	Hail	1.00 in.	0.00K
Flandreau	3/19/2012	12:26	Hail	0.75 in.	0.00K
Colman	5/5/2012	9:20	Hail	0.75 in.	0.00K
Colman	5/5/2012	20:30	Hail	1.00 in.	0.00K
Flandreau Municipal Airportt	6/29/2012	16:40	Hail	0.75 in.	0.00K
Flandreau Municipal Airport	6/29/2012	16:47	Hail	1.00 in.	0.00K
Trent	6/22/2013	21:08	Hail	1.00 in.	0.00K
Trent	7/19/2014	07:35	Hail	0.88 in.	0.00K
Trent	7/19/2014	07:36	Hail	1.00 in.	0.00K
Flandreau	7/24/2014	12:32	Hail	1.00 in.	0.00K
Colman	6/03/2015	06:28	Hail	1.25 in.	0.00K
Flandreau	6/09/2015	17:57	Hail	0.88 in.	0.00K
Colman	6/11/2017	05:05	Hail	1.00 in.	0.00K
Flandreau	6/11/2017	05:20	Hail	1.00 in.	0.00K
Flandreau	6/11/2017	05:23	Hail	1.00 in.	0.00K

Location or County	Date	Time	Type	Magnitude	Property Damage
Trent	8/13/2017	16:56	Hail	1.75 in.	0.00K
Colman	6/11/2019	15:00	Hail	0.75 in.	0.00K

SOURCE: http://www.ncdc.noaa.gov/stormevents

LIGHTNING

The extent or severity of lightning can range from significant to insignificant depending on where it strikes and what structures are hit. Water towers, cell phone towers, power lines, trees, and common buildings and structures all have the possibility of being struck by lightning. People who leave shelter during thunderstorms to watch or follow lightning also have the possibility of being struck by lightning. According to Sheldus and NOAA the lightning history for the past ten years denotes one (1) occurrences where damage was reported (See Table 4.9); however, possibility exists that the information reported is incomplete. It is also important to note that while only one occurrence of lightening related damage was reported, lightning strikes are very common in all South Dakota counties.

Table 4.9: Moody County 10-year Lightning History

Location	Date	Time	Type	Property Damage
Flandreau	5/10/2011	1:30	Lightning	20.00K

SOURCE: http://www.ncdc.noaa.gov/stormevents

TORNADO

The annual risk for intense summer storms is very high. The entire County is susceptible to summer storms. Warning time for summer storms is normally several hours, sufficient for relocation and evacuation if necessary. However, tornadoes may occur with little or no warning. Between the years of 1956 and 2020, the County confirmed ten (10) tornadoes. Table 4.10 includes the tornado history in the County since 1993.

Table 4.10: Moody County 10-year Tornado History

Location	Date	Time	Type	Magnitude	Property Damage
Colman	05/07/1993	17:55	Tornado	F1	500.00K
Egan	06/24/2003	21:50	Tornado	F0	0.00K
Colman	09/16/2006	15:56	Tornado	F0	0.00K
Trent	06/05/2008	20:00	Tornado	EF1	10.00K

SOURCE: http://www.ncdc.noaa.gov/stormevents

Major Tornado Occurrences:

- **May 1993 -** A tornado touched down intermittently on a northeast path through Moody County causing various kinds of damage (Estimated $500,000). South of Colman the tornado hit a farm killing 23 pigs, damaging tractors and equipment, and moving the rafters in a house. At

7:10 p.m. a 30,000 lb. semi-truck traveling west on SD highway 34 became temporarily airborne and was thrown into the ditch damaging the truck beyond repair but not hurting the driver. At 7:25 p.m., the tornado hit a farm two miles west of Ward shearing off the top of a silo and damaging the barn and garage.

- **June 2008 -** Thunderstorms produced numerous events of tornadoes, large hail and damaging winds over southeast South Dakota from late morning through the evening of June 5th. Near Trent South Dakota, a tornado blew a 40 by 100-foot metal machine shed a quarter mile, destroyed an outbuilding, and damaged trees.

Each year, many storms and a few tornadoes affect the county. Summer storms in the County usually produce a wide range of damage making damage estimates very difficult. A complete listing of all summer storms having occurred within the county is not possible due to inaccurate reporting. The National Weather Service reports online were the primary source for this information.

EXTREME TEMPERATURES

Extreme temperatures in the County are common occurrences. It is expected that at least two times each year there will be extreme heat or extreme cold in the area. The following information was found on the SHELDUS and NOAA websites. It is possible that people in the area have adapted to this type of extreme temperatures and thus such weather events are not reported as often as they occur. It is also possible that the information has only in recent years been tracked or reported. Table 4.11 identifies dates and times of the temperature extremes.

The location in table 4.11 is not specifically identified in the table by jurisdiction due to the vast area across the State of South Dakota affected by extreme temperatures. On January 13, 2009, after a clipper system dropped from one to four inches of snow, Arctic air and blustery north winds pushed into the area. The coldest air and the lowest wind chills of the season spread across much of central and northeast South Dakota. Wind chills fell to thirty-five to forty-five degrees below zero late in the evening of the thirteenth and remained through the fourteenth. By the morning of January 15, 2009, the Arctic high-pressure area settled in across northeast South Dakota, bringing wind chills as low as sixty degrees below zero. Many vehicles did not start because of the extreme cold and several schools had delayed starts. Daytime highs remained well below zero across the area. This was one of the coldest days that most areas experienced since the early 1970s.

The coldest air in recent history started with an unusually strong and cold area of high pressure surged into the northern Plains in early March 2019. Winds were mainly a gusty 20 to 35 mph, and when coupled with temperatures from 10 below to 20 below zero, produced a long duration of wind chills colder than 20 below zero. Coldest wind chills were recorded between 0400-0900 on March 3, reaching -51 near Oak Lake, -48 at Volga, -47 at Flandreau and White Lake, -46 at Colton and 5 miles south of Hendricks, -45 at Windom, Worthington and near Sioux Falls, and -44 at Huron, Brookings and Madison. March 3 was one of the coldest March days on record for the area, with the coldest or second coldest March high temperatures on record at Huron, Sioux Falls, Mitchell and Sioux City. With these types of temperature extremes, the biggest concern for people is exposure because prolonged exposure means almost certain death.

The counterpart to extreme cold is extreme heat which also has dangerous implications to humans, livestock, and critical structures and facilities if certain conditions are present. A temperature extreme occurrence took place between July 2 and July 6, 2012 when record heat and high humidity affected southeast South Dakota. Heat indices rose to 110 degrees across the area.

A recent excessive heat event took place when very hot and very humid weather, with daytime temperatures reaching the 95 to 100 degree range, brought the heat index to 100 to 115 degrees during the afternoon hours of July 19th through July 23rd. Emergency rooms at hospitals reported that an unknown number of people suffered heat stress, heat exhaustion, or dehydration, although no lasting heat related illnesses were reported. Dew points in the 70s over the area reflected the very high humidity, with dew points at a few places peaking at or just above 80 degrees.

Table 4.11: Moody County 10-year History of Extreme Temperatures

Location	Date	Time	Type
Moody County	01/14/2009	18:00	Extreme Cold/Wind Chill
Moody County	01/07/2010	12:00	Extreme Cold/Wind Chill
Moody County	02/01/2011	00:00	Extreme Cold/Wind Chill
Moody County	07/15/2011	12:00	Excessive Heat
Moody County	07/02/2012	11:00	Excessive Heat
Moody County	07/16/2012	11:00	Excessive Heat
Moody County	12/23/2013	01:00	Extreme Cold/Wind Chill
Moody County	01/23/2014	05:00	Extreme Cold/Wind Chill
Moody County	03/02/2014	02:00	Extreme Cold/Wind Chill
Moody County	01/16/2016	21:00	Extreme Cold/Wind Chill
Moody County	06/10/2016	11:00	Excessive Heat
Moody County	07/20/2016	12:00	Excessive Heat
Moody County	06/29/2019	12:00	Excessive Heat
Moody County	12/30/2017	08:00	Extreme Cold/Wind Chill
Moody County	01/01/2018	00:00	Extreme Cold/Wind Chill
Moody County	01/15/2018	00:00	Extreme Cold/Wind Chill
Moody County	03/03/2019	02:00	Extreme Cold/Wind Chill

SOURCE: http://www.ncdc.noaa.gov/stormevents

THUNDERSTORMS/HIGH WIND

Thunderstorms and high wind occurrences in the County are also very common. According to the National Climatic Data Center Storm Events database, the County experienced seventy-two (72) wind events from 1990-2019. Table 4.12 denotes the extent and severity of such hazards occurring in the last ten years. In addition, one occurrence of thunderstorm wind peak at 75 mph was recorded in Flandreau on May 5, 2012. The community experienced $1,000,000 in damage as a result of the storm. The County continues to educate residents of the dangers of such storms through public service announcements and other printed media.

Table 4.12: Moody County 10-year History for Thunderstorms/High Wind

Location	Date	Time	Type	Mag (mph)	Property Damage
Flandreau	07/14/2009	15:52	Thunderstorm Wind	52 kts. EG	0.00K
Flandreau	07/14/2009	15:53	Thunderstorm Wind	61 kts. EG	0.00K
Egan	06/11/2010	02:05	Thunderstorm Wind	61 kts. EG	0.00K
Egan	07/23/2010	21:03	Thunderstorm Wind	61 kts. EG	10.00K
Flandreau	07/23/2010	21:04	Thunderstorm Wind	52 kts. EG	0.00K
Moody County	10/26/2010	07:00	High Wind	52 kts. EG	0.00K
Egan	07/01/2011	14:15	Thunderstorm Wind	70 kts. EG	10.00K
Colman	07/01/2011	14:25	Thunderstorm Wind	61 kts. EG	0.00K
Sioux Falls Jct	07/01/2011	14:25	Thunderstorm Wind	56 kts. EG	50.00K
Flandreau	07/01/2011	14:30	Thunderstorm Wind	61 kts. EG	300.00K
Trent	03/19/2012	12:20	Thunderstorm Wind	52 kts. EG	5.00K
Flandreau	05/05/2012	20:57	Thunderstorm Wind	63 kts. MG	0.00K
Flandreau	05/05/2012	21:00	Thunderstorm Wind	65 kts. EG	1.000M
Flandreau Airport	05/05/2012	22:22	Thunderstorm Wind	61 kts. EG	5.00K
Flandreau	09/04/2012	20:05	Thunderstorm Wind	52 kts. EG	0.00K
Moody County	01/26/2014	12:00	High Wind	50 kts. EG	0.00K
Flandreau	08/06/2015	18:45	Thunderstorm Wind	61 kts. EG	0.00K
Flandreau	08/06/2015	18:57	Thunderstorm Wind	54 kts. MG	0.00K
Trent	08/09/2015	18:17	Thunderstorm Wind	56 kts. EG	0.00K
Moody County	02/19/2016	04:30	High Wind	36 kts. ES	0.00K
Flandreau	06/03/2016	16:50	Thunderstorm Wind	52 kts. EG	0.00K
Moody County	12/25/2016	23:00	High Wind	52 kts. MG	0.00K
Colman	05/28/2017	17:45	Thunderstorm Wind	56 kts. EG	0.00K
Colman	05/28/2017	17:45	Thunderstorm Wind	61 kts. EG	0.00K
Flandreau	07/22/2017	01:09	Thunderstorm Wind	56 kts. EG	0.00K
Flandreau	07/22/2017	01:21	Thunderstorm Wind	56 kts. EG	0.00K
Colman	09/19/2017	22:18	Thunderstorm Wind	65 kts. EG	25.00K

Location	Date	Time	Type	Mag (mph)	Property Damage
Colman	09/19/2017	22:21	Thunderstorm Wind	70 kts. EG	0.00K
Flandreau Airport	06/15/2019	17:45	Thunderstorm Wind	55 kts. MG	0.00K
Flandreau	07/20/2019	06:57	Thunderstorm Wind	61 kts. EG	0.00K
Flandreau	07/20/2019	06:59	Thunderstorm Wind	61 kts. MG	0.00K
Colman	08/17/2019	20:53	Thunderstorm Wind	56 kts. EG	0.00K
Colman	08/17/2019	21:00	Thunderstorm Wind	52 kts. EG	0.00K
Flandreau Airport	08/17/2019	21:10	Thunderstorm Wind	65 kts. EG	100.00K

SOURCE: http://www.ncdc.noaa.gov/stormevents

Major Wind Occurrences:

- **August 2005 -** Thunderstorm winds destroyed a barn near Trent by moving it 100 feet off its foundation, after which it collapsed. The collapsing barn heavily damaged a stock trailer. The winds also blew off part of the roof of a barn on a nearby farm. Tree damage was significant, with over 20 trees blown down, as well as numerous branches on other trees. One large branch that fell damaged a car and the roof of a house. $30,000 property damage.

- **July 2011** - Thunderstorm winds caused widespread tree damage in Flandreau, including numerous trees uprooted or snapped. Several homes and vehicles were damaged, mostly by falling trees or tree debris. A large camper in the city park was overturned. The winds and tree debris also damaged power lines, causing a power outage. Tree debris blocked numerous roads in and near town. $200,000 property damage.

- **May 2012** - Thunderstorm winds caused widespread damage in the south part of Flandreau. Roofs on homes, apartment buildings, and other buildings were blown off or damaged. The roof of a large church was blown off, and parts of the roof damaged nearby homes. The Flandreau city office building had part of its south wall blown off, resulting in interior damage to ceiling tiles and insulation. Siding on other walls of this building and on numerous homes was damaged. Tree damage was widespread, including several trees blown down or uprooted. The winds blew down power lines, leaving parts of the city without power for almost three hours. $1,000,000 property damage.

WINTER STORMS

Freezing Rain/Sleet/Ice and Heavy Snow are components of winter storms and included under this profile. Table 4.13 shows just how common snow and ice storms are in the County. While such storms would be considered extreme in many parts of the State, the consistent nature of such weather hazards are expected in this area. Thus, planning and response mechanisms for snow and ice storms are vital to the County and are routine procedures in the County due to the common nature of such storms. Winter storms in South Dakota are known to cover large geographical areas, often an entire county or multiple counties can be affected by a single storm. All the storms identified in Table 4.13 were considered to have occurred countywide. Due to the multiple occurrences of winter storms each year, an exhaustive compilation is not possible.

Table 4.13 Moody County 10-year History of Snow and Ice Storms

Location	Date	Time	Type	Property Damage
Moody County	01/12/2009	12:00	Blizzard	0.00K
Moody County	12/23/2009	15:00	Blizzard	0.00K
Moody County	01/06/2010	10:00	Winter Storm	0.00K
Moody County	12/11/2010	00:00	Blizzard	0.00K
Moody County	12/20/2010	06:00	Heavy Snow	0.00K
Moody County	12/31/2010	06:00	Winter Storm	0.00K
Moody County	01/31/2011	10:00	Winter Storm	0.00K
Moody County	02/20/2011	03:00	Heavy Snow	0.00K
Moody County	12/9/2012	10:00	Blizzard	0.00K
Moody County	02/10/2013	16:00	Blizzard	0.00K
Moody County	04/09/2013	03:00	Winter Storm	0.00K
Moody County	11/05/2013	13:00	Heavy Snow	0.00K
Moody County	12/03/2013	18:00	Winter Storm	0.00K
Moody County	01/16/2014	11:00	Blizzard	0.00K
Moody County	12/15/2014	08:00	Winter Storm	0.00K
Moody County	01/05/2015	11:00	Winter Storm	0.00K
Moody County	01/08/2015	14:00	Blizzard	0.00K
Moody County	11/30/2015	02:00	Winter Storm	0.00K
Moody County	12/01/2015	00:00	Winter Storm	0.00K
Moody County	12/15/2015	22:00	Heavy Snow	0.00K
Moody County	12/25/2015	20:00	Winter Storm	0.00K
Moody County	02/02/2016	07:00	Blizzard	0.00K
Moody County	03/23/2016	10:00	Winter Storm	0.00K
Moody County	11/18/2016	04:00	Winter Storm	0.00K
Moody County	12/16/2016	11:00	Winter Storm	0.00K
Moody County	01/24/2017	15:00	Winter Storm	0.00K
Moody County	02/23/2017	16:00	Blizzard	0.00K
Moody County	03/12/2017	17:00	Heavy Snow	0.00K
Moody County	03/23/2018	20:00	Winter Storm	0.00K
Moody County	04/13/2018	19:00	Blizzard	0.00K
Moody County	12/27/2018	09:00	Winter Storm	0.00K
Moody County	03/09/2019	04:00	Winter Storm	0.00K
Moody County	04/11/2019	03:00	Blizzard	840.00K

SOURCE: http://www.ncdc.noaa.gov/stormevents

Major Winter Storm Occurrences:

- **November 1996 through April 1997** - An ice storm consisting of several periods of freezing rain caused widespread damage and paralyzed travel. Widespread damage occurred to electrical poles and lines, leaving thousands without power for up to four days. There were numerous reports of people stranded in their vehicles after going into the ditch or getting stuck in snowdrifts. Many school districts cancelled school. Many ranchers faced the possibility of losing part of their cattle herd due to the cold and being unable to get food to them. Many buildings were beginning to fail from the weight of the snow of this storm and the previous one. There were reports of people getting stranded in vehicles for up to 40 hours. Numerous accidents occurred, including many vehicles which slid off the road. Two fatalities occurred 9 miles south of Coleman when a car slid off a gravel road and into a stream, drowning the occupants, also on November 14th. Tree damage was widespread with tree debris blocking several roads and sidewalks. Governor Janklow declared the state a disaster area. This was followed with President Clinton approving the first ever request for a major statewide snow emergency disaster in South Dakota. The National Guard, State DOT, and Private Contractors along with out of state resources were called in to help with snow removal as many communities had already spent their snow removal money before the storm.

- **April 2018** - The most intense storm of the month, in fact many months, wrapped up across the central Plains on April 13, spreading a mix of wintry precipitation across the area, accompanied by numerous thunderstorms. Eventually, influx of colder air would change all precipitation over to snow and ushered in a record-breaking snowfall of 8 to 16 inches (some locations over 20 inches). Life threatening conditions developed during the late evening of April 13, as the earlier mix of rain, sleet and snow changed to all snow, and brutal winds (gusting as high as 55 mph at Flandreau) whipped visibility to less than a quarter mile at times through the afternoon of April 14. State offices were closed, and schools cancelled on April 13. Travel was not recommended for much of the two-day period, if not impossible. Interstate 29 was closed from the North Dakota border to Sioux Falls 2000CST April 13 and remained closed until 0800CST April 15. A storm total snowfall of 10.5 inches was measured at Flandreau.

- **April 2019** - Blizzard conditions led to a shutdown of government offices and schools, and travel was not recommended due to the widespread whiteout conditions. Interstate 29 was closed from the evening of April 10 through noon on April 12. Storm-total snowfall from 4 to 8 inches occurred, with 8.0 inches 11 miles north of Colman and 5.4 inches at Flandreau. With winds gusting at times from 40 to 50 mph, many areas had snow drifts of several feet, making roads impassable. Ice accumulation of one-quarter to one-half inch occurred, resulting in scattered power outages as wind increased. At the peak, electric companies and cooperatives estimated as many as 25,000 customers were without power. Property damage costs include damage to utilities.

ASSESSING VULNERABILITY: OVERVIEW

Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B1.
Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B2.
Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B3.

Hazards were also analyzed in terms of the level of the community or county's vulnerability to the hazard. Vulnerability to the hazard is the susceptibility of life, property, and the environment to injury or damage if a hazard occurs. Representatives from each participating jurisdiction and the PDM Planning Team were asked to complete worksheets that rated their perception to

vulnerability of hazards for either their specific geographical location, or for county-wide risks. A low vulnerability hazard is one that has very low damage potential to either life or property (minor damage to less than 5% of the jurisdiction). A “medium” vulnerability hazard is unlikely to threaten human life, although some people may be at risk, but may pose moderate damage potential (causing partial damage to 5% to 10% of the jurisdiction, on an irregular occurrence). A “high” vulnerability hazard may threaten human life, and more than ten percent of the jurisdiction may be at risk on a regular occurrence. Table 4.14 below is an overall summary of vulnerability by jurisdiction produced from the FEMA worksheets completed by each participating jurisdiction and PDM Planning Team. Also see Tables 5.1-5.12 for additional strategies and solutions that jurisdictions are taking to mitigate high-priority hazards.

Table 4.14: Overall Summary of Vulnerability by Jurisdiction

Type of Disaster	Moody County	Colman	Egan	Flandreau	Trent	Ward
Dam Failure	L	L	N	L	N	N
Drought	H	L	L	M	L	L
Earthquake	N	N	N	N	N	N
Extreme Cold	M	L	L	M	L	M
Extreme Heat	M	L	L	M	L	M
Flood	M	L	M	M	H	M
Freezing Rain/Sleet/Ice	H	M	M	L	M	H
Hail	M	L	L	L	M	H
Heavy Rain	H	L	H	L	M	H
Heavy Snow	H	L	L	L	M	H
Ice Jam	M	N	N	L	L	N
Landslide	N	N	N	N	N	N
Lightning	H	L	M	L	L	M
Rapid Snow Melt	H	M	M	L	L	M
Strong Winds	H	M	M	M	M	H
Thunderstorm	H	L	M	L	M	H
Tornado	M	H	H	H	H	H
Urban Fire	M	M	L	H	L	L
Utility Interruption	H	M	M	H	L	H
Wildfire	M	L	L	N	N	L

N : Not applicable; not a hazard to the jurisdiction

L : Low risk/vulnerability; little damage potential (minor damage to less than 5% of the jurisdiction)

M : Medium risk/vulnerability; moderate damage potential (causing partial damage to 5-10% of the jurisdiction, and irregular occurrence)

H : High risk/vulnerability; significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and/or regular occurrence)

The following paragraphs summarize the description of the jurisdiction’s vulnerability to each hazard and the impact of each hazard on the jurisdiction**.**

Blizzards are characterized by high winds, blowing snow, cold temperatures, and low visibility. Blizzards create conditions such as icy roads, closed roads, downed power lines and trees. The County's population is especially vulnerable to these conditions because people tend to leave their homes to get to places such as work, school, and stores rather than staying inside. Traffic is one of the biggest hazards in the County during a blizzard because people often get stuck, stranded, and lost when driving their vehicles which usually prompts others such as family and or emergency responders to go out in the conditions to rescue them.

Drought can be defined as a period of prolonged lack of moisture. High temperatures, high winds, and low relative humidity all result from droughts and are caused by droughts. A decrease in the amount of precipitation can adversely affect stream flows and reservoirs, lakes, and groundwater levels. Crops and other vegetation are harmed when moisture is not present within the soil.

South Dakota's climate is characterized by cold winters and warm to hot summers. There is usually light moisture in the winter and marginal to adequate moisture for the growing season for crops in the eastern portion of the state. Semi-arid conditions prevail in the western portion. This combination of hot summers and limited precipitation in a semi-arid climatic region present a potential position of suffering a drought in any given year. The climatic conditions are such that a small departure in the normal precipitation during the hot peak growing period of July and August could produce a partial or total crop failure. South Dakota's economy is closely tied to agriculture only magnifies the potential loss which could be suffered by the state's economy during drought conditions. Roughly every fifty years a significant drought is experienced within the county, while less severe droughts have occurred as often as every three years.

Earthquakes occur in the area but have not had a great enough magnitude or intensity in the past ten years to be reported. The magnitude and intensity of an earthquake is measured by the Richter scale and the Mercalli scale. An earthquake of noteworthy magnitude has not occurred in the county for decades, but it would be reasonable to expect that a large earthquake would have comparative impact on the County as it would anywhere else. The County does not have skyscrapers or very many tall buildings, but it also does not have codes in place that require homes or buildings to be retrofitted.

Extreme Cold temperatures often accompany a winter storm, so you may have to cope with power failures and icy roads. Whenever temperatures drop decidedly below normal and as wind speed increases, heat can leave your body more rapidly. These weather-related conditions may lead to serious health problems. Extreme cold is a dangerous situation that can bring on health emergencies in susceptible people, such as those without shelter or who are stranded, or who live in a home that is poorly insulated or without heat. Exposure is the biggest threat/vulnerability to human life; however, incidences of exposure are isolated and thus unlikely to happen in masses.

Extreme Heat Severe heat waves have caused catastrophic crop damage, thousands of deaths from hyperthermia, and widespread power failures due to increased use of air conditioning. Loss of power and crop damage are the largest vulnerabilities to the county during extreme heat. Both have an effect on quality of life, however, neither are detrimental to the existence of the population of the County.

Flooding can result in injuries and even loss of life when quickly moving water is involved. Six inches of moving water is enough to sweep a vehicle off a road. Disruption of communication, transportation, electric service, and community services, along with contamination of water supplies and transportation accidents are very possible.

The county is networked with a series of creeks and tributaries, which are part of the Big Sioux River watershed. This area receives several large thunderstorms per year that can cause intense rainfall for short periods of time, resulting in water feeding the Big Sioux River through its respective tributaries. In addition to flooding caused by rainfall, the area surrounding the Big Sioux River is subject to flood damage because of the possibility of extensive snowpack and subsequent spring snowmelt flooding.

There have also been past issues dealing with the maintenance and clearing of drainage channels in the area that have resulted in obstructions restricting the flow of water during a storm. Some residents live in the 100-year flood plain located in the Big Sioux River watershed.

Conditions, at times, make response and evacuation operations, very difficult, adversely affecting the safety of residents. The flooding of township roads is a concern for the entire county. Township officials have identified areas that are either vulnerable or have experienced recurring damages. These areas are identified in maps contained in Appendix E.

Freezing Rain causes adverse conditions such as slippery surfaces and extra weight buildup on power lines, poles, trees, and structures. The additional weight can often cause weak structures to cave in and cause tree branches and power lines to break and fall. The County and the local jurisdictions within are susceptible to these conditions due to the types of structures and surfaces that exist in the county that cannot be protected from freezing rain. Traffic on the roads and highways tend to be the biggest hazard during freezing rain conditions because vehicles often slide off the road which prompts emergency responders and others to have to go out on rescue missions in the adverse conditions.

Hail causes damage to property such as crops, vehicles, windows, roofs, and structures. The County and its local jurisdictions are vulnerable to hail, like most other areas in the State due to the nature of the hazard. Mitigating for hail is difficult and is usually found in the form of insurance policies for structures, vehicles, and crops.

Heavy Rain causes damage to property such as homes and roads. Often when heavy rains occur in the County it may cause sewers to backup in homes due to excess water entering the wastewater collection lines. The excess water sometimes has no place to go and thus basements fill up with water which results in damage to water heaters, furnaces, and damage to living quarters for people who live in basement apartments. Roads and bridges can be washed out, thus causing traffic hazards for travelers and commuters. Many times the roads have to be closed causing rural traffic to have to take alternate routes which can sometimes be an additional five to ten miles out of the way. All areas of the County are vulnerable when heavy rains occur. Storm sewers are built for the typical storm and therefore do not accommodate for excessive or heavy rains.

Ice Jams cause damage to bridges, roads, and culverts due to water currents pushing large chunks of ice under or through small openings. There are 97 bridges and many more culverts throughout Moody County which are at risk for ice jams.

Lightning often strikes the tallest objects within the area. In towns, trees and poles often receive the most strikes. In rural areas, shorter objects are more vulnerable to being struck. Electrical lines and poles are also vulnerable because of their height and charge. In addition, many streetlights function with sensors. Since thunderstorms occur primarily during hours of darkness, lightning strikes close to censored lights cause the lights to go out, causing a potential hazard for drivers. Flickering lights and short blackouts are not at all uncommon in the county.

One of lightning's dangerous attributes includes the ability to cause fires. Since the entire county is vulnerable to lightning strikes and subsequent fires, these fires will be treated under the fire section of this PDM.

Most injuries from lightning occur near the end of thunderstorms. Individuals who sought shelter leave those areas prior to the entire completion of the thunderstorm. Believing it is safe to freely move around, concluding lightning strikes catch them off guard.

Severe Winter Storms have a high risk of occurrence. Approximately five snowstorms each resulting in five to ten inches of snow occur in the County area annually. Heavy snow can immobilize transportation, down power lines and trees, and cause the collapsing of weaker structures. Livestock and wildlife are also very vulnerable during periods of heavy snow. Most storms can be considered to have occurred countywide. Due to the multiple occurrences of winter storms each year, an exhaustive compilation is not possible.

Additionally, winter storms often result in some forms of utility mishaps. High voltage electric transmission/distribution lines run the length of the County. These lines are susceptible to breaking under freezing rain and icy conditions and severing during high blizzard winds. Any electrical complications bring associated risk of food spoilage, appliance burnout, loss of water, and potential harm for in-house life support users. Limited loss of power is not uncommon on an annual basis. A typical power interruption lasts from one to three hours. Most residents are prepared to deal with this type of inconvenience.

The greatest danger during winter weather is traveling. Many individuals venture out in inclement weather. Reasons include the necessity of getting to work, going to school, going out just to see how the weather is, and to rescue stranded persons.

Snow Drifts are caused by wind blowing snow and cold temperatures. These drifts can be small finger drifts on roadways causing cautionary driving, or twenty to forty-foot-high drifts that block entire highways, roads, and farmyards for several days.

Populations at highest vulnerability for this type of hazard are rural homeowners, which account for approximately forty-seven percent of the county, and the elderly. As with any weather event, those dependent upon healthcare supplies and other essentials will also bear the brunt of highway closures and slowed transportation due to snow and ice. Emergency services will also be delayed during winter storms.

Snow removal policies and emergency response is at excellent performance and no projects will be considered in this area. Generators provide back-up power to many critical facilities within the municipalities and in rural areas. However, some of the critical facilities that could be utilized in disaster situations do not have backup generators. Also, some facilities have generators that only power a portion of operations.

Strong Winds can be detrimental to the area. Trees, poles, power lines, and weak structures are all susceptible and vulnerable to strong winds. When strong winds knock down trees, poles, power lines, and structures it creates additional traffic hazards for travelers and commuters. Strong winds are a common occurrence in all parts of the County. The farming community tends to be vulnerable because many old farm sites have weak, dilapidated, or crumbling structures or structures such as grain bins which can easily be blown over. Another area of particular vulnerability would be those areas with dense tree growth where dead or decaying trees lose their stability and can be blown over or knocked down easily.

Thunderstorms cause lightning and sometimes large amounts of rain in a small timeframe. The entire county experiences thunderstorms on a regular basis and is only vulnerable when weather events outside the norm occur. Specific vulnerabilities are further identified in the paragraphs for "Lightning" and "Heavy Rains".

Tornadoes present significant danger and occur most often in South Dakota during the months of May, June, and July. The greatest period of tornado activity (about 82 percent of occurrence) is from eleven a.m. to midnight. Within this time frame, most tornadoes occur between four p.m. and six p.m. The annual risk for intense summer storms is very high. Often associated with summer storms are utility problems. High voltage electrical transmission lines run the length of the County. These lines are susceptible to breaking during high winds and hail. Tall trees located near electrical lines can be broken in wind or by lightning strikes and land on electrical lines, severing connections. Any electrical complications bring associated risk of food spoilage, appliance burnout, loss of water, and potential harm to in-house life support dependents. Limited loss of power is common on an annual basis. Typical power interruptions last around one to three hours. Most residents are prepared to deal with this.

Wildfires occur primarily during drought conditions. Wildfires can cause extensive damage, both to property and human life, and can occur anywhere in the county. Even though wildfires can have various beneficial effects on wilderness areas for plant species that are dependent on the effects of fire for growth and reproduction, large wildfires often have detrimental atmospheric consequences, and too frequent wildfires may cause other negative ecological effects. Current techniques may permit and even encourage fires in some regions as a means of minimizing or removing sources of fuel from any wildfire that might develop.

Since there are no remote forested regions in Moody County, wildfires can be easily spotted and are capable of being maintained. The County does not have any areas that are considered wildland-urban interface because property outside city limits is primarily agricultural land, thus, there are no urban interface areas of risk in the County. In addition, fire interference with traffic on highways is not a major concern. The most important factor in mitigating against wildfires continues to be common sense and adherence to burning regulations and suggestions disseminated by the County.

Moisture amounts have the biggest impact on fire situations. During wet years, fire danger is low. More controlled burns are conducted, and fewer mishaps occur. During dry years, severe restrictions are placed on any types of burns. For information on dealing with open/controlled burning within the county, see SDCL 34-29B and SDCL 34-35.

ASSESSING VULNERABILITY: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

Requirement 201.6(c)(3)(ii). Local Mitigation Plan Review Tool – C2.

Moody County participates in the National Flood Insurance Program (NFIP). The municipalities of Colman, Egan, Flandreau, and Trent participate in the NFIP, while Ward does not. The county and participating municipalities' initial involvement in the NFIP began as the communities were mapped between 1974 and 1977. All the participating municipalities currently utilize the most recently updated flood hazard boundary map. The effective date for those maps was August 19, 2008. The map identifies Zone "A" of the flood hazard areas, without identifying elevations at risk 100-year and 500-year flood events. The county as well as the municipalities of Colman, Egan, Flandreau and Trent; as well as Moody County will continue to participate and ensure compliance of the participating local jurisdictions located within the flood plain.

Floodplain management requirements are administered by the Floodplain Administrator as described in Table 4.18 and follow floodplain regulations described in the local jurisdiction's zoning ordinance in the participating communities.

Table 4.15:
Communities Participating in the National Flood Program, Moody County, SD

Community Name	Community ID	Current Map Effective Date
Moody County	460235	8/19/08(M)
Colman	460106	(NSFHA)
Egan	460061	8/19/08(M)
Flandreau	460062	8/19/08
Trent	460063	8/19/08
Ward	***Not Participating***	

The Moody County Emergency Management Office maintains the flood zone maps and utilizes DFIRMS for all planning mechanisms occurring in the unincorporated areas of the county; specifically, development of new structures. Each individual participating community has a designated floodplain administrator that requires elevation certificates and issues floodplain development permits for structures constructed within Zone A of the identified flood hazard areas. The DFIRMS are used to determine where the natural drainage occurs and ensures that new development will not interrupt the natural drainage. The Moody County Emergency Management Office has the DFIRMS in electronic format and thus will utilize and maintain the maps in the electronic format.

ADDRESSING VULNERABILTY: REPETITIVE LOSS PROPERTIES

Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B4

Due to various geomorphologic and topographical conditions, periodic flooding affects numerous areas in both incorporated and unincorporated areas of the County. Property adjacent to the Big Sioux River is most prone to flooding in Moody County. Residential development occurred adjacent to the Big Sioux River long before the initial flood hazard boundaries being identified in 1974. As a result, numerous structures already existed at the time of adoption of the first map and continue to be lived in today. Numerous structures are located within Flood Hazard Areas currently identified as Zone A. Many structures located within the County have experienced flooding or are required to be insured against flood due to their proximity to special flood hazard areas. The County has a total of 22 flood insurance policy holders. The vast majority of those policies insure residents adjacent to the Big Sioux River.

Table 4.16: Moody County National Flood Insurance Program Statistics

Community Name	Current NFIP Policies	Number of Claims Paid Since 1978	Total Value of Claims Paid	Policies for Structures in A-Zones	Repetitive Loss Properties
City of Flandreau	3	9	$75,293	2	0
Town of Trent	9	17	$111,910	8	2
Unincorporated areas of Moody County	10	32	$398,302	9	5
Totals	**22**	**58**	**$585,505**	**16**	**7**

SOURCE: South Dakota State NFIP Coordinator

The PDM Planning Team focused attention particularly on flood related issues. An issue of primary concern the number of times specific properties and structures on those properties flood. In Moody County there have been seven incidences of repetitive loss claims throughout the county, as compared to zero in the 2014 PDM. Repetitive loss properties are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any ten-year period. A goal of the County is to protect specific areas in the county from flooding. This goal aims to protect properties prone to flood losses but does not discount the possibility that in some cases structures located in the floodplain may need to be removed.

ADDRESSING VULNERABILTY: SEVERE REPETITIVE LOSS PROPERTIES

Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B4.

The Flood Insurance Reform Act of 2004 identified another category of repetitive loss, severe repetitive loss, and defined it as “a single-family property (consisting of one-to-four residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which four or more separate claims payments have been paid under flood insurance coverage with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least two separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property. Although Moody County has seven properties classified as “repetitive loss,” there are no properties classified as “severe repetitive loss.”

ASSESSING VULNERABILITY: IDENTIFYING STRUCTURES

Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B3.

One of the primary purposes of this PDM is identifying critical facilities, emergency shelters, and summer storm shelters and equipping those facilities with the means to provide the necessary energy for access to sanitation and maintain important functions during a natural hazard occurrence. In the event of a disaster as a result of severe summer of winter storms, a terrorist attack, or hazardous materials incident, the County and participating entities will have the ability to

prevent further loss of life by generator powered critical facility shelters. The City of Flandreau has many structures that are vital to emergency operations.

Each jurisdiction was responsible for listing critical infrastructure within their communities. Table 4.17 is a list of critical facilities that would cause the greatest distress in the county if destruction occurred. The information provided in Table 4.17 was compiled via survey of the participating communities. It should be noted that electrical transmission lines, transformers, and substations are generally not listed in Table 4.17 despite information being provided for them. They are displayed in Table 4.27.

Table 4.17: Critical Infrastructure in Moody County

Jurisdiction/ Entity	Location	Address	Sector	Sub-sector	Name	Owner Type
Colman	City of Colman	112 N Main Ave	Emergency Services	Building	Colman Police Department	Public
Colman	City of Colman	6 N Main Ave	Emergency Services	Building	Colman Fire Hall	Public
Colman	City of Colman	6 N Main Ave	Emergency Services	Building	Emergency Operations Center (Emergency Shelter)	Public
Colman	City of Colman	112 N Main Ave	Government Facility	Building	Colman City Hall	Public
Colman	City of Colman	101 SW 4th Street	Population to Protect	Building	Southern Heights Apartments	Private
Colman	City of Colman	305 S Allen St	Population to Protect	Public Park/Golf Course	Colman Park/Swimming Pool/Sunrise Golf Course	Public
Colman	City of Colman	213 S Allen St	Population to Protect	Building	Lutheran Church	Public
Colman	City of Colman	200 N Allen St	Population to Protect	Building	St. Peter's Church	Public
Colman	City of Colman	128 NE 3rd St	Population to Protect	Building	Clark Apartments	Private
Colman	City of Colman	200 S Loban Ave	Population to Protect	Building	Colman-Egan School	Public
Colman	City of Colman	Allen Avenue south of Discovery St	Non-Emergency Response Facility	Sanitary Sewer	Lift Station	Public
Colman	City of Colman	In Alley between Perry Avenue and Main Avenue north of 1st Street North	Non-Emergency Response Facility	Water Supply – Water Tower	Big Sioux Community Water Tower	Public
Colman	City of Colman	West of City	Non-Emergency Response Facility	Sanitary Sewer	Wastewater Lagoons	Public

Jurisdiction/ Entity	Location	Address	Sector	Sub-sector	Name	Owner Type
Colman	City of Colman	SE of intersection of Huebner Dr & 2nd St N	Non-Emergency Response Facility	Substation	Ottertail Substation	Private
Colman	City of Colman	S of SD Hwy 34 west of Crummer Ave	Non-Emergency Response Facility	Substation	Sioux Energy Substation	Private
Colman	City of Colman	Corner of Main Avenue and 1st Street North	Non-Emergency Response Facility	Building	Colman Street Maintenance Department	Public
Colman	City of Colman	Located in Flandreau City Park east of City	Non-Emergency Response Facility	Siren	Emergency Siren	Public
Colman	City of Colman	Colman Park	Non-Emergency Response Facility	Siren	Emergency Siren	Public
Colman	City of Colman	500 N Main Ave	Population to Protect	Public Park	Baseball Diamonds	Public
Colman	City of Colman	124 N Loban Ave	Population to Protect	Building	Sarah Flatten Daycare	Private
Colman	City of Colman	215 N Crummer Ave	Population to Protect	Building	Amy Schmidt Daycare	Private
Colman	City of Colman	216 N Florence Ave	Population to Protect	Building	Kari Schmidt Daycare	Private
Colman	City of Colman	328 S Florence Ave	Population to Protect	Building	Shaun Huntimer Daycare	Private
Colman	City of Colman	114 SW 4th St	Population to Protect	Building	Taya Meyer Daycare	Private
Egan	City of Egan	123 NE 2nd St	Emergency Services	Building	Egan Fire Hall Emergency Operations Center (Emergency Shelter)	Public
Egan	City of Egan	2nd Street east of River	Population to Protect	Public Park	Egan Campground and Park	Public
Egan	City of Egan	2nd Street east of Maple Street	Population to Protect	Public Park	Ballfield	Public
Egan	City of Egan	100 W 3rd St	Population to Protect	Building	Donnely Apartments	Private
Egan	City of Egan	110 W 3rd St	Government Facility	Building	Egan City Hall	Public
Egan	City of Egan	600 2nd St	Non-Emergency Response Facility	Water Supply	Big Sioux Rural Water Tank	Public
Egan	City of Egan	600 2nd St	Non-Emergency Response Facility	Water Supply	Big Sioux Rural Water Connection	Public
Egan	City of Egan	Intersection of 2nd St and Ellsworth Ave	Non-Emergency Response Facility	Substation	Ottertail Substation	Private

Jurisdiction/ Entity	Location	Address	Sector	Sub-sector	Name	Owner Type
Egan	City of Egan	Intersection of Gilbert St and 2nd St	Non-Emergency Response Facility	Sanitary Sewer	Lift Station	Public
Egan	City of Egan	Northeast corner of Town	Non-Emergency Response Facility	Sanitary Sewer	Wastewater Lagoons	Public
Egan	City of Egan	101 N Irvin St	Population to Protect	Building	Senior Center	Public
Egan	City of Egan	104 N Irvin St	Non-Emergency Response Facility	Siren	Emergency Siren	Public
Flandreau	City of Flandreau	108 E Pipestone	Emergency Services	Building	Moody County Sheriff	Public
Flandreau	City of Flandreau	Intersection of Prospect Ave & Henry St	Emergency Shelter	Building	Tornado Shelter	Public
Flandreau	City of Flandreau	Mobile Home Park (Intersection of Ash Ave & Birch St)	Emergency Shelter	Building	Tornado Shelter	Public
Flandreau	City of Flandreau	200 N Crescent	Emergency Services	Building	Flandreau Police Department	Public
Flandreau	City of Flandreau	206 E 3rd St	Emergency Services	Building	Flandreau Fire Dept	Public
Flandreau	City of Flandreau	101 E Pipestone	Emergency Services Government Facility	Building	Courthouse & Emergency Operation Center & Emergency Shelter	Public
Flandreau	City of Flandreau	1005 West Elm Ave	Government Facility	Building	Flandreau City Hall	Public
Flandreau	City of Flandreau	Flandreau Municipal Airport	Government Facility	Building	Snow Removal Equipment Building	Public
Flandreau	City of Flandreau	One mile east of the intersection of Hwy 32 & 13 on 230th St	Population to Protect	Recreation	Flandreau City Park	Public
Flandreau	City of Flandreau	601 W 1st Ave	Population to Protect	Recreation	Flandreau Aquatic Center	Public
Flandreau	City of Flandreau	800 S Wind St	Population to Protect	Building	Greenleaf Assisted Living	Public
Flandreau	City of Flandreau	611 2nd Ave	Population to Protect	Building	Riverview Health Services	Public
Flandreau	City of Flandreau	505 S Wind St	Population to Protect	Building	Our Saviors Lutheran Church	Public
Flandreau	City of Flandreau	1005 S Mountain Chief Dr	Population to Protect	Building	United States Indian School	Public
Flandreau	City of Flandreau	500/600/700 W Community Dr	Population to Protect	Building	Flandreau Public School	Public

Jurisdiction/ Entity	Location	Address	Sector	Sub-sector	Name	Owner Type
Flandreau	City of Flandreau	2nd Ave and Prairie St	Population to Protect	Building	Rescue Church	Public
Flandreau	City of Flandreau	800 W Community Dr	Population to Protect	Building	National Guard Armory/Flandreau Community Center	Public
Flandreau	City of Flandreau	101 N Prairie St	Population to Protect	Building	Second Presbyterian Church	Public
Flandreau	City of Flandreau	105 S Bates St	Population to Protect	Building	St. Simon and Jude Church	Public
Flandreau	City of Flandreau	508 W 1st Ave	Population to Protect	Building	Redeemer Lutheran Church	Public
Flandreau	City of Flandreau	202 E 2nd Ave	Population to Protect	Building	Flandreau Baptist Tree	Public
Flandreau	City of Flandreau	104 S Veterans St	Population to Protect	Building	Big Sioux Baptist Church	Public
Flandreau	City of Flandreau	109 N Main Ave	Population to Protect	Building	FSST Medical Center	Public
Flandreau	City of Flandreau	214 N Prairie	Population to Protect	Building	Flandreau Medical Center	Public
Flandreau	City of Flandreau	1005 S Mountain Chief Dr	Population to Protect	Building	United States Indian School Dormitory	Public
Flandreau	City of Flandreau	803 W Community Dr	Population to Protect	Building	Boys and Girls Club	Public
Flandreau	City of Flandreau	S Veterans St	Non-Emergency Response Facility	Sanitary Sewer	Lift Station	Public
Flandreau	City of Flandreau	E 2nd Ave	Non-Emergency Response Facility	Sanitary Sewer	Lift Station	Public
Flandreau	City of Flandreau	W 1st Ave	Non-Emergency Response Facility	Sanitary Sewer	Lift Station	Public
Flandreau	City of Flandreau	FIS Indian School	Non-Emergency Response Facility	Sanitary Sewer	Lift Station	Public
Flandreau	City of Flandreau	105 N Water St	Non-Emergency Response Facility	Sanitary Sewer	Flandreau Street Department	Public
Flandreau	City of Flandreau	407 N West Street	Non-Emergency Response Facility	Sanitary Sewer	County Highway Shop	Public
Flandreau	City of Flandreau	W Bridge Avenue	Non-Emergency Response Facility	Sanitary Sewer	City Disposal Plant	Public
Flandreau	City of Flandreau	107 N Water St	Non-Emergency Response Facility	Water	Flandreau Water Pump House	Public

Jurisdiction/ Entity	Location	Address	Sector	Sub-sector	Name	Owner Type
Flandreau	City of Flandreau	211 N Lindsay St	Non-Emergency Response Facility	Water	Water tower	Public
Flandreau	City of Flandreau	Corner of 3rd Ave and Veterans St	Non-Emergency Response Facility	Water	Water tower	Public
Flandreau	City of Flandreau	201 S Wilson St	Non-Emergency Response Facility	Siren	Emergency Siren	Public
Flandreau	City of Flandreau	207 N George Billam Drive	Non-Emergency Response Facility	Siren	Emergency Siren	Public
Flandreau	City of Flandreau	102 W LaFayette Ave	Non-Emergency Response Facility	Siren	Emergency Siren	Public
Flandreau	City of Flandreau	310 N Crescent St	Non-Emergency Response Facility	Siren	Emergency Siren	Public
Flandreau	City of Flandreau	401 S Crescent St	Non-Emergency Response Facility	Siren	Emergency Siren	Public
Flandreau	City of Flandreau	Located in Flandreau City Park east of City	Non-Emergency Response Facility	Siren	Emergency Siren	Public
Flandreau	City of Flandreau	1005 W Elm Ave	Non-Emergency Response Facility	Substation	Flandreau Substation	Public
Flandreau	City of Flandreau	202 South Center St	Non-Emergency Response Facility	Communications	Wow!	Private
Flandreau	City of Flandreau	210 North Crescent St	Non-Emergency Response Facility	Communications	Century Link	Private
Trent	Town of Trent	101 3rd St	Emergency Services	Building	Trent Fire Hall Emergency Operations Center (Emergency Shelter)	Public
Trent	Town of Trent	Corner of 1st Ave & 3rd St	Government Facility	Building	Trent City Hall & Street Shop	Public
Trent	Town of Trent	102 2nd St	Population to Protect	Building	Trent Baptist Church	Public
Trent	Town of Trent	Northwest of intersection of 1st St & Railroad St	Population to Protect	Swimming Pool	Trent Swimming Pool	Public
Trent	Town of Trent	North end of Main Street	Population to Protect	Campground	Trent Campground	Public
Trent	Town of Trent	Intersection of 4th Ave and 3rd St	Population to Protect	Building	Trent Community Hall	Public
Trent	Town of Trent	South of intersection of 478th Ave & 3rd St	Population to Protect	Park & Ball Diamonds	Park & Ball Diamonds	Public
Trent	Town of Trent	Southwest of Intersection of Main St & Walnut Ave	Non-Emergency Response Facility	Sanitary Sewer	Lift Station	Public

Jurisdiction/ Entity	Location	Address	Sector	Sub-sector	Name	Owner Type
Trent	Town of Trent	Southwest of Town	Non-Emergency Response Facility	Sanitary Sewer	Lagoon	Public
Trent	Town of Trent	Intersection of 1st St & 3rd Ave	Non-Emergency Response Facility	Water Supply	Water Pressure Tank	Public
Trent	Town of Trent	103 E 3rd St	Non-Emergency Response Facility	Siren	Emergency Siren	Public
Trent	Town of Trent	North of Intersection of Railroad St and 3rd St	Non-Emergency Response Facility	Building	Golden West Telecommunications	Private
Ward	Town of Ward	112 Pine St	Emergency Services	Building	Ward Fire Hall Siren/Fixed Generator	Public
Ward	Town of Ward	401 223 St	Population to Protect	Building	Immanuel Lutheran Church	Public
Ward	Town of Ward	112 Pine St	Non-Emergency Response Facility	Water Supply	Ward Water Well/Pumphouse	Public
Ward	Town of Ward	309 223rd St	Population to Protect	Building	Ward Community Center	Public
Moody County	Moody County	North of Intersection of 486 Ave and 223 St	Non-Emergency Response Facility	Electric Supply	Water Ottertail Power Co. Sub Station	Private
Moody County	Moody County	West of Flandreau	Non-Emergency Response Facility	Electric Supply	Sub Station	Private
Moody County	Moody County	Intersection of 483 Ave and SD Hwy 34	Non-Emergency Response Facility	Water Supply	Big Sioux Community Water System Tower	Private
Moody County	Moody County	23343 479th Avenue	Non-Emergency Response Facility	Water Supply	Big Sioux Community Water System Treatment Facility	Private
Moody County	Moody County	Interstate 29 & SD Hwy 32	Non-Emergency Response Facility	Building	SDDOT Maintenance Building	Private
Moody County	Moody County	47228 SD Hwy 34	Non-Emergency Response Facility	Communications	Wow!	Private
Moody County	Moody County	North of Intersection of 486 Ave and 223 St	Non-Emergency Response Facility	Electric Supply	Water Ottertail Power Co. Sub Station	Private

ASSESSING VULNERABILITY: COMMUNITY CAPABILITIES

Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B1.

Each community has a unique set of capabilities, including authorities, policies, programs, staff, funding, and other resources for accomplishing mitigation. One important step in assessing the vulnerability of a given community is to objectively review the capabilities to implement mitigation strategies and to identify limiting factors. Each community reviewed existing administrative documents, procedures, and policies. This helped the communities and planning team to evaluate how existing capabilities contribute to the vulnerability by reducing or exacerbating disaster impacts. Table 4.18 identifies whether each community has the specified administrative and technical capabilities, and who serves in such capacity. Table 4.19 encapsulates the efficacy of the specified planning mechanisms regarding disaster mitigation and to identify potential deficiencies in the specified plans.

Table 4.18: Administrative and Technical Capabilities

Administrative/ Staff Composition	Local Jurisdiction					
	Colman	***Egan***	***Flandreau***	***Trent***	***Ward***	***Moody County***
Board of Adjustment	Elected Officials	Elected Officials	Planning Commission	Elected Officials	NA	Elected Officials
Building Official	Appointed	Appointed	Appointed	Appointed	NA	Appointed
Community Planner	NA	NA	NA	NA	NA	Appointed
Elected Officials	Aldermanic	Trustee	Aldermanic	Trustee	Trustee	Commission
Emergency Manager	NA	NA	NA	NA	NA	Appointed/ Zoning Officer
Engineer/Highway Superintendent	NA	NA	NA	NA	NA	Appointed
Floodplain Administrator	Finance Officer	Appointed	City Administrator	Finance Officer	NA	Zoning Officer
GIS Coordinator	NA	NA	NA	NA	NA	Appointed
Planning Commission	Elected Officials	Elected Officials	Appointed	Elected Officials	NA	Appointed
Zoning Officer	Finance Officer	Finance Officer	City Administrator	Finance Officer	NA	Appointed
Grant Writing Capability (Yes/No)	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*
Non-profit organizations focused on environmental protection.	Yes**	Yes**	Yes**	Yes**	Yes**	Yes**
Public-Private partnership initiatives addressing disaster-related issues	No	No	No	No	No	No

NA: This Jurisdiction has nobody serving in this role

* First District Association of Local Governments provides these services without cost

** East Dakota Watershed Development District

Table 4.19: Capabilities of Growth Guidance Instruments

Capabilities of Community Planning Mechanisms	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Does the Future Land-Use Map identify natural hazard areas?	Y	Y	Y	Y	NA	Y
Do the land-use policies discourage development or redevelopment within natural hazard areas?	Y	Y	Y	Y	NA	Y
Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?	Y	Y	Y	Y	NA	Y
Does the transportation plan limit access to hazard areas?	N	N	N	N	NA	N
Is transportation policy used to guide growth in safe locations?	Y	Y	Y	Y	NA	Y
Are movement systems designed to function under disaster conditions (e.g. evacuation)?	Y	Y	Y	Y	Y	Y
Are environmental systems that protect development from hazards identified and mapped?	N	N	N	N	NA	N
Do environmental policies provide incentives to development that is located outside protective ecosystems?	N	N	N	N	NA	N
Do environmental policies maintain and restore protective ecosystems?	N	N	N	N	NA	Y
Are the goals and policies of the comprehensive plan related to those of the FEMA Local Hazard Mitigation Plan?	N	N	N	N	NA	N
Is safety explicitly included in the plan's growth and development policies?	Y	Y	Y	Y	NA	Y
Does the monitoring and implementation section of the plan cover safe growth objectives?	N	N	N	N	NA	N

Capabilities of Community Planning Mechanisms	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Does the Zoning Ordinance conform to the comprehensive plan in terms of discouraging development or redevelopment within natural hazard areas?	Y	Y	Y	Y	NA	Y
Does the zoning ordinance contain natural hazard overlay zones that set conditions for land use within such zones?	Y	Y	Y	Y	NA	Y
Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use?	N	N	N	N	NA	Y
Does the zoning ordinance restrict development within, or filling of, wetlands, floodways, and floodplains?	Y	Y	Y	Y	NA	Y
Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?	Y	Y	Y	Y	NA	Y
Do the subdivision regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?	N	N	N	N	NA	Y
Do the subdivision regulations allow density transfers where Hazard areas exist?	N	N	N	N	NA	N

NA: This jurisdiction does not have the specified document.

ASSESSING VULNERABILITY: ESTIMATING POTENTIAL LOSSES

Requirement 201.6(b)(3). Local Mitigation Plan Review Tool – A4.
Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B3.
Requirement 201.6(d)(3)). Local Mitigation Plan Review Tool – D1.

The 2014 Plan provided some specific information regarding potential losses. As part of this Plan the Planning Team decided to include estimates for number of structures, value of structures, and the percentage of which are located within identified hazard areas. These estimates shall be used in multiple ways, including the comparison statistics for future development and disaster mitigation plans. Michelle Nielson of Sioux Valley Energy Cooperative Inc. provided the information for Sioux Valley Energy. Inconsistencies and missing information result from lack of existing mechanisms, plans, and technical documents available.

Moody County and its municipalities (with the exception of Ward) all have continued to enforce floodplain ordinances throughout the period of the previous plan. Any structures which would have been constructed during the planning period would either be floodproofed above BFE (in a manner consistent with the applicable ordinance) or placed upon property where it was determined the elevation was high enough to remove the property from the floodplain prior to construction. Though assessed values have changed since 2014, proportionally the number and/or percentage of lots with structures within the floodplain would not. Further new, more detailed information will be available for future iterations of this plan which will likely significantly affect the overall (economic) vulnerability of structures within floodplains of Moody County. For those reasons data from the previous PDM was retained for this section.

The assessor's office provided the assessed valuation of total structures on each property within the incorporated and rural areas of the county. The data provides a total value for structures of a certain use on each property. It was not possible to discern the value of structures per lot so the actual number of structures is based on the number of parcels with the specified use type. For the purposes of this plan only Residential, Commercial/Industrial, Agricultural, and Manufactured Homes were included. More specifically, all agricultural structures were included; only primary residential structures (houses, apartments, etc.) and not including sheds, lean-to's, and garages were included. All commercial or industrial structures were included, whether considered primary or accessory structures. Public or quasi-publicly owned structures and other structures for which the Department of Equalization did not have an assessed value were not included in the calculation. Structures throughout the incorporated and unincorporated portions of the county were reviewed based upon the DFIRM provided with the update to the flood hazard boundaries in 2008. The average value for structures of a given use-type was calculated and applied to the total number of properties identified within the floodplain to establish the value of structures within the floodplain. The information does not account for letters of map amendment or letters of map revision which may have been approved.

All properties with structures, whether owner occupied or not were included in the valuations provided in Tables 4.20 through 4.26. The reports provided by the assessor's office did not include the number of people in each structure; thus, many of the tables are missing this information. The following tables also do not address information regarding religious, governmental, or utility structures. Although not included in Tables 4.20 through 4.26, the State of South Dakota Hazard Mitigation Plan incorporated HAZUS analysis accounting for potential losses to those structures within Moody County.

Table 4.20: Moody County (Rural Area)
Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in County	# in HA	% in HA	$ in County	$ in HA	% in HA	# in Rural Areas	# in HA	% in HA
Residential	1,105	44	3.98%	$92,323,965	$3,676,248	3.98%	2,993	109	3.65%
Commercial/Industrial	23	1	4.35%	$9,716,858	$422,472	4.35%		0	0.00%
Agricultural	585	46	7.86%	$20,412,415	$1,605,079	7.86%		0	0.00%
Mobile Homes	54	6	11.11%	$1,892,840	$210,316	11.11%		15	0.50%
Total	**1,767**	**96**	**5.43%**	**$124,346,078**	**$5,914,115**	**4.76%**	**2,993**	**124**	**4.14**

Table 4.21: Colman Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	$ in City	$ in HA	% in HA	# in City	# in HA	% in HA
Residential	216	0	0.00%	$17,996,412	$0	0.00%	594	0	0.00%
Commercial/Industrial	37	0	0.00%	$4,053,350	$0	0.00%		0	0.00%
Agricultural	2	0	0.00%	$503,172	$0	0.00%		0	0.00%
Manufactured Home	18	0	0.00%	$436,728	$0	0.00%		0	0.00%
Total	**273**	**0**	**0.00%**	**$22,989,662**	**$0**	**0.00%**	**594**	**0**	0.00%

Table 4.22: Egan Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	$ in City	$ in HA	% in HA	# in City	# in HA	% in HA
Residential	100	0	0.00%	$3,611,328	$0	0.00%	278	0	0.00%
Commercial/Industrial	15	1	6.67%	$334,216	$22,281	6.67%		0	0.00%
Agricultural	2	0	0.00%	$400,688	$0	0.00%		0	0.00%
Manufactured Home	12	0	0.00%	$265,764	$0	0.00%		0	0.00%
Total	**129**	**1**	**0.78%**	**$4,611,996**	**$22,281**	**0.48%**	**278**	**0**	0.00%

Table 4.23: Flandreau Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	$ in City	$ in HA	% in HA	# in City	# in HA	% in HA
Residential	730	11	1.51%	$51,123,976	$770,361	1.51%	2,341	26	1.10%
Commercial/Industrial	132	9	6.82%	$10,825,319	$738,090	6.82%		0	0.00%
Agricultural	3	1	33.33%	$47,314	$15,771	33.33%		0	0.00%
Manufactured Home	35	0	0.00%	$917,241	$0	0.00%		0	0.00%
Total	**900**	**21**	**2.33%**	**$62,913,850**	**$1,524,222**	**2.42%**	**2,341**	**26**	**1.10%**

Table 4.24: Trent Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	$ in City	$ in HA	% in HA	# in City	# in HA	% in HA
Residential	81	19	23.46%	$4,879,082	$1,144,476	23.46%	232	40	17.44%
Commercial/Industrial	15	5	33.33%	$789,431	$263,144	33.33%			
Agricultural	2	0	0.00%	$13,538	$0	0.00%			
Manufactured Home	15	2	13.33%	$503,898	$67,186	13.33%		4	1.84%
Total	**113**	**26**	**23.01%**	**$6,185,949**	**$1,474,806**	**23.84%**	**232**	**44**	**18.97%**

Table 4.25: Ward Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	$ in City	$ in HA	% in HA	# in City	# in HA	% in HA
Residential	23	0	0.00%	$498,590	$0	0.00%	48	0	0
Commercial/Industrial	1	0	0.00%	$61,587	$0	0.00%			
Agricultural	0	0	0.00%	$0	$0	0.00%			
Manufactured Home	1	0	0.00%	$9,407	$0	0.00%			
Total	**25**	**0**	**0**	**$569,584**	**0**	**0**	**48**	**0**	**0**

Table 4.26: Moody County Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in County	# in HA	% in HA	$ in County	$ in HA	% in HA	# in County	# in HA	% in HA
Residential	2,255	74	3.28%	$170,433,353	$5,591,086	3.28%	6,486	175	2.70%
Commercial/Industrial	223	16	7.17%	$25,780,761	$1,445,987	5.61%		0	0.00%
Agricultural	594	47	7.91%	$21,377,127	$1,620,850	7.58%		0	0.00%
Manufactured Home	135	8	5.93%	$4,025,878	$277,502	6.89%		19	0.30%
Total	**3,207**	**145**	**4.52%**	**$221,617,119**	**$8,935,425**	**4.03%**	**6,486**	**194**	**2.99%**

Notes:

 # in HA: Number of structures in hazard area was determined using aerial photography and DFIRM boundaries. Some structures included may have received LOMA's, removing them from the flood plain, since the effective date of the maps.

$ in HA: Value of structures in hazard area was estimated by determining the average value per structure and multiplying that value by the number of properties or structures used with a corresponding land use.

 # in [Jurisdiction]: The number of people was based on the 2010 Census.

 # in Hazard Area: The number of people in a hazard area was determined by multiplying the average household size of a given community as identified by the number of structures in the identified hazard area, and multiplying that number by the rate of occupancy for the community (All statistics from the US Census 2010).

Table 4.27: Sioux Valley Energy Vulnerable Structures

Type of Structure	Total Number of Structures	Total Value of Structures	HAZARDS			
			Flood	Strong Winds	Tornado	Winter Storms
Poles	9,342	$18,684,000	Yes	Yes	Yes	Yes
Overhead Transformers	474	$711,000	Yes	Yes	Yes	Yes
Underground Transformers	917	$2,200,800	Yes	No	Yes	No
Underground Cabinets	487	N/A	Yes	No	Yes	No
Underground Pedestals	592	N/A	Yes	No	Yes	No
Miles of Underground Line	247	$18,525,000	Yes	No	No	No
Miles of Overhead Line	447	$33,525,000	Yes	Yes	Yes	Yes
Substations	N/A	N/A	Yes	Yes	Yes	Yes

SOURCE: Michele Nielson, Sioux Valley Energy

As part of the State of South Dakota Hazard Mitigation Plan, data was prepared for specific hazard types. Although the data is not current, the modeling used in the plan would be difficult to replicate or improve upon. The following sections describing vulnerability to flooding and tornadoes is based largely on the corresponding sections in the State of South Dakota Hazard Mitigation Plan.

Flooding

All of Moody County is in the Big Sioux River Watershed, therefore Moody County was included within the Big Sioux Region in the State of South Dakota Hazard Mitigation Plan. Based on its history of flood problems, the County was deemed a high priority jurisdiction in South Dakota's Plan. For that reason, HAZUS-MH analysis was performed in conjunction with the completion of the State's Plan. The results were based on flooding with a one percent chance of occurrence or commonly referred to as a "100-year flood" and display the potential base flood losses to the County. The full results of HAZUS-MH analysis for the County are displayed in Table 4.28.

FEMA updated the HAZUS modeling based on 2010 Census information as part of a nationwide study. Data from Moody County was extracted to produce a specified report for the purposes of this plan. Since no flood elevations have been established for any portion of Moody County, the HAZUS data, though not precise is the best available data for projecting flood losses in Moody County at the present time.

Table 4.28: HAZUS-MH Base Flood (1 Percent Chance) Loss Estimation Results (2019)

Building Damage	Loss Ratio*	Contents Damage and Inventory Loss	Total Economic Building Loss	Number of Displaced People	People Needing Shelter
$2,072,000	0.5%	$1,949,000	$4,220,000	216	9

SOURCE: State of South Dakota Hazard Mitigation Plan 2019. p 3-175; Table 3-45. South Dakota Office of Emergency Management.

*Loss ratio is the percent of the total building inventory value that could be damaged from flooding in any given year.

Tornado

As part of the State of South Dakota Hazard Mitigation Plan HAZUS-MH analysis was performed calculating potential building exposure to tornadoes in the state. Total value of structures lost due to tornadoes from 1950 – 2016 was calculated, inflated to current (2016) dollars. A loss ratio was then calculated by dividing the total damage by the total building exposure. Table 4.29 identifies data specific to the annualized losses from tornadoes for the County as identified in the State of South Dakota Hazard Mitigation Plan.

To provide additional insight into potential losses caused by tornadoes, historic loss data was also analyzed on a statewide scale. According to the National Climatic Data Center Storm Events database, there were 1,711 tornadoes in South Dakota between January 1950 and December 2016. Of those, 636 tornadoes rated as an F1 or higher. Total property damage for these events is estimated at $688 million. This suggests that South Dakota experiences 10 tornadoes, of F1 intensity or greater, and $11 million in losses each year. There were 18 deaths and 465 injuries in this time period, which averages out to approximately seven injuries each year. Of these storms, eleven resulted in major disaster declarations, with a total relief cost estimated at $165,245,996 in 2016 dollars. This averages out to $15.022 million (also in 2016 dollars) per major disaster. Based

on the frequency of events, South Dakota averages one major disaster level tornado every 156 events or approximately every 6 years. The total historic losses and annualized losses by county are presented.

Table 4.29: Moody County Annualized Tornado Losses

Total Events 1950-2016	Total Property Damage (inflated) 1950-2016	Annualized Losses	Total Building Exposure	Loss Ratio
10	$840,270	$12,731	$752,929	1.116

SOURCE: State of South Dakota Hazard Mitigation Plan 2019. Appendix 3D-9; Table 10 and 12. South Dakota Office of Emergency Management.

ASSESSING VULNERABILITY: ANALYZING DEVELOPMENT TRENDS

Requirement 201.6(b)(3). Local Mitigation Plan Review Tool – A4.
Requirement 201.6(c)(3). Local Mitigation Plan Review Tool – C1.
Requirement 201.6(d)(3). Local Mitigation Plan Review Tool – D1.
Requirement 201.6(d)(3). Local Mitigation Plan Review Tool – D2.

The land use and development trends for each jurisdiction were identified by the representatives from each of the jurisdictions. Four of the county's five communities as well as the county itself have comprehensive land use plans which identified future areas for development. In addition to Moody County, the cities of Colman, Egan, Flandreau, and Trent all have adopted Comprehensive Land Use Plans with Future Land Use Maps. The Comprehensive Land Use Plans for each community were reviewed by each community utilizing one. Specifically, available undeveloped areas projected for residential, commercial, and industrial uses were reviewed. Based upon their own projected density of development for each land use, the communities then identified the potential number of lots which could be created within flood hazard areas given current land use regulations and controls. Egan, Flandreau, and Trent have adopted the most recently prepared National Flood Insurance Program Flood Hazard and approved recommended ordinances for the proper regulation of property within the floodplain. No formal map or regulatory amendments have been made since the approval of the last PDM Plan. It is expected the planned portions of the communities with the floodplain will change when the updated floodplain boundaries identified by the RiskMap project are adopted. Tables 4.30 – 4.34 identify the projected vulnerability for communities which have adopted land use plans. The City of Colman is the only jurisdiction with a revised land use plan from 2014. Future Land Use Maps for each jurisdiction which have adopted Comprehensive Land Use Plans are included in Appendix F. Colman's amount of remaining area for future development changed only in the residential category. Their Future Land Use Plan does identify some area within the 100-year floodplain as projected for future residential development, however other portions of the plan indicate those areas would not be developed. Future Land Use Maps for each jurisdiction which have adopted Comprehensive Land Use Plans are included in Appendix F.

Table 4.30: City of Colman
Potential Floodplain Development – By Land Use Type

	Community Totals		Flood Hazard Area			
Land Use Category	Projected Development Density (Units/Acre)	Acres of projected future development	Acres of future development in Hazard Area	% Area for future development	Potential # of Lots for future development	# of Undeveloped Lots Already Appropriately Zoned
Residential	2.5	85	0.0	0.0	0	0
Commercial	1	17	0.0	0.0	0	0
Industrial	0.25	32	0.0	0.0	0	0

Table 4.31: City of Egan
Potential Floodplain Development – By Land Use Type

	Community Totals		Flood Hazard Area			
Land Use Category	Projected Development Density (Units/Acre)	Acres of projected future development	Acres of future development in Hazard Area	% Area for future development	Potential # of Lots for future development	# of Undeveloped Lots Already Appropriately Zoned
Residential	2.5	31	0.5	1.6	1	0
Commercial	1	15	0.0	0.0	0	0
Industrial	0.25	17	0.0	0.0	0	0

Table 4.32: City of Flandreau
Potential Floodplain Development – By Land Use Type

	Community Totals		Flood Hazard Area			
Land Use Category	Projected Development Density (Units/Acre)	Acres of projected future development	Acres of future development in Hazard Area	% Area for future development	Potential # of Lots for future development	# of Undeveloped Lots Already Appropriately Zoned
Residential	2.5	74	0.0	0.0	0.0	6
Commercial	1	3	0.0	0.0	0.0	0
Industrial	0.25	5	0.0	0.0	0.0	0

.

Table 4.33: Town of Trent
Potential Floodplain Development – By Land Use Type

	Community Totals		Flood Hazard Area			
Land Use Category	Projected Development Density (Units/Acre)	Acres of projected future development	Acres of future development in Hazard Area	% Area for future development	Potential # of Lots for future development	# of Undeveloped Lots Already Appropriately Zoned
Residential	2.5	29	7.2	24.8	18	17
Commercial	1	3	0.0	0.0	0	0
Industrial	0.25	7	7	100.0	2	1

UNIQUE OR VARIED RISK ASSESSMENT

Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B1.
Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B3.
Requirement 201.6(d)(3). Local Mitigation Plan Review Tool – D1.

Vulnerability to all-natural hazards was considered by each community and by the Planning Team. In community meetings, each community rated its vulnerability to certain natural hazards. Specific information regarding the vulnerability of structures to flood and tornado was available. A detailed description of the county's communities' vulnerability to flooding within the 100-year floodplain is identified above. Information compiled and utilized by the State of South Dakota in its State of South Dakota Hazard Mitigation Plan (2019) was included in the plan to describe the vulnerability of the county and its communities to tornadoes. Less quantitative data is available regarding the potential impact of other natural hazards. Anecdotal information gathered from the meetings was used to generally assess the communities' vulnerability to certain hazards.

The overall mitigation strategy and its goals are intended to minimize loss of life and injury; in addition to ensuring essential public services and the availability of emergency shelter in the event of natural hazards. Critical Infrastructure maps contained herein identify critical facilities which would provide essential services or prove most vulnerable to certain natural hazards. Loss of private property and personal revenue during a natural disaster is of secondary concern but certainly was considered by each community as evidenced by the detailed information regarding vulnerability to flood. What follows is a description by community of the perceived vulnerability of each community to certain hazards as identified in Table 4.13: Overall Summary of Vulnerability by Jurisdiction. The hazards are categorized according to the vulnerability rating assigned by each community with information regarding the rationale for the rating of each hazard.

Colman

High Vulnerability

- Tornado

As described in Table 4.28, ten tornadoes were confirmed throughout Moody County between 1950 and 2016. An F1 tornado was sighted near Colman in 1993 and a F0 tornado was located near Colman in 2003. The community identified the need to provide emergency shelter to its residents, emergency services during recovery, and community assistance during clean-up. No specific projects for clean-up were discussed.

Medium Vulnerability

- Freezing Rain/Sleet/Ice
- Rapid Snow Melt
- Strong Winds
- Urban Fire

The risks of freezing rain/sleet/ice were discussed as the reality of living in South Dakota. Underscored was the potential for utility interruptions during severe winter storms which increase susceptibility of vulnerable populations to unsanitary conditions or ever over exposure to cold weather. The school auditorium provides shelter in emergencies and would be grossly inadequate in the event of a utility failure during a winter or summer storm unless an emergency generator is used. It was determined that the community can adequately handle snow removal and should focus on ensuring essential services and utility provision to residences.

Rapid snow melt can result in water damage and overland flooding during spring thaw. Improving storm drainage throughout the community will reduce the impact of flooding within the community.

Strong winds carry the probability to affect a large number of properties at any one time, but the effects typically carry small financial risk. Without generating tornadoes, it is unlikely for the loss of life to occur to any individual seeking shelter from a storm with these characteristics. However, it is common for heavy wind and rain to cause trees to be uprooted and broken. In some cases, siding, shingles and even entire smaller buildings are blown from foundations in strong local windstorms. Principal concerns in these events were providing warning and shelter to those without adequate shelter, planning for emergency procedures during and after storms, and continued provision of utilities in the likely event a downed tree causes utility interruptions. In order to alleviate the community's vulnerability to strong winds and severe storms, the community identified the need to bury overhead electrical lines and improve the community's storm siren system.

The majority of Colman's commercial buildings and single-family residences were constructed prior to the adoption of zoning regulations for the town. Consequently, numerous buildings are located close to each other. Therefore, the risk of fire to any individual building poses a significant threat to neighboring properties as well. The original downtown still includes numerous "zero-lot line" structures. Residences commonly are located within five to seven feet of lot lines with accessory structures even closer. In addition, the US Census estimates the average owner-occupied residence in Colman was built in 1965, with over 43% of residences constructed prior to 1960. The community first adopted zoning regulations in 1998; according to the census, since then, only 4.4% of the town's residences have been constructed. Total value of residential structures in the Town of Colman can be found in Table 4.20.

Low Vulnerability

- Drought
- Extreme Cold
- Extreme Heat
- Flood
- Heavy Rain
- Heavy Snow
- Lightning
- Thunderstorm
- Hail

Drought is not generally a significant concern to the residents of Colman. Water for the City of Colman is provided by Big Sioux Community Water System. This water source can provide a potable water source during prolonged periods of drought. The primary concern with prolonged periods without rain is economic losses. Agriculture is vital to the local economy and will be regardless of the incorporation of new industry into the community. It is important to encourage

diversified agricultural practices throughout the region to minimize the negative impact of drought on local economies.

Extreme heat and extreme cold were discussed as a threat when utility provision is interrupted. It is not uncommon for residents to visit neighbors in these instances to ensure elderly or other vulnerable residents are not suffering from heat exposure. The community found it most important to minimize utility interruptions to foster extreme heat resiliency.

Though a portion of the community is listed within the 100-year flood plain, even during heavy rain and rapid snow melt, overland flooding is uncommon in the community. The most common form of water damage is due to high water tables during spring thaw. Improving storm drainage throughout the community can reduce the impact of flooding within the community.

Heavy rain, heavy snow, lightning, thunderstorms, and hail are most probable to affect the largest number of properties at any one time, but the effects typically carry small financial risk. It is unlikely for the loss of life to occur to any individual seeking shelter from a storm with these characteristics. However, it is common for these events to cause trees to be uprooted and broken. In some cases, siding, shingles and even entire smaller buildings are blown from foundations in strong local windstorms. Principal concerns in these events were providing warning and shelter to those without adequate shelter, planning for emergency procedures during and after storms, and continued provision of utilities in the likely event a downed tree or hailstorm resulting in utility interruptions.

Egan

High Vulnerability

- Heavy Rain
- Tornado

Heavy rain carries the probability to result in flooding across a large number of properties at any one time. Principal concerns in the event of a heavy rain include providing warning of flooding and planning for emergency procedures during and after storms, and continued provision of utilities in the likely event a flood causes property damage, transportation disruptions or utility interruptions. The City Council identified the need for alternative transportation routes as the community may become isolated in the event of a heavy rain/flooding event. Specifically, the locations where the Big Sioux River crosses SD Hwy 34, 2nd Street and Pierce Street. Also, there is a need to study and implement storm water drainage improvements in the southeast portion of the community.

As described in Table 4.28, ten tornadoes were confirmed throughout Moody County between 1950 and 2016. In 2003, an F0 tornado was reported near Egan. The potential for damage and devastation to property is nearly unavoidable. The community identified the need to provide emergency shelter, if necessary, to its residents.

Medium Vulnerability

- Freezing Rain/Sleet/Ice
- Lightning
- Rapid Snow Melt
- Flood
- Strong Winds
- Thunderstorm

The risks of freezing rain/sleet/ice were discussed. The potential for utility interruptions during severe winter storms which increase susceptibility of vulnerable populations to unsanitary

conditions or ever over exposure to cold weather posed the most significant risk. The senior citizen center/City Halls serves as a base of operations and shelter for displaced residents when emergencies occur. However, the existing facility is inadequate in reference to size and needs a back-up generator in the event of utility failure during a winter or summer storm. It was determined that the community can adequately handle snow removal and should focus on ensuring essential services and utility provision to residences.

Rapid snow melt can result in water damage and overland flooding during spring thaw. However, the most common form of water damage is due to high water tables during spring thaw and heavy rains in the fall. Improving storm drainage throughout the community can reduce the impact of flooding within the community. The City Council identified the need for alternative transportation routes as the community may become isolated in the event of a heavy rain/flooding event. Specifically, the locations where the Big Sioux River crosses SD Highway 34, 2nd Street and Pierce Street. Also, there is a need to study and implement storm water drainage improvements in the southeast portion of the community.

Thunderstorms without any accompanying threatening conditions are considered beneficial and result in no property damage or injuries to individuals. Lightning that sometime accompanies thunderstorms can present a hazard to people and property. Lightning strikes can kill or injure individuals caught outside during a storm. Lightning can also damage property and start fires, but the effects typically carry small financial risk.

Low Vulnerability

- Drought
- Extreme Cold
- Extreme Heat
- Hail
- Heavy Snow
- Ice Jam
- Urban Fire
- Wildfire

Drought is not generally a significant concern to the residents of Egan. Water for the City of Egan comes from the Big Sioux Community Water System. Egan also has a backup well used in the event of an emergency. Both sources can provide a potable water source during prolonged periods of drought. The primary concern with prolonged periods without rain is economic losses.

Extreme heat and extreme cold were discussed as a threat when utility provision is interrupted. The community found it most important to minimize utility interruptions to foster extreme heat and cold resiliency.

Hail has the potential to affect the largest number of properties at any one time and can inflict direct bodily harm on persons caught in the open during a storm. The community did not identify a need to enhance the existing warning systems but were concerned with providing emergency shelter.

The incidence of heavy snow is common in Moody County. These events can be more treacherous in rural areas than urban due to the potential to strand motorists or result in car accidents. With SD Highway 34 traversing the community, it is possible for travelers to become stranded in heavy snow events.

Ice jams can occur at many locations along the Big Sioux River and bridges are particularly susceptible locations for ice jams. There are two bridges in the City. One is located on the east side of the community and the other is south of town. Flooding events resulting from ice jams can be prevented by monitoring the ice conditions along the river and breaking up ice jams before they become large enough to disrupt the flow of the river.

The majority of Egan's commercial buildings and single-family residences were constructed prior to the adoption of zoning regulations for the town. Consequently, numerous buildings are located close to each other. Therefore, the risk of urban fire to any individual building poses a significant threat to neighboring properties as well. The original downtown still includes numerous "zero-lot line" structures. Residences commonly are located within five to seven feet of lot lines with accessory structures even closer. In addition, the US Census estimates the average owner-occupied residence in Egan was built in 1953, with over 60% of residences constructed prior to 1950. The community first adopted zoning regulations in 2001; according to the census, since then, only 8% of the town's residences have been constructed. Total value of residential structures in the Town of Egan can be found in Table 4.21.

Flandreau

High Vulnerability

- Tornado
- Urban Fire

Flandreau has never been directly hit by a tornado. According to the 2019 SD Hazard Mitigation Plan, ten tornadoes were confirmed throughout Moody County between 1950 and 2016. Two of these tornadoes were within forty miles of Flandreau. The City of Flandreau serves as the county seat for Moody County. The potential for damage and devastation from a tornado is very severe. The City Council recently constructed two storm shelters (safe rooms) located at the north and south parts of the City. The community identified the need to provide timely warnings, emergency services during recovery, and community assistance during clean-up.

Most of the commercial buildings and single-family residences in Flandreau were constructed prior to the adoption of zoning regulations by the City in 1999. Prior to 1999, the City had been performing some zoning activities such as issuing building permits; they had minimal land use regulations. Therefore, numerous buildings are located close to each other. The risk of fire to any individual building poses a threat to neighboring properties as well. The original downtown still includes numerous "zero-lot line" structures. Residences commonly are located within five to seven feet of property lines with accessory structures even closer. According to US Census estimates, over 29% of residences in Flandreau were constructed prior to 1940. An additional 66% of residences were constructed prior to 1980. Flandreau's current Comprehensive Land Use Plan and Zoning Regulations were adopted in 2006. Total value of residential structures in the Flandreau can be found in Table 4.22. The local volunteer fire department needs to continue to offer training to its members and purchase required equipment in order to maintain sufficient firefighting capabilities to protect the lives and property of Flandreau area residents. The City Council has identified the needs to upgrade the fire station.

Medium Vulnerability

- Drought
- Extreme Cold
- Extreme Heat
- Flood
- Strong Winds

Flandreau's water supply comes from three wells located in the Big Sioux aquifer. The community is fortunate to be served by a backup water source that is provided by Big Sioux Community Water System. Both sources can provide a potable water source during prolonged periods of drought. The primary concern with prolonged periods without rain is economic losses. Agriculture is vital to the local economy. It is important to encourage diversified agricultural practices throughout the region to minimize the negative impact of drought on local economies.

The risks of extreme cold were discussed. The discussion was centered on the potential for utility interruptions during severe winter storms which increase susceptibility of vulnerable populations to over exposure to cold weather. The city armory building provides shelter in emergencies and would be inadequate in the event of a utility failure during a winter or summer storm unless an emergency generator is purchased and used. It was determined that the community should focus on ensuring essential services and utility provision to residences.

Extreme heat was discussed as a threat especially during an electrical outage. Drinking water, fans and air conditioning will allow most people to endure an extreme heat event. A generator equipped armory building could serve as a refuge for residents during an extreme heat event.

Flandreau has a current flood plain map for the city. The Big Sioux River flows along the north and west sides of the City. Portions of the City and city park adjacent to the Big Sioux River are within a 100-year flood plain. Most of the community does not have any major flooding issues. Some areas of the community are prone to flooding due to heavy rain or rapid snow melt. The City would like to study and construct the necessary storm water drainage improvements to resolve the flooding issues.

Strong winds can affect properties in the City, but the effects typically do not cause serious property damage. The City's main concerns were providing warning and shelter to those without adequate shelter, planning for emergency procedures during and after storms, and continued provision of utilities during an emergency situation. Flandreau would like to construct emergency safe room shelters within the City and city park

Low Vulnerability

- Dam Failure
- Freezing Rain/Sleet/Ice
- Hail
- Heavy Rain
- Heavy Snow
- Ice Jam
- Lightning
- Rapid Snow Melt
- Thunderstorm
- Wildfire

There is one dam located on the Big Sioux River on the edge of Flandreau. The dam was constructed to hold water for recreational purposes in the city park. The probability of dam failure is low. In the event a failure should occur, the City would be minimally impacted.

The risks of freezing rain/sleet/ice, and heavy snow were discussed. Emphasis was placed on the potential for utility interruptions during severe winter storms which increase susceptibility of vulnerable populations to exposure to cold weather effects. The city armory provides shelter in emergencies but would be inadequate in the event of a utility failure during a winter or summer storm unless an emergency generator is purchased and used. It was determined that the community can handle snow removal and should focus on ensuring essential services and utility provision to residences.

Thunderstorms, hail, heavy rain and lightning are most probable to affect the largest number of properties at any one time, but the effects typically carry small financial risk. Thunderstorms in most cases will not involve death or serious injuries to individuals in the area as long as adequate warnings and shelter are available. Hail, heavy rain and lightning can cause serious property damage. The City's main concerns were providing warning and shelter to those without adequate shelter, planning for emergency procedures during and after storms, and continued provision of utilities during an emergency situation. Flandreau is planning to construct emergency storm shelters within the city.

Ice jams and rapid snow melt events can cause localized flooding. Ice jams can also damage bridges over rivers and creeks. The Big Sioux River is the only waterway near Flandreau that periodically experiences ice jams. Ice jams on the Big Sioux River have not significantly impacted the City. Rapid snow melt like heavy rain can result in ponding in certain areas within Flandreau. The City Council has identified the need to study and undertake storm water drainage improvements to reduce ponding within the City.

Wildfire is rare in Moody County and poses little threat to the community. Only development on the fringe of the City is at risk. However, the local volunteer fire department, with assistance from outside agencies expects to be able to handle any wildfire in the area.

Trent

High Vulnerability

- Flood
- Tornado

A substantial portion of the community is situated within the 100-year flood plain, during heavy rain and rapid snow melt, overland flooding is common in the community. Trent has the highest percentage of structures of any Moody County community located in the 100-year flood plain. Addressing the impact of the Big Sioux River and improving storm drainage throughout the community will reduce the impact of flooding within the community.

As described in Table 4.28, ten tornadoes were confirmed throughout Moody County between 1950 and 2016 with one F1 tornado occurring near Trent in 2008. The potential for damage and devastation to property is nearly unavoidable. The community identified the need to provide tornado shelter for its residents.

Medium Vulnerability

- Freezing Rain/Sleet/Ice
- Hail
- Heavy Rain
- Heavy Snow
- Strong Winds
- Thunderstorm

Trent commonly experiences freezing rain/sleet/ice. In the past these events caused hardship for residents during utility interruptions. The community hall provides shelter in emergencies and is inadequate in the event of a utility failure during a winter or summer storm unless an emergency generator is used.

Heavy snow has the potential to affect the largest number of properties at any one time, but the effects typically carry small financial risk. In some cases, transportation routes can become impassible until snow is cleared. Principal concerns in these events were providing warning and shelter to those without adequate shelter.

Thunderstorms often are accompanied by heavy rain, strong winds and hail. These events carry the probability to affect a large number of properties at any one time. Without generating tornadoes, it is unlikely for the loss of life to occur to any individual seeking shelter from a storm with these characteristics. The community identified the need to provide warning to residents and users of the community's recreational facilities of potential severe weather, including thunderstorms and flooding; and to provide shelter to those without adequate shelter; planning for emergency procedures during and after storms; and continued provision of utilities in the likely event a downed tree causes utility interruptions.

Low Vulnerability

- Drought
- Extreme Cold
- Extreme Heat
- Ice Jam
- Lightning
- Rapid Snow Melt
- Urban Fire

Drought is not generally a significant concern to the residents of Trent. Water for the City of Trent comes from two city wells drawing water from the Big Sioux aquifer. The community is fortunate to be served by a backup water source that is provided by Big Sioux Community Water System. Both sources can provide a potable water source during prolonged periods of drought.

Extreme cold and extreme heat was discussed as a threat when utility provision is interrupted. It was determined that the best way to address these extremes was to insure the continuation of utility services in these events.

Ice jams can occur at many locations along the Big Sioux River and bridges are particularly susceptible locations for ice jams. There is one bridge located west of the community on 240th Street. Flooding events resulting from ice jams can be prevented by monitoring the ice conditions along the river and breaking up ice jams before they become large enough to disrupt the flow of the river.

Lightning has the potential to disrupt utilities, especially electrical utilities, and can cause fires. Although lightning rarely causes damage within the community, the impacts of a lightning strike can have severe results.

Rapid snow melt can result in water damage and overland flooding during spring thaw. Improving storm drainage throughout the community will reduce the impact of flooding within the community. Flooding in these and other instances threatens the functionality of the town's sanitary sewer lagoon. The town identified the need to reinforce the community's sanitary sewer lagoon with riprap.

The majority of Trent's commercial buildings and single-family residences were constructed prior to the adoption of zoning regulations for the town. Consequently, numerous buildings are located close to each other. Therefore, the risk of urban fire to any individual building poses a significant threat to neighboring properties as well. The original downtown still includes numerous "zero-lot line" structures. Residences commonly are located within five to seven feet of lot lines with accessory structures even closer. In addition, the US Census estimates the average owner-occupied residence in Trent was built prior to the 1980's, with over 26% of residences constructed prior to 1940. The community first adopted zoning regulations in 1998. Total value of residential structures in the Town of Trent can be found in Table 4.23.

Ward

High Vulnerability

- Freezing Rain/Sleet/Ice
- Hail
- Heavy Rain
- Heavy Snow
- Strong Winds
- Thunderstorm
- Tornado

The risks of freezing rain/sleet/ice, and heavy snow were discussed as the reality of living in South Dakota. Emphasis was placed on the potential for utility interruptions during severe storms which increase susceptibility of vulnerable populations to extreme temperatures.

Thunderstorms often are accompanied by heavy rain, strong winds and hail. These events carry the probability to affect a large number of properties at any one time. Without generating tornadoes, it is unlikely for the loss of life to occur to any individual seeking shelter from a storm with these characteristics. The City's main concerns are providing shelter to those without adequate shelter and continued provision of utilities during an emergency situation.

Ward has never been directly hit by a tornado. According to the 2019 SD Hazard Mitigation Plan, ten tornadoes were confirmed throughout Moody County between 1950 and 2016. Two of these tornadoes were within thirty-five miles of Ward. The potential for damage and devastation from a tornado is very severe. The community identified the need to provide timely warnings, emergency services during recovery, and community assistance during clean-up.

Medium Vulnerability

- Extreme Cold
- Extreme Heat
- Flood
- Lightning
- Rapid Snow Melt

Extreme heat was discussed as a threat especially during an electrical outage. As in the incidence of extreme cold, the community found it most important to minimize utility interruptions to foster extreme heat resiliency.

Lightning has the potential to disrupt utilities, especially electrical utilities, and can cause fires. Although lightning rarely causes damage within the community, the impacts of a lightning strike can have severe results.

Ward does not have a flood plain map for the city. A Moody County flood plain map shows the area surrounding Ward is not within a 100-year flood plain. Due to the flat terrain, most of the community does not have any major flooding issues except ponding and high-water table. Ward can experience overland flooding during heavy rain and rapid snow melt events.

Low Vulnerability

- Drought
- Urban Fire
- Wildfire

Ward receives its water from the Big Sioux Community Water System. The community is fortunate to be served by a reliable water source which can provide the required water during periods of drought.

The Town of Ward does not utilize zoning to regulate the placement of buildings in the community. Ward is a small community with a population of 48 persons in 17 occupied residences. Most of the structures in Ward are fairly spread out throughout the community. Total value of residential structures in the Town of Ward can be found in Table 4.24. The risk of fire to any individual building poses a minimal threat to neighboring properties as well. The Town should establish a Comprehensive Land Use Plan and Zoning Regulations.

Although rare, the community is susceptible to urban fire. The community identified the need to upgrade its water distribution lines in order to provide enhance fire protection. The local volunteer fire department needs to continue to offer training to its members and purchase required equipment in order to maintain sufficient firefighting capabilities to protect the lives and property of Ward area residents.

Moody County

High Vulnerability

- Drought
- Freezing Rain/Sleet/Ice
- Heavy Rain
- Rapid Snow Melt
- Heavy Snow
- Strong Winds
- Lightning
- Thunderstorm

The most commonly referenced concern relating to natural hazards in Moody County was the interruption of utility services. While not a naturally occurring hazard, utility interruption becomes the result of natural hazards and significantly affects any community's resiliency to a given hazard. Severe weather accounts for loss of electricity throughout South Dakota every year; Moody County is no exception. Losing electricity can increase health risks associated with certain forms of extreme/severe weather. Loss of electricity certainly affects the provision of other essential services throughout a community (water and sewer), particularly for those communities without back-up power for utility services. It is also necessary to keep back-up power for emergency services, emergency shelter, law enforcement, and emergency management in the event of severe weather.

Freezing Rain/Sleet/Ice and heavy snow are common in Moody County. These events can be more treacherous in rural areas than urban due to the potential to strand motorists or result in car accidents. Interstate 29 runs through spans Moody County from north to south, and SD Highway 34 nearly bisects the county from east to west. In addition to the two highways being heavily traveled by commuters and freight traffic passing through the county; the crossing of SD HWY 34 with Interstate 29 is the location of the exit for Madison, SD (in Lake County) which is home to a college, and an employment center. Also, Flandreau (in Moody County) and Pipestone, MN are served by these routes and are common destinations for tourist and entertainment purposes. In freezing or snowy conditions visibility becomes difficult; roads become slick and accidents, some fatal, happen. Aside from hazards to motorists, as discussed with many of the municipalities, these events tend to lead to utility interruptions which were discussed earlier.

Drought is considerably more threatening to rural residents of the county than to residents within City Limits. In a County such as Moody, which depends greatly on agriculture for its economy, the devastation of a drought would be felt directly by its rural residents and indirectly by all residents. Only a small percentage of the tillable acreage in the county is irrigated, so it is dependent upon rainfall as the sole water source. Cattle and other livestock on feed are fed the crops grown locally (principally) with other feeds used only to supplement the base feed stock. Water is provided for residents in rural areas via rural water, however currently the primary provider of rural water in Moody County is distributing near maximum capacity.

A prolonged period of drought could jeopardize the public water supply for many rural and municipal residents in the County. Residents using private wells for a primary water source are also at risk for diminished water supply in a drought. The depths private wells fluctuate depending on the water level of the shallow aquifers, which fluctuate in drought conditions. Also, many livestock operations rely on stock dams as water sources for cattle. Stock dams are fed by the water table as well. If the primary water sources dry up, supplementary sources of water must be found. Prolonged drought increases the risk of wildfire (discussed later).

Thunderstorms resulting in high winds and potential flash flooding have occurred often in the past in Moody County. Since 2018, five separate storms have resulted in wind reports exceeding 70 miles per hour associated with thunderstorms. One particular storm on July 1, 2011 resulted in wind speeds exceeding 80 miles per hour near Egan and over $200,000 worth of damage in Flandreau where trees throughout town were uprooted, roofs were lifted from structures, and windows were broken. Lightning strikes happen frequently associated with these storms as well, however damage from lightning is less frequent. Despite the occasional strike of a structure or ignition of bales in a field, the county's communication and power distribution is most susceptible to interruption as a result of lightning strike.

Moody County's drainage pattern varies depending upon location in the county. East of the Big Sioux River (approximately the eastern one-third) drainage channels are more defined and flooding is contained within a more recognizable floodplain. Although some structures (in the rural portion of the county) are constructed within the identified floodplain, the county's roads (consisting of township, county, state and federal roadways) are most susceptible to damage due to flooding. Many road improvements have been made on rural (township) roads without regard to downstream drainage and as a result some bridges and culverts need to be replaced to handle greater volumes of water, and at a minimum the carrying capacity versus the demand on those structures should be studied.

The drainage pattern of the western two-thirds of the County is more frequently dotted with potholes than defined drainage channels. These water sources are less apt to “wash-out” a road but may result in inundation of roadways. Perhaps the most common problem for rural roads is the undermining of the road base by high water tables or small water bodies surrounding the roads. Townships are tasked with maintaining many miles of roads in Moody County. The officials from these entities were asked to identify habitual problem locations on their road systems. Maps identifying these vulnerable sites are found in Appendix E. In order to upgrade these locations to break the cycle of repair, flood, repair, etc., it may be necessary to conduct a more thorough drainage study of certain problem corridors most prone to flooding.

Medium Vulnerability

- Extreme Cold
- Extreme Heat
- Flood
- Hail
- Ice Jam
- Tornado
- Urban Fire
- Wildfire

Extreme cold carries similar dangers to the local economy in reference to livestock production. Recent events in the western portion of the state underscore the possibility of massive losses to herds of livestock in extreme cold. Since most herds are in more confined areas in Moody County than in western South Dakota, it is less likely the effects would equal the October storm in 2013. Extreme cold becomes a risk to residents during prolonged power outages, such as the loss of power that happened in neighboring Clark County in 2005 but again even in that extreme example no loss of life occurred.

The vulnerability of the county to extreme heat is similar to that of drought. Indeed, extreme heat can lead to health risks for the residents of Moody County. The county does not have a significant record of heat related injuries or deaths, but it would be possible to see risk to the health of residents if extreme heat were accompanied by a loss of utilities. In rural areas a primary threat from extreme heat is the potential loss to livestock. As described in reference to drought, water supplies may dwindle during a prolonged period of drought. Should extreme heat occur during such a time, the increased physiological demand for water in livestock coupled with a shortage of water could result in significant economic losses. Couple the risk of running out of water with the increased risk of certain animal diseases during drought and high temperatures and the local economy stands highly vulnerable to these drought and extreme heat.

Considerable discussion has already been dedicated to flooding in Moody County. Moody County is fortunate to have recent flood hazard boundary maps. The county also utilizes GIS software with parcel mapping and areal imagery that can be overlaid by the most recent flood hazard boundaries. A small cluster of residences adjacent to Lake Campbell in the northwest corner of the county were constructed prior to the identification of the floodplain. Most structures within the floodplain are located near the Big Sioux River within communities. In the rural area, structures located in the floodplain are located on farmsteads established near the Big Sioux River and its tributaries long before the formal identification of flood hazard boundaries.

Hail is common in Moody County as a result of thunderstorms. Damage from hail is typically economic. Every year hail damages crops in Moody County, resulting in the loss of revenue to numerous local farmers. While large hail is rare, Moody County residents have suffered damage due to hail greater than 2” in diameter in the past.

Ice moving on tributaries and the Big Sioux River hold the potential to block culverts or bridges crossing the river or damage the roads. It is uncommon for ice jams to result in significant damage for flooding because such blockages are generally removed as soon as possible to alleviate the damage they cause.

Tornadoes, as discussed in the communities, can be devastating, however in the rural areas they are less likely to result in damage to more than a few properties in any one event. The rural portions of the county are not densely populated with the exception of development adjacent to Lake Campbell in the northwest corner of the county. Therefore, it is unlikely for structures on multiple properties outside of municipalities to be affected by a tornado unless it would touch down in that cluster of development.

Vulnerability to urban and wildfire is due to the lack of an experienced firefighting service in the county. The county and its municipalities are served by three volunteer fire departments. Many of those fire departments have outdated equipment and several members with minimal training. The county has not suffered significant wildfire or urban fire in recent history, but the potential exists for fire and difficulty containing it based on available equipment.

Low Vulnerability

- Dam Failure

Most dams in Moody County are privately owned and hold back small volumes of water. The flooding of these dams would affect only the owner of the dam, so the risk to the residents of the county is minimal.

After conducting the risk assessment for each jurisdiction, the PDM Planning Team decided that all areas of the county have an equal chance of a natural hazard occurrence in their area. While the extent to which each jurisdiction is affected by such hazards varies slightly between the local jurisdictions, the implications are the same. Thus, the PDM Planning Team decided that all jurisdictions in the County are equally affected by the types of hazards/risks that affect the PDM jurisdiction. Thus, the unique or varied risk requirement is not applicable to the Moody County PDM.

On the following pages, a hazard vulnerability map is shown for each of the jurisdictions participating in this PDM. The maps identify critical infrastructure and one-hundred-year flood plain. Since the other major hazards facing the county are not geographically based, winter storms and severe summer storms are about as likely to occur in one part of the county as another. Similarly, wildfires can occur almost anywhere in the county, although they are more likely to occur in areas with extensive grassland cover or shrubs. Certain facilities provide for utility services within Moody County. While specific locations for above ground electrical distribution lines are not identified on the map(s) they are located throughout the County and are vulnerable to both flooding and severe weather. (See Figures 4.2 through 4.7).

Figure 4.1: Moody County Hazard Vulnerability Map

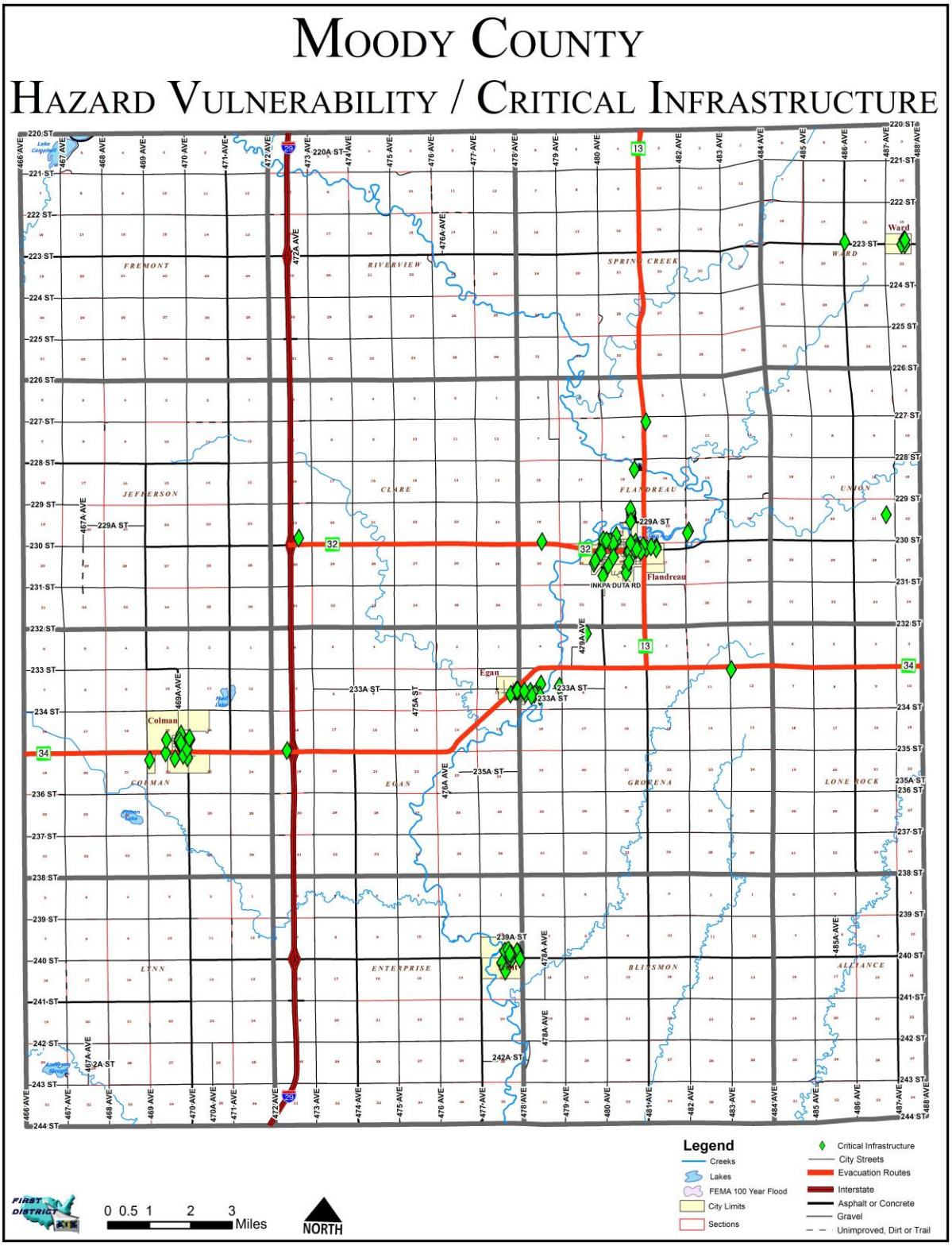


Figure 4.2 City of Colman Hazard Vulnerability Map

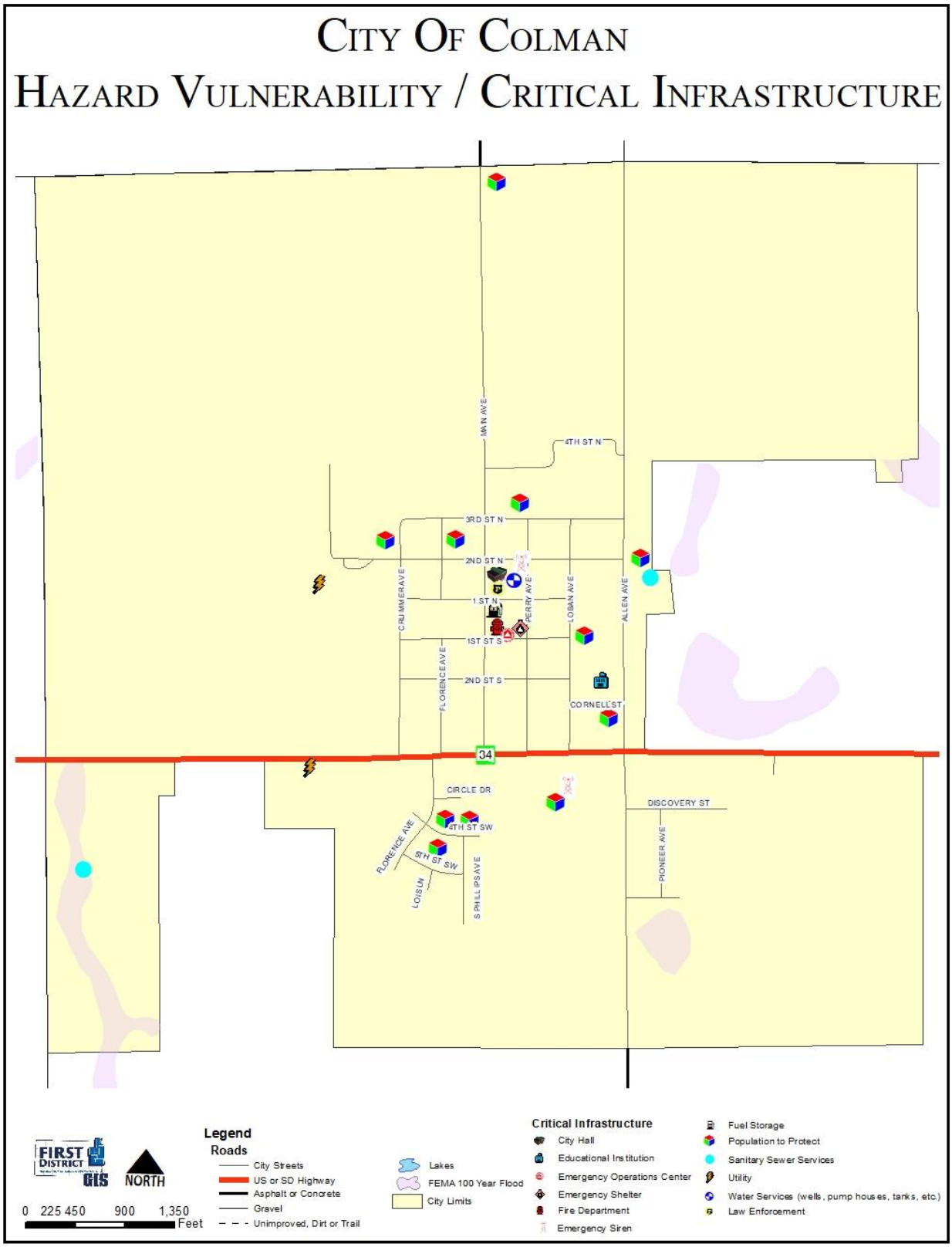


Figure 4.3: City of Egan Hazard Vulnerability Map

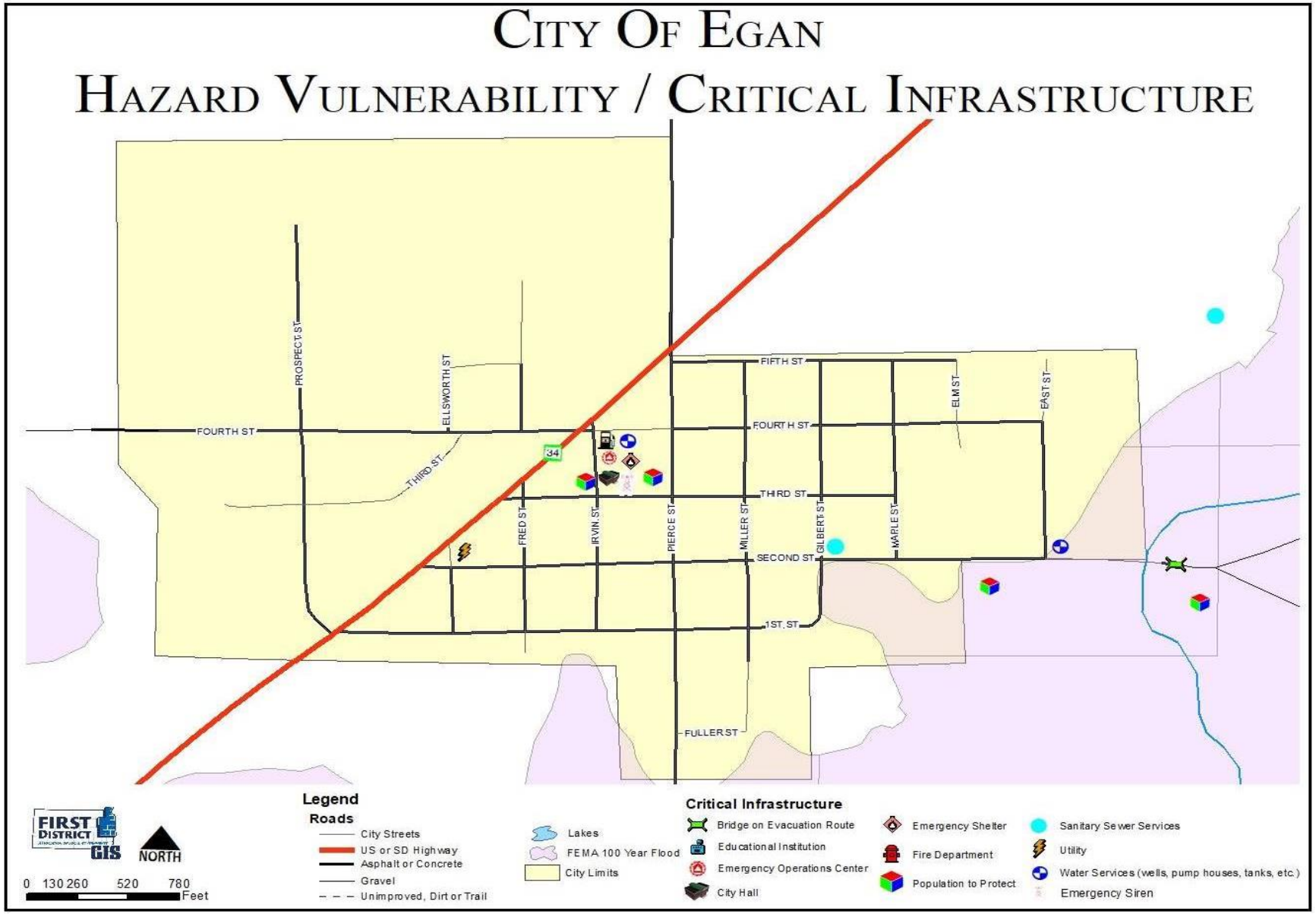


Figure 4.4: City of Flandreau Hazard Vulnerability Map

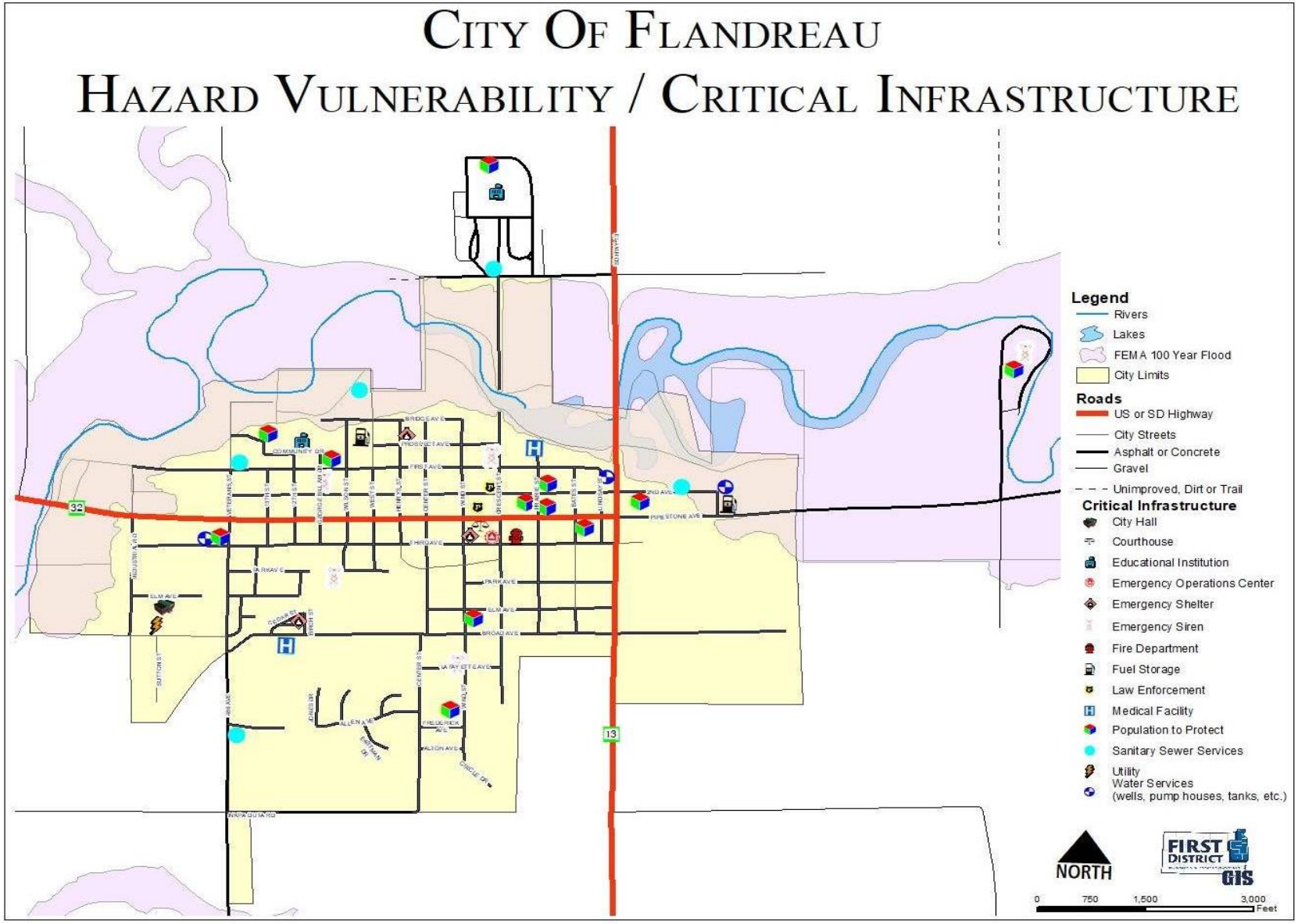


Figure 4.5: Town of Trent Hazard Vulnerability Map

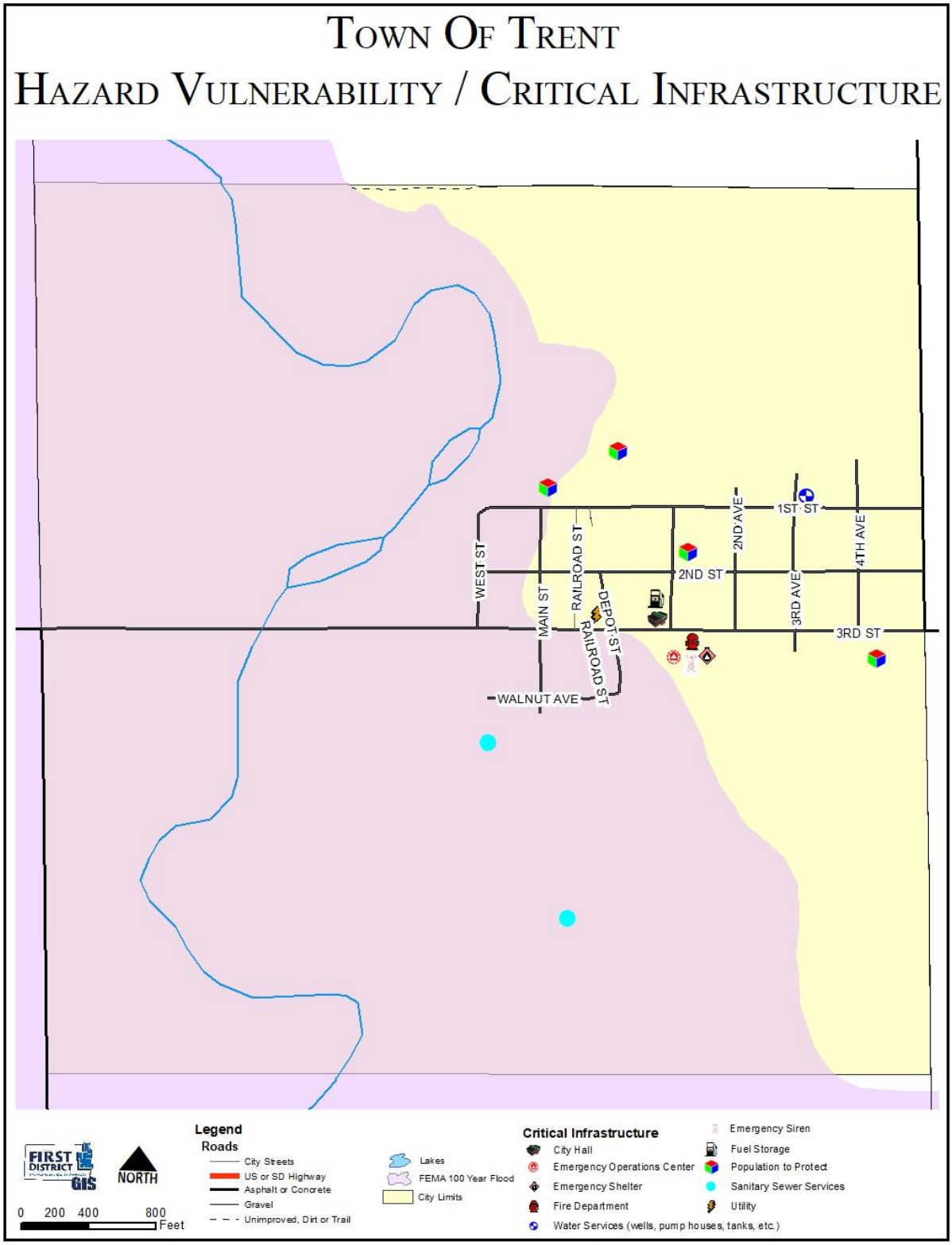
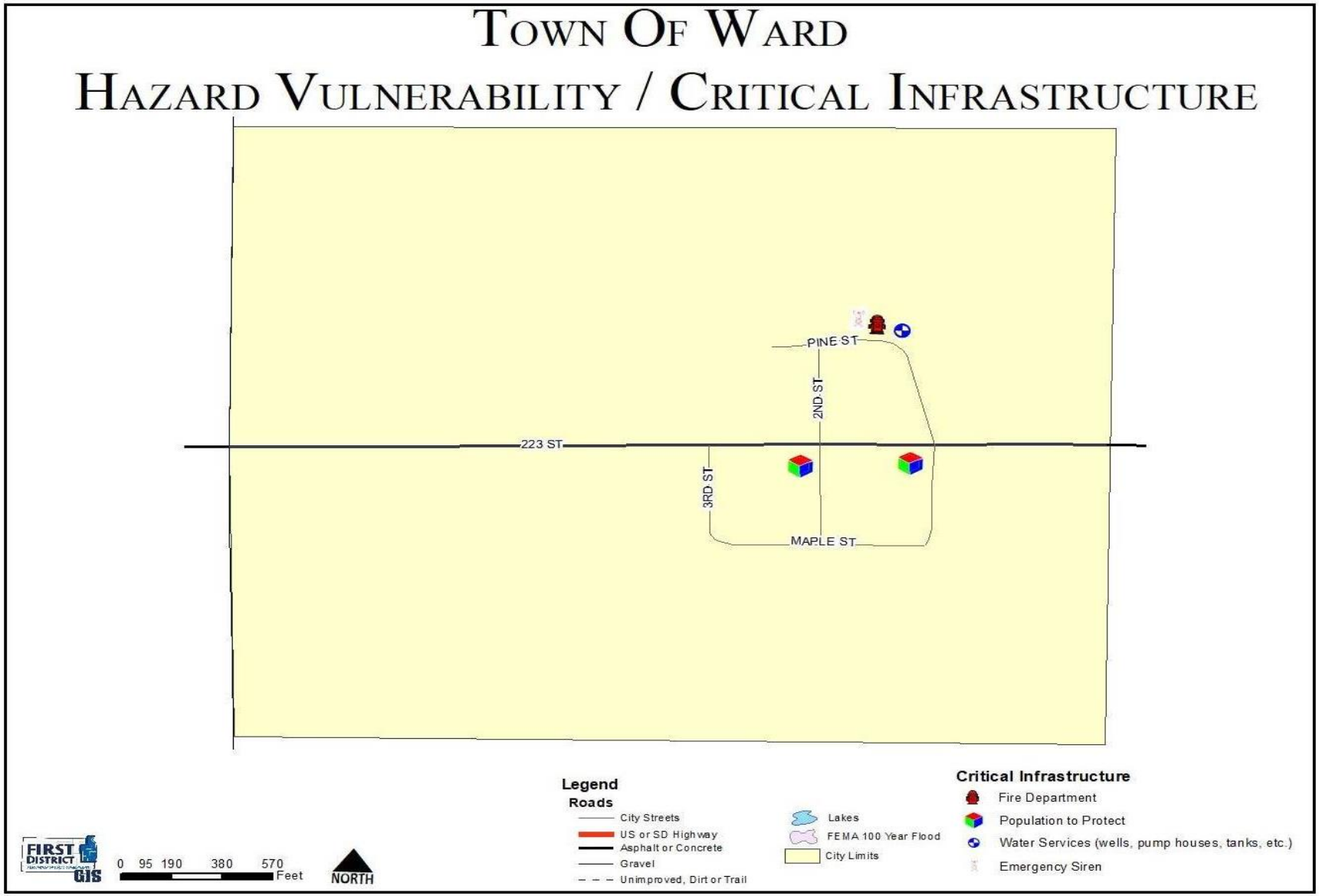


Figure 4.6: Town of Ward Hazard Vulnerability Map



CHAPTER 5
MITIGATION STRATEGY

MITIGATION OVERVIEW

Requirement 201.6(c)(3)(i). Local Mitigation Plan Review Tool – C3.
Requirement 201.6(c)(3)(ii). Local Mitigation Plan Review Tool – C4.
Requirement 201.6(c)(3)(iii) & (iv). Local Mitigation Plan Review Tool – C5.
Requirement 201.6(d)(3). Local Mitigation Plan Review Tool – D3.

The State Hazard Mitigation Plan addresses several mitigation categories including warning and forecasting, community planning, and infrastructure reinforcement. The County and participating entities' greatest needs are mitigating high wind and flood hazards, backup generators for critical infrastructure, construction of storm shelters, and public awareness.

After the completion of the risk assessment (identification of hazards, probability of hazards and vulnerability to hazards), it was the mutual consensus of the PDM Planning Team that mitigation strategies of the PDM should focus on the following hazards: winter storms, severe summer storms, flooding, wildfires (urban/rural).

The PDM Planning Team first reviewed the goals, objectives and priorities of the 2014 Plan. The goals and objectives of the previous plan were incorporated into the goals of this plan. The PDM Planning Team completed the goal identification process by considering the county's and participating jurisdictions' vulnerability to each identified hazard, and the severity of the threat posed by each hazard. Much of the discussion focused on damage caused by past events, and what could be done to ensure that future damage will be lessened or eliminated. By reviewing each jurisdiction's Comprehensive Land Use Plan (if available), the participants also considered how future development might affect the county's and participating jurisdictions' vulnerability to the hazards they face. When identifying goals, numerous activities or projects were identified with broadly defined benefits to numerous jurisdictions within the County. Numerous actions were agreed by the PDM Planning Team to have broad reaching benefits but due to scope or varying levels of importance to individual jurisdictions no specific cost, timeframe, or priority was assigned. Likewise, many infrastructure projects and policies throughout all communities would mitigate hazards but were not located in the most vulnerable areas. All communities reviewed the activities/policies and corresponding problem statements to identify whether they applied to their respective jurisdiction. The results of the community review of those general activities/policies are displayed in Tables 5.1 – 5.12. Specific projects for each community are listed in Table 5.13. Those projects intended to mitigate problems at a specific location are represented in Figures 5.1 to 5.7.

Principal Goals

1. **Reduce the loss of life, property, infrastructure, critical facilities, cultural resources and impacts from severe weather, flooding and other natural disasters.**

2. **Improve public safety during severe weather, flooding and other natural disasters.**

3. **Improve the County's Emergency Preparedness and Disaster Response and Recovery capabilities.**

Mitigation Activities for Flooding Hazards

Goal #1: Protect specific areas of Moody County from flooding.
Goal #2: Educate and inform Moody County residents regarding flooding safety.
Goal #3: Reduce the extent to which utility interruptions affect areas during flooding events.

- **Actions/Projects to reduce flood risk through policy implementation (See Table 5.1)**

- **Actions/Projects to change the characteristics or impacts of flood hazards (See Table 5.2)**

- **Actions to reduce loss potential of infrastructure to flood hazards (See Table 5.3)**

Mitigation Activities for Severe Weather Hazards (summer and winter)

Goal #1: Increase public awareness and education on severe weather issues.
Goal #2: Improve public safety during severe weather.
Goal #3: Reduce the extent to which utility interruptions affect areas during severe weather situations.
Goal #4: Reduce crippling effects of winter storms, especially regarding smaller communities.

- **Actions/Projects to reduce severe weather risk through policy implementation (See Table 5.4)**

- **Actions/Projects to change the characteristics or impacts of severe weather hazards (See Table 5.5)**

- **Actions/Projects to reduce loss potential of infrastructure to sever weather hazards (See Table 5.6)**

Table 5.1: Actions/Projects to Reduce Flood Risk through Policy Implementation

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Public is unaware of scope of flood risk and existing emergency plans.	Public education. Disseminate information regarding how to deal with flooding. This would include transportation issues, home protection strategies, safety issues, and how to move forward after a flooding situation.	✓	✓	✓	✓	✓	✓
	Encouraging homeowners in flood-prone areas to purchase flood insurance.	✓	✓	✓	✓		✓
Jurisdiction is unaware potential hydrologic impacts of drainage/ development projects.	Conduct necessary studies addressing drainage (storm water flow/runoff, etc).	✓	✓	✓	✓	✓	✓
Residents are not eligible for flood insurance.	Begin participation in the National Flood Insurance Program.					✓	
Failure to comply with NFIP programs makes the community ineligible for flood insurance and certain funding.	Ensure continued National Flood Insurance Program compliance by enforcing flood plain management ordinance.	✓	✓	✓	✓		✓
Jurisdiction is unaware of opportunities to participate programs to assist in achieving mitigation goals.	Work to improve the level of communication and coordination with the State NFIP coordinator.	✓	✓	✓	✓		✓
Jurisdiction has no legal mechanism to regulate land use.	Adoption and enforcement of land use regulation.					✓	
Need to continue to regulate minimum land use and development standards	Continue enforcement of zoning and subdivision ordinances.	✓	✓	✓	✓		✓
Jurisdiction has little legal mechanism to regulate drainage.	Developing a county/city drainage ordinance.						

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Need to continue to regulate minimum construction standards.	Continue enforcement of building codes.						
No technical analysis or identification of specific mitigation projects.	Identify and prioritize capital/structural mitigation projects that are cost effective and technically feasible.	✓	✓	✓	✓	✓	✓

Table 5.2: Actions/Projects to Change the Characteristics or Impacts of Flood Hazards

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Portions of storm sewer system is not designed to 100-year flood event.	Installing or upgrading storm sewer piping.	✓	✓	✓	✓	✓	
Inadequate warning for flooding on Big Sioux River.	Add additional stream gauges along river within the county.		✓	✓	✓		✓
Drainage patterns have changed, culverts are inadequate for conveyance of water.	Installing or enlarging drainage culverts.	✓	✓	✓	✓		✓
Certain streets have substandard or no curb and gutter.	Curbing and guttering of city streets to improve storm water flow.	✓	✓	✓	✓	✓	
Capacity of rivers, streams, and retention areas is decreased due to accumulation of debris.	Clean out debris in drainage areas, tributaries, etc to improve water flow.	✓	✓	✓	✓	✓	✓
Sanitary and/or storm sewer are vulnerable to back-up in flood event.	Install valves, plugs in sanitary and/or storm sewer system.	✓	✓	✓	✓	✓	
	Investigate opportunities for berming.				✓		
Potential for development in flood prone areas.	Preservation and expansion of open space along the river and enhancement of existing berm areas.		✓	✓	✓		✓
	Work with property owners to implement deed restrictions for open lots/vacant properties in the flood hazard areas to prevent development.	✓	✓	✓	✓		✓

Table 5.3: Actions/Projects to Reduce Loss Potential of Infrastructure to Flood Hazards

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Many roads and bridges were built prior to identification of flood hazard areas.	Replace and raise bridges.		✓	✓			✓
	Elevating roads in flood-prone areas.	✓	✓	✓	✓	✓	✓
Some utility poles are located in areas vulnerable to flooding.	Flood-proof or replace utility structures in flood-prone areas.	✓	✓	✓	✓	✓	✓
Structures constructed in the floodplain prior to identification of flood hazard areas.	Making structural retrofits to infrastructure.	✓	✓	✓	✓	✓	✓

Table 5.4: Actions/Projects to Reduce Severe Weather Risk through Policy Implementation

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Public is unfamiliar with certain disaster preparation measures.	Public education. Disseminate information regarding how to deal with severe weather (summer/winter). Some of the issues that may be addressed within the information would include: safety issues on downed power lines, electrical and fire dangers, the necessity for generators and advice on using them, protecting property, survival strategies during storms, and purchasing of back-up power for various household and farming operations.	✓	✓	✓	✓	✓	✓
Lack of data regarding vulnerability to winter storms.	Gather data to create a more precise loss estimate for winter storms.	✓	✓	✓	✓	✓	✓
Lack of data regarding vulnerability to summer storms.	Gather data to create a more precise loss estimate for summer storms.	✓	✓	✓	✓	✓	✓

Table 5.5: Actions/Projects to Change the Characteristics or Impacts of Severe Weather Hazards

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Certain areas and populations are not served by storm shelters.	Construct tornado safe rooms or community shelters.	✓	✓		✓	✓	✓
	Construct storm shelters at manufactured home parks.	✓	✓		✓	✓	✓
	Construct storm shelters at RV parks.	✓	✓		✓		✓
Critical facilities are vulnerable to power failure.	Install backup generators.					✓	✓
Sirens are out of date.	Ensure storm sirens meet federal standards.	✓	✓	✓	✓	✓	✓
Certain areas are susceptible to snow drifting.	Survey areas in need of snow shelterbelts and plant trees accordingly.	✓	✓	✓	✓	✓	✓
	Install or plant living snow fences.	✓	✓	✓	✓	✓	✓
Certain areas of town cannot hear storm sirens and other emergency warning systems.	Construct new or improve existing warning systems.	✓	✓	✓	✓	✓	✓

Table 5.6: Actions/Projects to Reduce Loss Potential of Infrastructure to Severe Weather Hazards

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Utility lines and structures are subject to failure in high wind, heavy rain, ice events.	Upgrading of utility lines.	✓	✓	✓	✓	✓	✓
	Burial of utility lines when needed.	✓	✓	✓	✓	✓	✓
	Require upgrading of overhead lines when age or disasters provide an opportunity.	✓	✓	✓	✓	✓	✓
	Removal of trees near power lines.	✓	✓	✓	✓	✓	✓
	Attachment of guy wires to dead-end poles.	✓	✓	✓	✓	✓	✓
	Testing integrity of poles.	✓	✓	✓	✓	✓	✓
	Usage of anti-galloping devices.	✓	✓	✓	✓	✓	✓
	Making structural retrofits to facilities.	✓	✓	✓	✓	✓	✓

Mitigation Activities for Fire and Drought Hazards

Goal #1: Increase firefighting capabilities.
Goal #2: Reduce the negative effects droughts have on Moody County.
Goal #3: Reduce the negative effects wildfires have on Moody County.

- **Actions/Projects to reduce fire and drought risk through policy implementation (See Table 5.7)**
- **Actions/Projects to reduce loss potential of infrastructure to fire and drought hazards (See Table 5.8)**
- **Actions/Projects to change the characteristics or impacts of fire and drought hazards (See Table 5.9)**

General Mitigation Activities

Technological (See Table 5.10):

Planning (See Table 5.11):

Administration/Coordination (See Table 5.12)

Table 5.7: Actions/Projects to Reduce Fire and Drought Risk through Policy Implementation

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Community becomes vulnerable to fire hazard while staff is being trained.	Find funding sources to pay for persons to fill positions while individuals are at training courses.	✓	✓	✓	✓	✓	✓
Potential for development in areas vulnerable to wildfire or urban fire.	Adoption and enforcement of property regulations in areas vulnerable to wildfire.	✓	✓	✓	✓	✓	✓
	Establish/require minimum fire suppression standards for subdivisions.	✓	✓	✓	✓	✓	✓
Community has no plan/policy for water rationing in emergency.	Develop water rationing measures that will be implemented during a drought situation.	✓	✓	✓	✓	✓	✓
Public is unaware of benefits of conserving water.	Always educate residents on the benefits of conserving water, not just during a drought.	✓	✓	✓	✓	✓	✓

Table 5.8: Actions/Projects to Reduce Loss Potential of Infrastructure to Fire and Drought Hazards

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Firefighting equipment becomes out of date quickly.	Ensure that fire departments are adequately equipped to respond to wildfires	✓	✓	✓	✓	✓	✓
Fire hydrants become unusable.	Have rural fire departments locate dry fire hydrants.	✓	✓	✓	✓	✓	

Table 5.9: Actions/Projects to Change the Characteristics or Impacts of Fire and Drought Hazards

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Reservoirs are vulnerable to silting and decrease in efficient provision of water services in emergency situations.	Dredge reservoirs to improve water quality. Reservoirs silt in and dredging, water can flow to more places, more quickly, and more easily.	✓	✓	✓	✓	✓	✓
Dead or dry plant material creates fire hazard/ location changes seasonally and annually.	Burn areas to ensure a fire break rather than ignition fuel.	✓	✓	✓	✓	✓	✓
Local economy is very dependent on corn/soybean production.	Educate farmers on the benefits of a diversified crop protection plan in the event of a drought.	✓	✓	✓	✓	✓	✓
	Work with local farmers to investigate the use of more drought resistant crops.	✓	✓	✓	✓	✓	✓

Table 5.10: Technological Activities

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Current data and software can become obsolete or out of date.	Continue utilizing a working computer aided mapping project for the County. This includes using overlays of GIS data, HazMat, and Roads.						✓
	Enhance existing computer aided dispatch.	✓	✓	✓	✓	✓	✓
	Use HAZUS software to estimate losses in flooding situations. Information may also be able to be used for other hazard areas.	✓	✓	✓	✓	✓	✓
	Work with South Dakota State University to explore additional methods of estimating losses in natural hazards.	✓	✓	✓	✓	✓	✓

Table 5.11: Planning Activities

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
Maintenance of a mitigation plan is beyond the economic capability of this community.	Find funding to review and update the regional and local disaster mitigation plans on a five-year cycle.	✓	✓	✓	✓	✓	✓
Disaster mitigation projects have not always been incorporated into other plans.	Incorporate disaster mitigation actions into appropriate local and regional plans – Master Plans, land use, transportation, open space, and capital programming.	✓	✓	✓	✓	✓	✓
	Integrate disaster mitigation concerns into subdivision, site plan review, and other zoning reviews. In particular, require the consideration of downstream flooding impacts caused by new projects.	✓	✓	✓	✓	✓	✓
	Integrate disaster mitigation concerns into transportation projects (e.g. drainage improvements, underground utilities, etc.).	✓	✓	✓	✓	✓	✓
This community's mitigation projects are not coordinated with other communities' projects.	Develop a means for sharing information on a regional basis about successful disaster mitigation planning and programs.	✓	✓	✓	✓	✓	✓

Table 5.12: Administration/Coordination Activities

Problem Statements	Actions	*Colman*	*Egan*	*Flandreau*	*Trent*	*Ward*	*Moody County*
This community is not staffed, nor does it have funding mechanisms to apply for and administer funding sources for mitigation projects.	Identify and pursue funding that builds local capacity and supports grant-writing for mitigation actions identified in the PDM.	✓	✓	✓	✓	✓	✓
Need to improve coordination of activities with other governmental jurisdictions and utility providers.	Increase communication/coordination between federal, state, regional, county, municipal, private, and non-profit agencies in the area of pre-disaster mitigation.	✓	✓	✓	✓	✓	✓
	Maintain and enhance working relationships with the utility providers.	✓	✓	✓	✓	✓	✓

After meetings with the local jurisdictions and opportunities for public input, a series of mitigation goals were devised to best aid the County in reducing and lessening the effects of hazards. Projects previously identified in the 2014 PDM were carefully analyzed and discussed to determine which of the projects had enough merit to be included in the updated PDM and to determine if the projects meet the hazard mitigation needs of the county. These projects were evaluated based on a cost/benefit ratio and priority. Although this PDM focuses on disaster mitigation rather than disaster preparedness, some communities discussed disaster preparedness projects as well. It was difficult for individual communities to recognize the difference between providing storm shelters and making sure the storm shelters function properly (for example). Actions considered in this category included the acquisition of emergency generators and erecting or replacing warning sirens in areas that currently are not well served.

Most of the mitigation actions proposed by the jurisdictions were identified by city council members, public works personnel, or PDM Planning Team members from the jurisdiction. Some actions were also proposed by townships and utility providers due to the direct impact of disasters on infrastructure and services they provide. Once each jurisdiction had its list of proposed actions complete, it was submitted to the Emergency Management Director. At the second PDM Planning Team meeting, the actions were reviewed. At the third PDM Planning Team meeting a final opportunity was given for the jurisdictions to add any additional actions or refine information relating to previously identified projects.

Although in some cases additional data will be necessary, a timeframe for completion, oversight, funding sources, and any other relevant issues were addressed. These implementation strategies are geared toward the specific goal and area. Often, these projects will not encounter any resistance from environmental agencies, legal authorities, and political entities. Table 5.13 is a presentation of the mitigation actions proposed by the PDM Planning Team, County, communities, townships, and utility providers. In addition to identifying the proposed actions, the table includes additional information about each action. Elected officials and staff of each municipality and the county were responsible for providing most of this information for actions in their community, but the other planning participants helped in this process. The following information is provided for each action:

- A statement regarding the specific problem the proposed action will mitigate.
- The local priority rating (discussed in the next section).
- The time frame to accomplish the action – “Short” means actions that are intended to be initiated within two years, “Medium” is for actions that should be started within five years, and “Long” is for actions that are not anticipated to be started for at least five years.
- The party(s) primarily responsible for implementing the action.
- The estimated cost - estimates for many of the actions were obtained from knowledgeable sources based on current information. Estimates are subject to change due to specific details of specific projects.
- Potential sources of funding (discussed below).
- The primary hazard being addressed.
- The goal corresponding to the action.

As mentioned above, jurisdictions and entities integrally involved in the planning for disasters due to wide ranging implications to them include townships and utility providers. Some utility providers were represented on the PDM Planning Team. Each utility provider was asked individually to submit their own mitigation actions. The main mitigation activity proposed by utility providers was the burying of overhead lines in rural areas of the county.

In addition, on February 26, 2020 the First District attended the annual Moody County Township Meeting. Eleven of the sixteen Moody County Townships were present. The Township supervisors were asked to identify potential mitigation projects. Each individual township was provided maps upon which they were asked to identify potential mitigation activities and vulnerable roads or infrastructure. Primarily these activities included replacing culverts with larger culverts, elevating or rip-rapping roads, and reconstructing roads. The five townships that were not present, were contacted by First District by email or telephone conservations. Not all townships submitted the maps with potential activities; however, the Appendix E includes maps of vulnerable sites and potential mitigation actions proposed by the townships in the County.

A High Priority Rating can be defined as a potential project that had received widespread support amongst the local governing body when asked during the planning process and would be first priority when planning future mitigation projects. A Medium Priority Rating also would receive general support amongst the governing body but was not a first priority project compared to those deemed a High Priority. Low Priority received the least amount of support, but still were believed to be a necessary action to take for hazard mitigation. Where estimated project costs were available, they were considered in establishing priorities. However, no formal cost benefit analysis was performed on any specific project. Ultimately the prioritization of these projects was based upon the perceived needs of the local jurisdiction.

Particular attention needs to be paid to sources of funding for the actions. Given the existing financial reality of very tight county and municipal budgets, some of the proposed actions realistically cannot be implemented without substantial grant assistance. With such assistance, it is likely that many of the high priority projects can be undertaken without placing an onerous burden on local budgets. Resources for some of the actions available from FEMA through the South Dakota Office of Emergency Management include the Hazard Mitigation Grant Program, Pre-Disaster Mitigation grant program, and Flood Mitigation Assistance grant programs. Other possible sources of funding include:

<u>Grant and loan programs/sources</u>

- Community Development Block Grant program
- Economic Development Administration
- FEMA Assistance to Firefighters Grant program
- South Dakota Dept of Environment and Natural Resources
- South Dakota Dept of Transportation
- US Department of Agriculture Rural Development Office

<u>Local resources</u>

- General obligation bonds
- Revenue bonds
- Tax Increment Financing (TIF) districts

Table 5.13: Proposed Mitigation Activities

MOODY COUNTY PROBLEM STATEMENTS	MOODY COUNTY ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
There are many bridges in Moody County in a state of disrepair.	Reconstruct bridges and culverts.	High	Medium	Moody County Commissioners Highway Superintendent	Unknown	HMGP, County. SDDOT	Flooding	Protect Specific Areas of Moody County from floods.
CITY OF COLMAN PROBLEM STATEMENTS	**CITY OF COLMAN ACTIONS**	**PRIORITY RATING**	**TIMEFRAME**	**CONTACT**	**COST**	**FUNDING SOURCE**	**HAZARD**	**GOAL**
The City needs a Tornado Safe Emergency Shelter.	Construction of Tornado Shelter.	Low	Low	Colman Finance Officer	$50,000.00	HMGP	Tornado	Improve public safety during severe weather.
Overhead lines are vulnerable to high winds and freezing rain/sleet/ice.	Continue burying overhead 3 Phase power lines in community.	High	Short	Colman City Council	$200,000	HMGP/CDBG RD/CITY	Severe Weather Hazards (summer and winter)	Reduce the extent to which utility interruptions affect areas during severe weather situations.
Urban development has exceeded capacity & capability of stormwater mgt system. Areas of city are prone to flooding in heavy rain or rapid snow melt.	Study and implement storm water drainage improvements throughout the community.	High	Short	Colman City Council	$256,000	DENR/HMGP/ City/CDBG	Flooding	Protect Specific Areas of Moody County from floods.

CITY OF EGAN PROBLEM STATEMENTS	CITY OF EGAN ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
The City needs permanent generator for lift stations.	Purchase of Permanent Generator for Critical Infrastructure.	High	Short	Egan City Council	$15,000	City, HMGP	Severe Weather Hazards (Summer and Winter)	Reduce the extent to which utility interruptions affect areas during severe weather situations.
The City needs a Tornado Safe Emergency Shelter.	Construction of Tornado Shelter.	Low	Long	Egan Finance Officer	$50,000.00	HMGP	Tornado	Improve public safety during severe weather.
The City needs additional evacuation routes for certain areas of the community.	Improve alternative evacuation routes.	Medium	Long	Egan City Council	$Unknown	HMGP/DOT/CITY	HMGP/CDBG RD/CITY	Severe Weather Hazards (summer and winter)
Urban development has exceeded capacity/capability of stormwater mgt system. Areas of city are prone to flooding in heavy rain or rapid snow melt.	Study and implement stormwater drainage improvements and long-term maintenance.	Medium	Long	Egan City Council	$Unknown	DENR/HMGP/ City/CDBG	Flooding	Protect Specific Areas of Moody County from floods.

CITY OF EGAN PROBLEM STATEMENTS	CITY OF EGAN ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Overhead lines are vulnerable to high winds and freezing rain/sleet/ice.	Bury 3 Phase power lines in community.	High	Short	Egan City Council/ Ottertail	$200,000	HMGP/CDBG RD/CITY	Severe Weather Hazards (summer and winter)	Reduce the extent to which utility interruptions affect areas during severe weather situations.
CITY OF FLANDREAU PROBLEM STATEMENTS	**CITY OF FLANDREAU ACTIONS**	**RATING**	**TIMEFRAME**	**CONTACT**	**COST**	**FUNDING SOURCE**	**HAZARD**	**GOAL**
Storm sirens are in need of replacement.	Ensure storm sirens meet federal standards.	Low	Long	Flandreau City Council	$25,000	HMGP/CITY/COUNTY	Severe Weather Hazards (Summer and Winter)	Improve public safety during severe weather situations.
The City needs to upgrade existing fire station.	Construct new fire station for the City.	Low	Long	Flandreau City Council	$1,000,000	HMGP RD/CITY	Fire	Increase fire-fighting capabilities.
Structures constructed in the floodplain prior to identification of flood hazard areas.	Acquisition of structures located in the floodplain or floodway.	Medium	Long	Flandreau City Council	$Unknown	HMGP/CITY	Severe Weather Hazards (Summer and Winter)	Reduce the extent to which utility interruptions affect areas during flooding events.

CITY OF FLANDREAU PROBLEM STATEMENTS	CITY OF FLANDREAU ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Development has exceeded capacity/capability of stormwater mgt system. Areas of city are prone to flooding in heavy rain or rapid snow melt.	Implement Drainage Improvements Including Storm Sewer in multiple areas of community.	Medium	Medium	Flandreau City Council	$2,000,000	HMGP/DENR CDBG/RD/City	Flooding	Protect Specific Areas of Moody County from floods.
Public is unfamiliar with certain disaster preparation measures.	Educate public on use and enrollment in the City's emergency alert system.	High	Short	Flandreau City Council	Minimal	HMGP/CITY	Tornado	Increase public awareness and education on severe weather issues.
TOWN OF TRENT PROBLEM STATEMENTS	**TOWN OF TRENT ACTIONS**	**RATING**	**TIMEFRAME**	**CONTACT**	**COST**	**FUNDING SOURCE**	**HAZARD**	**GOAL**
The Town needs to upgrade existing storm siren system.	Upgrade storm siren system.	Low	Long	Trent Town Board	$25,000	HMGP/TOWN/ COUNTY	Severe Weather Hazards (Summer and Winter)	Improve public safety during severe weather situations.
Overhead lines are vulnerable to high winds and freezing rain/sleet/ice	Bury 3 Phase power lines in community.	Low	Long	Trent Town Board/ Ottertail	$300,000	HMGP/CDBG RD/TOWN	Severe Weather Hazards (summer and winter)	Reduce the extent to which utility interruptions affect areas during severe weather situations.

TOWN OF TRENT PROBLEM STATEMENTS	TOWN OF TRENT ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
The Town needs a Tornado Safe Emergency Shelter.	Construction of Tornado Shelter.	Low	Long	Trent Town Board	$150,000.00	HMGP	Tornado	Improve public safety during severe weather.
The third cell of town's sanitary sewer lagoon is prone to inundation in flood events.	Investigate opportunities for berming.	High	Short	Trent Town Board	$25,000	DENR/HMGP/ TOWN/ CDBG	Severe Weather Hazards (summer and winter)	Improve public safety during severe weather.
Urban development has exceeded capacity/capability of stormwater mgt system. Areas of city are prone to flooding in heavy rain or rapid snow melt.	Study and implement stormwater drainage sewer improvements.	Medium	Medium	Trent Town Board	$100,000	DENR/HMGP/ City/CDBG	Flooding	Protect Specific Areas of Moody County from floods.
Town residents need to be aware of services available during inclement weather.	Develop information programs/awareness campaign.	Medium	Medium	Trent Town Board	Minimal	Town	Severe Weather Hazards (Summer and Winter)	Increase public awareness and education on severe weather issues.

TOWN OF WARD PROBLEM STATEMENTS	TOWN OF WARD ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Overhead lines are vulnerable to high winds and freezing rain/sleet/ice.	Bury 3 Phase power lines in community.	Low	Long	Ward Town Board / Ottertail	$25,000	Town/REED/USDA/ HMGP	Severe Weather Hazards (summer and winter)	Reduce the extent to which utility interruptions affect areas during severe weather situations.
Water lines are inadequate for sustainable fire suppression.	Construct new water lines within portions of the community.	High	Medium	Ward Town Board	$200,000	Town/REED/USDA/ DENR/CDBG/ HMGP	Fire	Increase fire-fighting capabilities.
High water table results in flooding/ponding during high rain events.	Install drain tile system to remove excess water.	High	Short	Ward Town Board	$50,000	Town/USDA/DENR/CDBG	Flooding	Protect specific areas of Moody County from flooding.
The Town needs a Tornado Safe Emergency Shelter.	Construction of Tornado Shelter.	Low	Long	Ward Town Board	$150,000.00	HMGP	Tornado	Improve public safety during severe weather.

SIOUX VALLEY ENERGY PROBLEM STATEMENTS	SIOUX VALLEY ENERGY ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Overhead lines are vulnerable to high winds and freezing rain/sleet/ice.	Bury power lines in ice prone areas where feasible.	Medium	Medium	Sioux Valley Energy	Dependent on type of line and construction method.	FEMA-HMGP / Utility Funds	Severe Weather Hazards (Summer and Winter)	Reduce the extent to which utility interruptions affect areas during severe weather situations.
Overhead lines are vulnerable to high winds and freezing rain/sleet/ice.	Bury or rebuild critical overhead power lines to make them more resistant to damage from ice.	High	Medium	Sioux Valley Energy	Dependent on type of line and construction method.	FEMA-HMGP / Utility Funds	Severe Weather Hazards (Summer and Winter)	Reduce the extent to which utility interruptions affect areas during severe weather situations.
Overhead lines are vulnerable to high winds and freezing rain/sleet/ice.	Bury power lines in areas of high traffic volume where feasible.	Medium	Medium	Sioux Valley Energy	Dependent on type of line and construction method.	FEMA-HMGP / Utility Funds	Severe Weather Hazards (Summer and Winter)	Reduce the extent to which utility interruptions affect areas during severe weather situations.
Overhead lines are vulnerable to high winds and freezing rain/sleet/ice.	Bury power lines in heavily treed areas or rebuild overhead lines away from heavily treed areas.	Medium	Medium	Sioux Valley Energy	Dependent on type of line and construction method.	FEMA-HMGP / Utility Funds	Severe Weather Hazards (Summer and Winter)	Reduce the extent to which utility interruptions affect areas during severe weather situations.
Utility poles are located in areas vulnerable to flooding.	Bury or rebuild overhead power lines away from flood-prone areas.	Medium	Medium	Sioux Valley Energy	Dependent on type of line and construction method.	FEMA-HMGP / Utility Funds	Flooding	Reduce the extent to which utility interruptions affect areas during severe weather situations.

Figure 5.1: Moody County Potential Mitigation Project Map

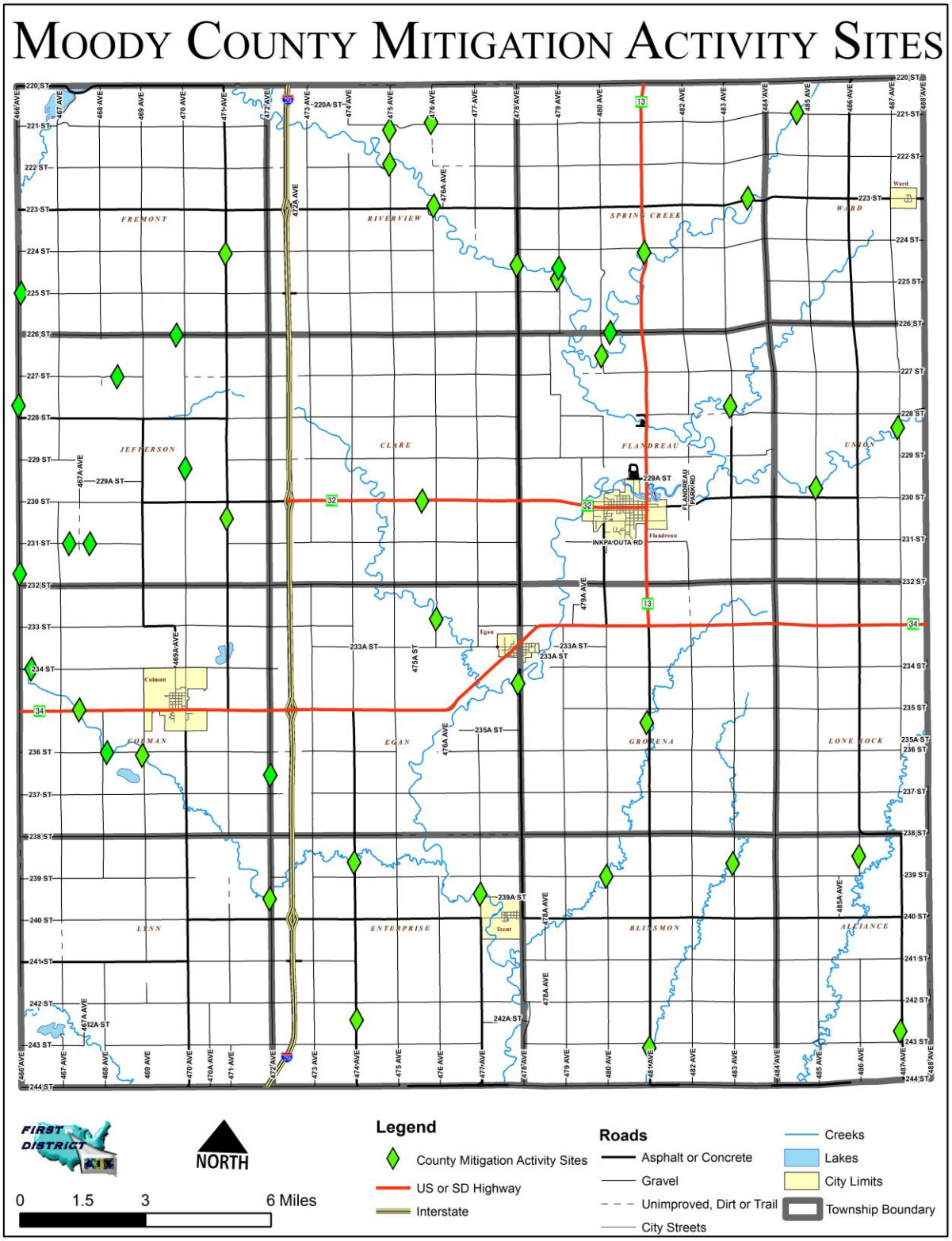


Figure 5.2: City of Colman Potential Mitigation Project Map

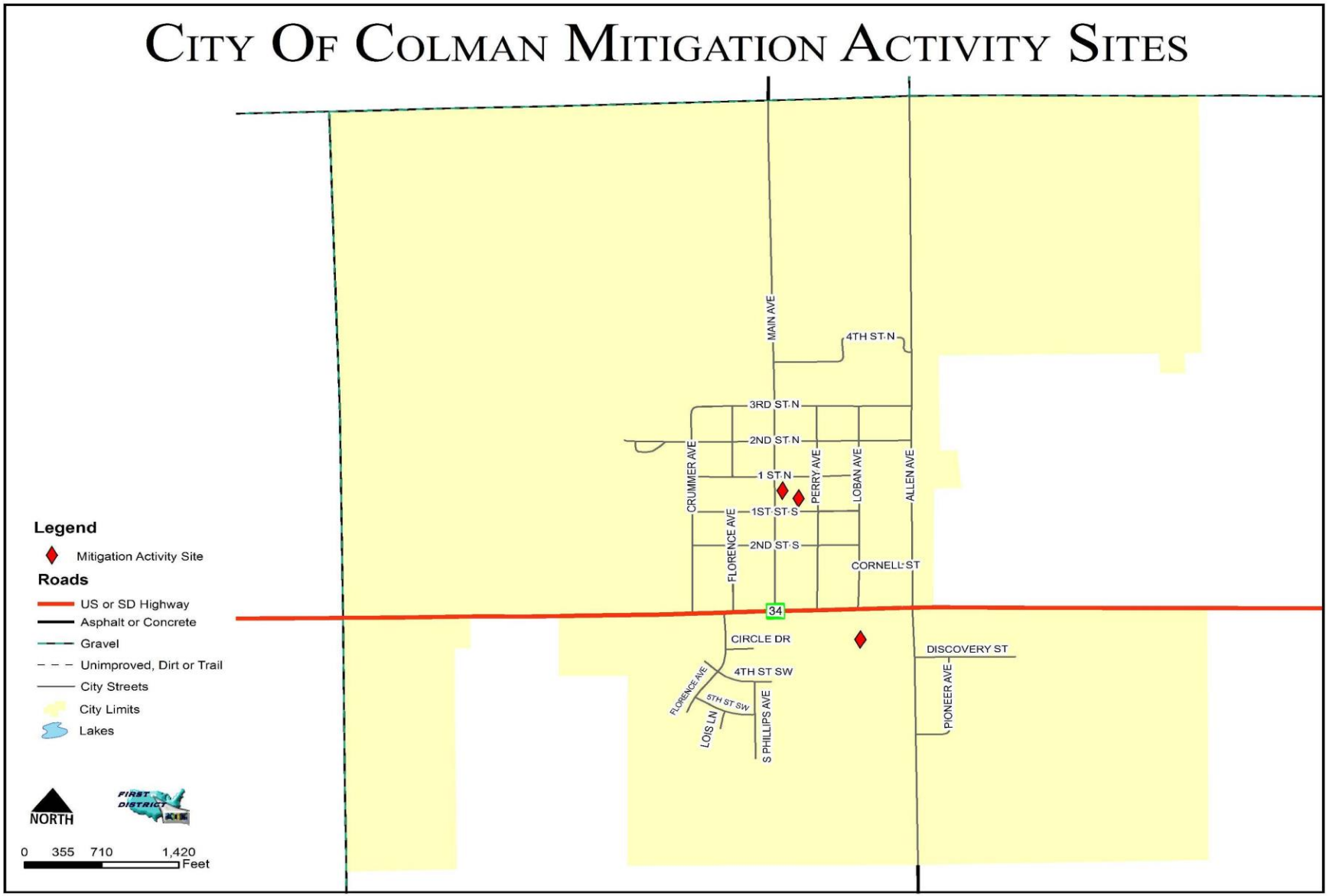


Figure 5.3: City of Egan Potential Mitigation Project Map

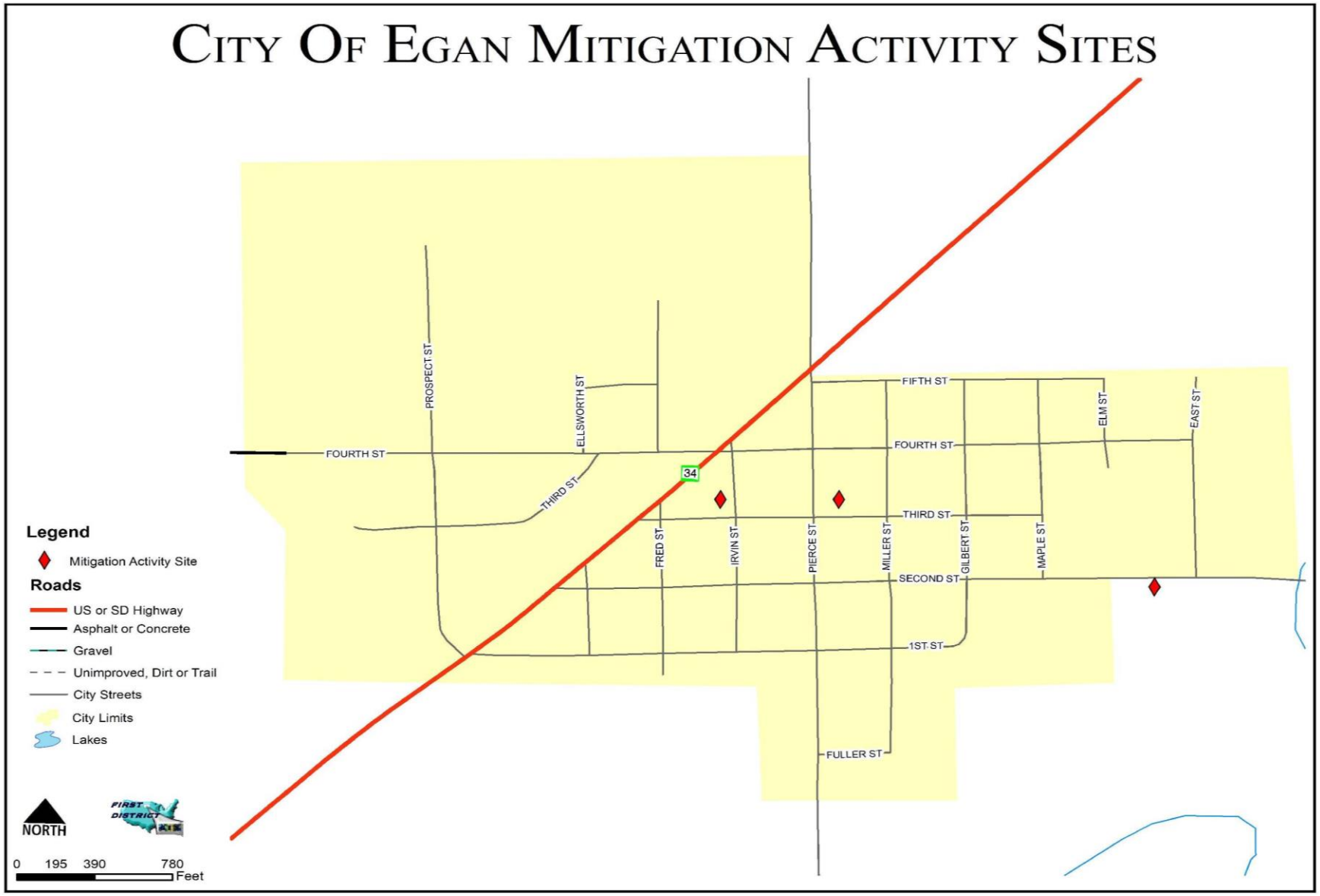


Figure 5.4: City of Flandreau Potential Mitigation Project Map

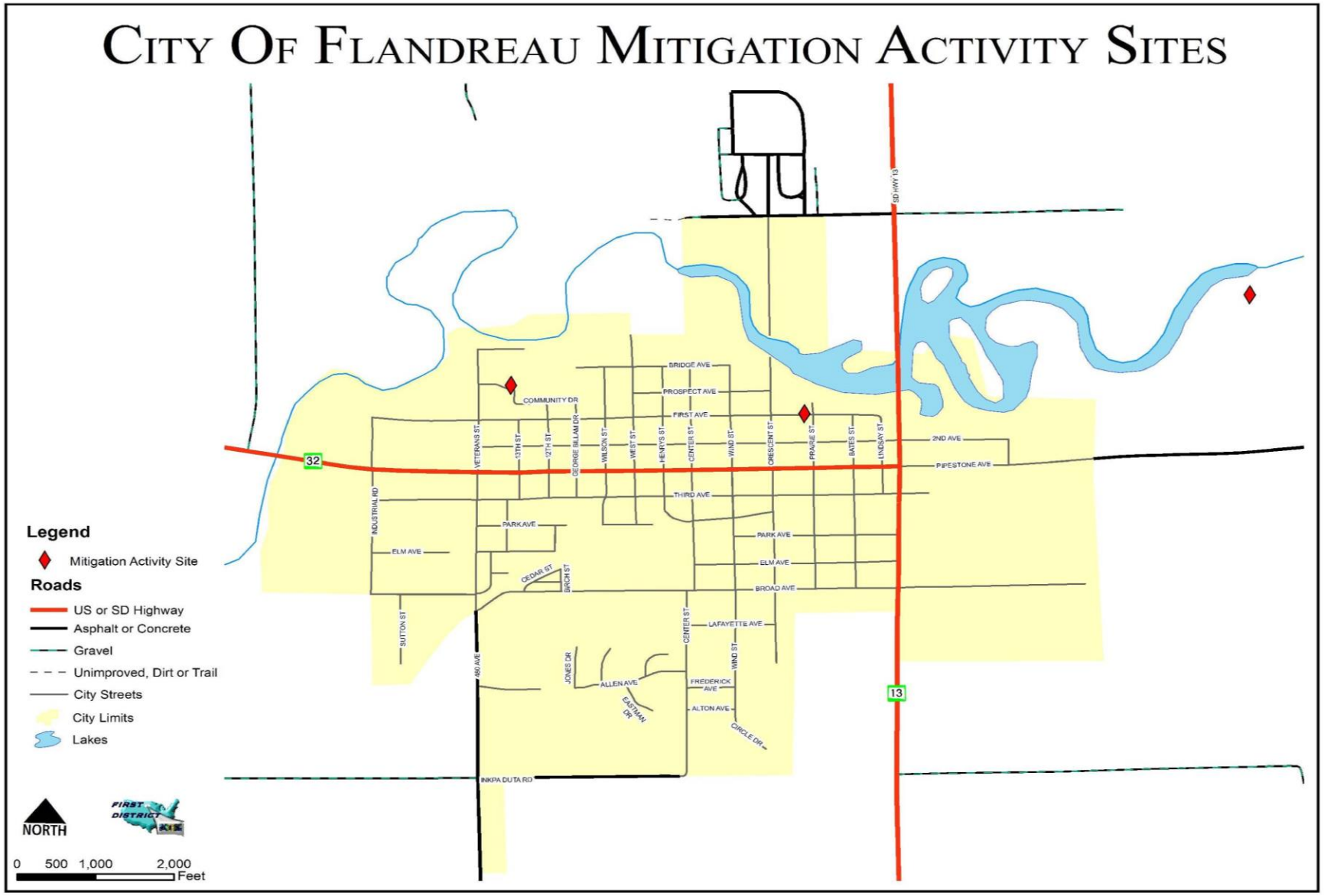


Figure 5.5: Town of Trent Potential Mitigation Project Map

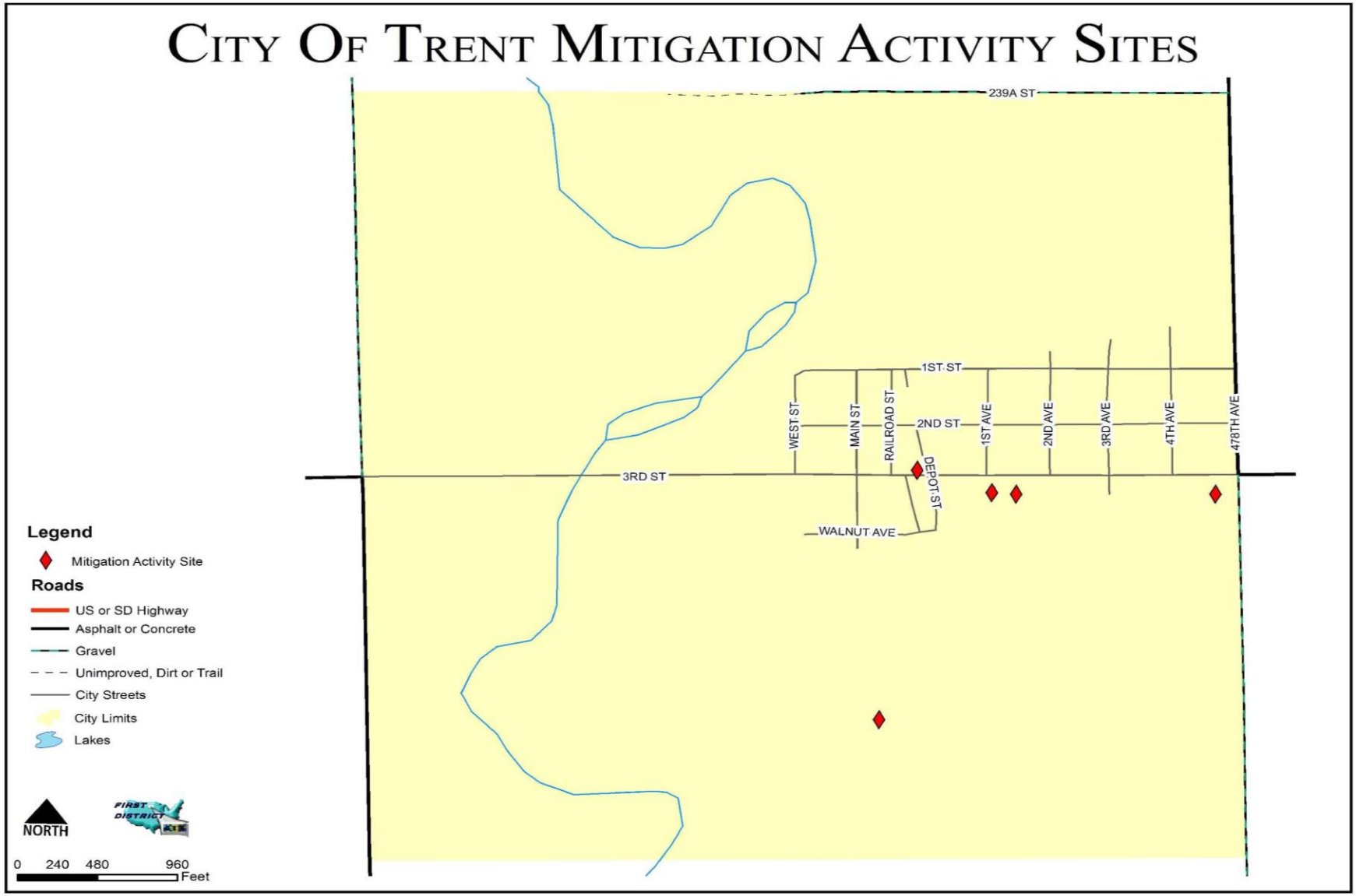
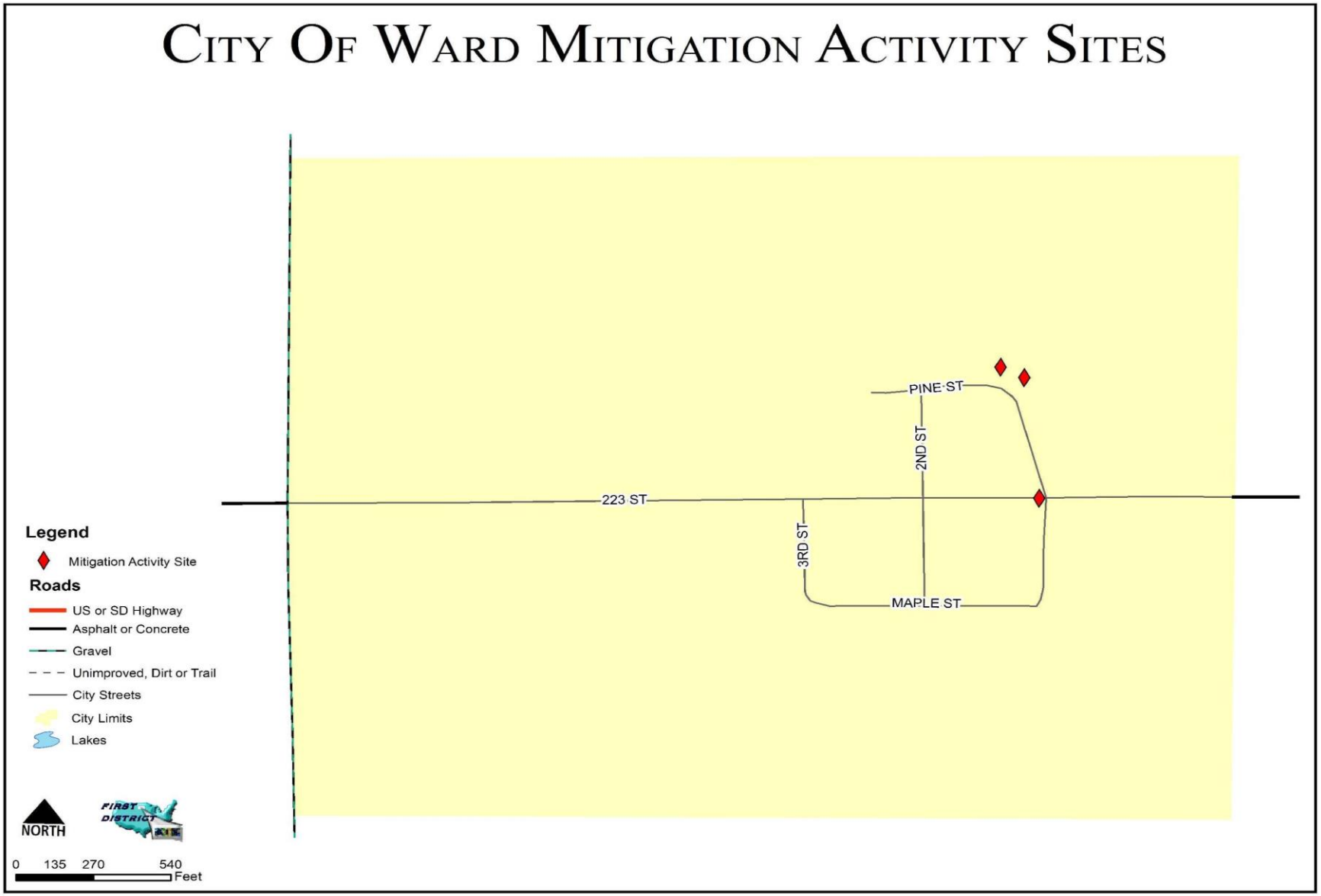


Figure 5.6: Town of Ward Potential Mitigation Project Map



IMPLEMENTATION OF MITIGATION ACTIONS

Requirement 201.6(c)(4)(ii). Local Mitigation Plan Review Tool – C6.
Requirement 201.6(d)(3). Local Mitigation Plan Review Tool – D3.

Upon adoption of the updated Moody County PDM, each jurisdiction will become responsible for implementing its own mitigation actions. The planning required for implementation is the sole responsibility of the local jurisdictions and private businesses that have participated in the PDM update. All of the municipalities have indicated that they do not have the financial capability to move forward with projects identified in the PDM at this time, however, all will consider applying for funds through the State and Federal Agencies once such funds become available. If and when the municipalities are able to secure funding for the mitigation projects, they will move forward with the projects identified. A cost-benefit analysis will be conducted on an individual basis after the decision is made to move forward with a project.

The 2007 PDM was the first approved mitigation plan that the County has ever had on file. At the time the PDM was drafted it met the requirements for an approved mitigation plan. The 2007 PDM was not used or incorporated into other planning documents or mechanisms. From a practical standpoint the 2014 PDM update required communities to reflect on past disasters, consider future disasters, and think about how or if future disasters would be handled differently, or better. Information from the 2014 PDM plan was incorporated during the drafting of the 2019 PDM plan update. FEMA approved methodology and format utilized for the 2019 Moody PDM update is similar to counties neighboring Moody County.

CHAPTER 6
PLAN MAINTENANCE

MONITORING, EVALUATING, AND UPDATING THE PLAN

Requirement 201.6(c)(4)(i). Local Mitigation Plan Review Tool – A6.
Requirement 201.6(c)(4)(ii). Local Mitigation Plan Review Tool – C6.

The County and all the participating local jurisdictions thereof will incorporate the findings and projects of the PDM in all planning areas as appropriate. Periodic monitoring and reporting of the PDM is required to ensure that the goals and objectives for the County PDM are kept current and that local mitigation efforts are being carried out. Communities will establish an annual review of projects and infrastructure listed in the plan. As funding becomes available, projects are completed, or the inevitable new project needs to be added, communities will report to the Moody County Emergency Management Director. Communities should adopt a schedule which corresponds with the annual report of the Emergency Management Director to the County Commissioners in November of each year.

During the process of implementing mitigation strategies, the county or communities within the county may experience lack of funding, budget cuts, staff turnover, and/or a general failure of projects. These scenarios are not in themselves a reason to discontinue and fail to update the PDM. A good plan needs to provide for periodic monitoring and evaluation of its successes and failures and allow for appropriate changes to be made.

CONTINUED PUBLIC PARTICIPATION/INVOLVEMENT

Requirement 201.6(c)(4)(iii). Local Mitigation Plan Review Tool – A5.
Requirement 201.6(c)(4)(ii). Local Mitigation Plan Review Tool – C6.

During interim periods between the five-year re-write, efforts will be continued to encourage and facilitate public involvement and input. The PDM will be available for public view and comment at the Moody County Emergency Management Office located in the Moody County Courthouse in Flandreau and the First District Association of Local Governments office. The PDM will also be available for review on the web at the Moody County website www.moodycounty.net and at the First District Association of Local Governments homepage www.1stdistrict.org. Comments will always be received whether orally, written or by e-mail.

All ongoing workshops and trainings will be open to the public and appropriately advertised. Ongoing press releases and interviews will help disseminate information to the general public and encourage participation.

As implementation of the mitigation strategies continues in each local jurisdiction, the primary means of public involvement will be the jurisdiction's own public comment and hearing process. State law as it applies to municipalities and counties requires this as a minimum for many of the proposed implementation measures. Effort will be made to encourage cities, towns and counties to go beyond the minimum required to receive public input and engage stakeholders.

ANNUAL REPORTING PROCEDURES

Requirement 201.6(c)(4)(ii). Local Mitigation Plan Review Tool – C6.

The PDM shall be reviewed annually, as required by the County Emergency Management Director, or as the situation dictates such as following a disaster declaration. The Moody County Emergency Management Director will review the PDM annually in November and ensure the following:

1. The County Elected body will receive an annual report and/or presentation on the implementation status of the PDM;
2. The report will include an evaluation of the effectiveness and appropriateness of the mitigation actions proposed in the PDM; and
3. The report will recommend, as appropriate, any required changes or amendments to the PDM.

FIVE-YEAR PDM REVIEW

Requirement 201.6(c)(4)(i). Local Mitigation Plan Review Tool – A6.
Requirement 201.6(c)(4)(ii). Local Mitigation Plan Review Tool – C6.

Every five years the PDM will be reviewed and a complete update will be initiated. All information in the PDM will be evaluated for completeness and accuracy based on new information or data sources. New property development activities will be added to the PDM and evaluated for impacts. New or improved sources of hazard related data will also be included.

In future years, if the County relies on grant dollars to hire a contractor to write the PDM update, the County will initiate the process of applying for and securing such funding in the third year of the PDM to ensure the funding is in place by the fourth year of the PDM. The fifth year will then be used to write the PDM update, which in turn will prevent any lapse in time where the county does not have a current approved PDM on file.

The goals, objectives, and mitigation strategies will be readdressed and amended as necessary based on new information, additional experience and the implementation progress of the PDM. The approach to this PDM update effort will be essentially the same as the one used for the original PDM development.

The Emergency Management Director will meet with the PDM Planning Team for review and approval prior to final submission of the updated PDM.

PLAN AMENDMENTS

Requirement 201.6(c)(4)(ii). Local Mitigation Plan Review Tool – C6.

PDM amendments will be considered by the Moody County Emergency Management Director, during the PDM's annual review to take place the end of each county fiscal year. All affected local jurisdictions (cities, towns, and counties) will be required to hold a public hearing and adopt the recommended amendment by resolution prior to considerations by the PDM Planning Team.

INCORPORATION INTO EXISTING PLANNING MECHANISMS

Requirement 201.6(B)(3). Local Mitigation Plan Review Tool – A4.

All communities with existing comprehensive land use plans will review mitigation projects annually when reviewing their comprehensive land use plan, as is recommended in each of their plans. In addition, all municipalities, including the towns without comprehensive land use plans, will consider the mitigation requirements, goals, actions, and projects when it considers and reviews the budget and other existing planning documents. Preparation of the budget is an opportune time to review the plan since municipalities are required by state law to prepare budgets for the upcoming year and typically consider any expenditure for the upcoming year at that time.

The local jurisdictions will post a permanent memo to their files as a reminder for them to incorporate their annual review of the mitigation actions identified into the budget preparation process. This does not require the projects be included in the budget, it merely serves as a reminder to the City officials that they have identified mitigation projects in the PDM that should be considered if the budget allows for it.

POTENTIAL FUNDING SOURCES

Although all mitigation techniques will likely save money by avoiding losses, many projects are costly to implement. None of the local jurisdictions have the funds available to more forward with mitigation projects at this time; thus, the Potential Funding Sources section was included so that the local jurisdictions can work towards securing funding for the projects. Inevitably, due to the small tax base and small population most of the local jurisdictions do not have the ability to generate enough revenue to support anything beyond the basic needs of the community. Thus, mitigation projects will not be completed without a large amount of funding support from State or Federal programs.

The County jurisdictions will continue to seek outside funding assistance for mitigation projects in both the pre- and post-disaster environment. Primary Federal and State grant programs have been identified and briefly discussed, along with local and non-governmental funding sources, as a resource for the local jurisdictions

Federal

The following federal grant programs have been identified as funding sources which specifically target hazard mitigation projects:

Title: Pre-Disaster Mitigation Program Agency: Federal Emergency Management Agency
Through the Disaster Mitigation Act of 2000, Congress approved the creation of a national program to provide a funding mechanism that is not dependent on a Presidential Disaster Declaration. The Pre-Disaster Mitigation (PDM) program provides funding to states and communities for cost-effective hazard mitigation activities that complement a comprehensive mitigation program and reduce injuries, loss of life, and damage and destruction of property. The funding is based upon a 75% Federal share and 25% non-Federal share. The non-Federal match can be fully in-kind or cash, or a combination. Special accommodations will be made for "small and impoverished communities", who will be eligible for 90% Federal share/10% non-Federal. FEMA provides PDM grants to states that, in turn, can provide sub-grants to local governments for accomplishing the following eligible mitigation activities: State and local hazard mitigation planning, Technical assistance (e.g. risk assessments, project development), Mitigation Projects, Acquisition or relocation of vulnerable properties, Hazard retrofits, Minor structural hazard control or protection projects Community outreach and education (up to 10% of State allocation)

Title: Flood Mitigation Assistance Program Agency: Federal Emergency Management Agency
FEMA's Flood Mitigation Assistance program (FMA) provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes and other structures insurable under the National Flood Insurance Program (NFIP). FMA was created as part of the National Flood Insurance Reform Act of 1994 (42 USC 4101) with the goal of reducing or eliminating claims under the NFIP. FMA is a pre-disaster grant program and is available to states on an annual basis. This funding is available for mitigation planning and implementation of mitigation measures only and is based upon a 75% Federal share/25% non-Federal share. States administer the FMA program and are responsible for selecting projects for funding from the applications submitted by all communities within the state. The state then forwards selected applications to FEMA for an eligibility determination. Although individuals cannot apply directly for FMA funds, their local government may submit an application on their behalf.

Title: Repetitive Flood Claims Program Agency: Federal Emergency Management Agency
FEMA's Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Up to $10 million is available annually for FEMA to provide RFC funds to assist States and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP). FEMA may contribute up to 100 percent of the total amount approved under the RFC grant award to implement approved activities, if the Applicant has demonstrated that the proposed activities cannot be funded under the Flood Mitigation Assistance (FMA) program.

Title: Hazard Mitigation Grant Program Agency: Federal Emergency Management Agency
The Hazard Mitigation Grant Program (HMGP) was created in November 1988 through Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistant Act. The HMGP assists states and local communities in implementing long-term mitigation measures following a Presidential disaster declaration. To meet these objectives, FEMA can fund up to 75% of the eligible costs of each project. The state or local cost-share match does not need to be cash; in-kind services or materials may also be used. With the passage of the Hazard Mitigation and Relocation Assistance Act of 1993, federal funding under the HMGP is now based on 15% of the federal funds spent on the Public and Individual Assistance programs (minus administrative expenses) for each disaster. The HMGP can be used to fund projects to protect either public or private property, so long as the projects in question fit within the state and local governments overall mitigation strategy for the disaster area and comply with program guidelines. Examples of projects that may be funded include the acquisition or relocation of structures from hazard-prone areas, the retrofitting of existing structures to protect them from future damages; and the development of state or local standards designed to protect buildings from future damages. Eligibility for funding under the HMGP is limited to state and local governments, certain private nonprofit organizations or institutions that serve a public function, Indian tribes and authorized tribal organizations. These organizations must apply for HMPG project funding on behalf of their citizens. In turn, applicants must work through their state, since the state is responsible for setting priorities for funding and administering the program.

Title: Public Assistance (Infrastructure) Program, Section 406 Agency: Federal Emergency Management Agency
FEMA's Public Assistance Program, through Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, provides funding to local governments following a Presidential Disaster Declaration for mitigation measures in conjunction with the repair of damaged public facilities and infrastructure. The mitigation measures must be related to eligible disaster related damages and must directly reduce the potential for future, similar disaster damages to the eligible facility. These opportunities usually present themselves during the repair/replacement efforts. Proposed projects must be approved by FEMA prior to funding. They will be evaluated for cost effectiveness, technical feasibility and compliance with statutory, regulatory and executive order requirements. In addition, the evaluation must ensure that the mitigation measures do not negatively impact a facility's operation or risk from another hazard. Public facilities are operated by state and local governments, Indian tribes or authorized tribal organizations and include: *Roads, bridges & culverts *Water, power & sanitary systems *Draining & irrigation channels *Airports & parks *Schools, city halls & other buildings Private nonprofit organizations are groups that own or operate facilities that provide services otherwise performed by a government agency and include, but are not limited to the following: *Universities and other schools *Power cooperatives & other utilities *Hospitals & clinics *Custodial care & retirement facilities *Volunteer fire & ambulance *Museums & community centers

Title: SBA Disaster Assistance Program Agency: US Small Business Administration
The SBA Disaster Assistance Program provides low-interest loans to businesses following a Presidential disaster declaration. The loans target businesses to repair or replace uninsured disaster damages to property owned by the business, including real estate, machinery and equipment, inventory and supplies. Businesses of any size are eligible; along with non-profit organizations SBA loans can be utilized by their recipients to incorporate mitigation techniques into the repair and restoration of their business.

Title: Community Development Block Grants Agency: US Department of Housing and Urban Development
The community Development Block Grant (CDBG) program provides grants to local governments for community and economic development projects that primarily benefit low- and moderate-income people. The CDBG program also provides grants for post-disaster hazard mitigation and recovery following a Presidential disaster declaration. Funds can be used for activities such as acquisition, rehabilitation or reconstruction of damaged properties and facilities and for the redevelopment of disaster areas.

Local

Local governments depend upon local property taxes as their primary source of revenue. These taxes are typically used to finance services that must be available and delivered on a routine and regular basis to the general public. If local budgets allow, these funds are used to match Federal or State grant programs when required for large-scale projects.

Non-Governmental

Another potential source of revenue for implementing local mitigation projects are monetary contributions from non-governmental organizations, such as private sector companies, churches, charities, community relief funds, the Red Cross, hospitals, Land Trusts and other non-profit organizations.

APPENDIX

Appendix A - Resolution of Adoption by Jurisdiction

Appendix B - PDM Planning Team Agendas, Sign-in Sheets, and Minutes

Appendix C - Community Meeting Agendas, Sign-in Sheets, Minutes, and Public Comments

Appendix D - Hazard Identification/Vulnerability Worksheets

Appendix E - Township Vulnerable and Potential Mitigation Project Site Maps

Appendix F - Comprehensive Land Use Maps

Appendix G - Review of 2014 PDM Mitigation Project Implementation

Appendix H - References

Appendix A
Resolution of Adoption by Jurisdiction

Moody County Resolution

City of Colman Resolution

City of Egan Resolution

City of Flandreau Resolution

Town of Trent Resolution

Town of Ward Resolution

Sioux Valley Energy Resolution

Appendix B
PDM Planning Team Notices, Agendas, Sign-in Sheets, and Meetings

Moody County
Pre-disaster Mitigation Plan Kickoff Meeting
1:00 p.m. December 18th, 2019
Moody County Courthouse
Flandreau, SD 57028

Public Notice

Moody County Pre-disaster Mitigation Plan Meeting

Moody County will begin the process of updating the Moody County Pre-disaster Mitigation Plan. This plan identifies potential natural disasters, their impact and possible projects to mitigate the impact of said disasters. The County is required by the Federal Emergency Management Agency to update this plan every five years. The Moody County Pre-disaster Mitigation Planning Team will meet at 1:00 p.m. on Wednesday December 18, 2019 in the Farmers Room at the Moody County Courthouse – 101 East Pipestone Avenue, Flandreau, South Dakota. The public is welcome to attend. Questions or comments may be directed to Moody County Emergency Management Director, Terry Albers @ 605-997-3251.

Moody County
Pre-disaster Mitigation Plan Kickoff Meeting
1:00 p.m. December 18th, 2019
Moody County Courthouse
Flandreau, SD 57028

Letter to PDM Planning Team

To Whom It May Concern:

The County's current FEMA approved Pre-disaster Mitigation Plan will expire in September of 2020. This plan identifies potential natural disasters, their impact and possible projects to mitigate the impact of said disasters. The County is required by FEMA to update this plan every five years. The County applied for federal funding to assist with the cost of an update and was informed in October 2019 of the grant award. The County has entered into a contract with the First District Association of Local Governments to facilitate the development of the Plan.

The goal of the plan will be to reduce the personal and economic costs of hazard events in the rural and urban areas of Moody County. The County believes this effort is an investment that will enhance and strengthen the economic structure and long-term stability of the rural and municipal areas of the County.

Through this planning process, projects are identified that will make the next disaster event as uneventful as possible. The goal is to enlist the support of community stake holders to sponsor or support a project. The planning process does not happen overnight. We expect this process to last approximately six to nine months. While it might take perhaps years for certain projects to be completed, the Plan is the document that will bring all pre-disaster mitigation efforts to a central location.

Your community/school/utility/entity etc. has been identified as a potential partner in this process. I would be pleased if your organization would select an individual to serve on the Pre-disaster Mitigation Planning Team. The Mitigation Planning Team will meet three times over the next seven months.

An organization/familiarization kick-off meeting of the Mitigation Planning Team is set for **1:00 p.m. on Wednesday, December 18, 2019.** The meeting will be held in the **Farmers Room at the Moody County Courthouse 101 East Pipestone Avenue, Flandreau, South Dakota.**

Thank you for your serious consideration of the County's request.

Sincerely,

Terry Albers
Director
Moody County Emergency Management
(605) 997-3251

Moody County
Pre-disaster Mitigation Plan Kickoff Meeting
1:00 p.m. December 18th, 2019
Moody County Courthouse
Flandreau, SD 57028

Agenda

- Introduction of PDM Team Members
- What is Mitigation Planning?
- Why is Moody County updating the Pre-Disaster Mitigation Plan?
- Review plan components
- Review timeline/scope

MOODY COUNTY PRE-DISASTER MITIGATION PLANNING TEAM MEETING

KICKOFF MEETING

December 18, 2019

Name	Organization	Email*
Todd Kass	1st district	
Michael Hangsted	City of Colman	cityofcolman@iw.net
Tom Newton	1st district	tom@1stdistrict.org
Terry Albers	Moody County EM	mcem@moodycounty.net
Jeff Peterson	City of Flandreau	jeffpeterson@cityoflandreau.com
Brenda Duncan	City of Egan	EganCity@mcisweb.com

Moody County Pre-Disaster Mitigation Plan Team Kick-Off Meeting
1:00 p.m. December 18. 2020
Moody County Courthouse

Meeting Minutes

6 individuals were in attendance:

Albers	Terry	Moody County EMO
Hauglid	Michael	City of Colman
Kays	Todd	First District
Duncan	Brenda	City of Egan
Nealon	Tom	First District
Peterson	Jeff	City of Flandreau

Moody County Emergency Management Terry Albers welcomed those in attendance and had Team members introduce themselves and what entity they represented. Albers then introduced Todd Kays and Tom Nealon of the First District Association of Local Governments.

Kays provided an overview of what is mitigation planning and why the county is required to update their Pre-Disaster Mitigation (PDM) Plan. Kays also provided a review of the components to be included within the plan (risk assessment, vulnerability, proposed mitigation actions).

Planning Team representatives provided information regarding mitigation activities within their own respective entities. A general review of the existing Pre-Disaster Mitigation Plan started by defining work responsibilities, having the First District doing background and research, and the PDM Team providing oversight and guidelines throughout the process. The timeline and scope of project were reviewed.

Meeting adjourned at 1:30 p.m. Date and time for the next meeting to be scheduled later.

Minutes recorded by Tom Nealon

Moody County
Pre-disaster Mitigation Planning Team Meeting 2
Time_____ Date_____
Teleconference via _____

Public Notice

Moody County
Pre-disaster Mitigation Planning Team Meeting 2
Time _____ Date _____
Teleconference via _____

Letter to PDM Planning Team

Moody County
Pre-disaster Mitigation Planning Team Meeting 2
Time_____ Date_____
Teleconference via _____

Agenda

Moody County
Pre-disaster Mitigation Planning Team Meeting 2
Time_____ Date_____
Sign-In

Minutes
Moody County
Pre-disaster Mitigation Planning Team Meeting 2
Time_____ Date_____
Teleconference via _____

__ people were in attendance:

Last Name	First Name	Organization

Moody County
Pre-disaster Mitigation Planning Team Meeting 3
Time_____ Date_____
Teleconference via _____

Public Notice

Moody County
Pre-disaster Mitigation Planning Team Meeting 3
Time _____ Date _____
Teleconference via _____

Letter to PDM Planning Team

Moody County
Pre-disaster Mitigation Planning Team Meeting 3
Time_____ Date_____
Teleconference via _____

Agenda

Moody County
Pre-disaster Mitigation Planning Team Meeting 3
Sign-In

Minutes
Moody County
Pre-disaster Mitigation Planning Team Meeting 3
Time_____ Date_____
Teleconference via _____

__ people were in attendance:

Last Name	First Name	Organization

Email Notices to Adjoining County Emergency Managers

November 26th, 2019

Emergency Managers,

Moody County will begin an update process to its current Pre-disaster Mitigation Plan. Moody County has contracted the First District Association of Local Governments to facilitate the development of the update to the PDM Plan. You are cordially invited to attend the PDM team's project kick-off meeting to be held at 1:00 p.m. on Wednesday December 18, 2019 in the Farmers Room at the Moody County Courthouse – 101 East Pipestone Avenue, Flandreau, South Dakota.

Todd Kays, on behalf of Moody County Emergency Director Terry Albers
Executive Director
First District Association of Local Governments

April 9th, 2020

Emergency Managers,

Moody County will be holding a meeting of the PDM Planning Team sometime during the week of May 11th, 2020. The meeting will be held telephonically with specific information regarding the date, time, and manner in which the public may participate will be forthcoming. The purpose of this notice is to provide adjoining county emergency managers the opportunity to view and comment the proposed Moody County Pre-Disaster Mitigation Plan. The plan can be found at the following address: _____.

Your questions or comments may be directed to Terry Albers, Emergency Management Director (605) 997-3251 or Tom/Payton with First District at (605) 882-5115.

Payton Schafers, on behalf of Moody County Emergency Director Terry Albers
Planner/Economic Development Officer
First District Association of Local Governments

Appendix C
First Community Meeting Agendas and Sign-in Sheets

Appendix C includes Agendas and "Sign-in Sheets" from Meetings held at the community level for the Moody County Pre-Disaster Mitigation Plan. Meetings were held at the regular monthly meetings for the following communities:

Town	Date
Colman	February 10, 2020
Egan	January 15, 2020
Flandreau	March 16, 2020
Trent	January 14, 2020
Ward	February 10, 2020

At all of the previously described meetings each individual in attendance was asked to identify the probability of each specific hazard's occurrence. Following discussion on each individual hazard, Board members categorized these hazards as high probability to occur, low probability to occur, or unlikely to occur. The result was recorded on a master sheet for each town. Next, each individual in attendance was asked to identify the town's vulnerability to each specific hazard. Following discussion on each individual hazard, Board members classified the town's vulnerability to each hazard as high vulnerability, low vulnerability, or noted that the hazard was not a hazard in the jurisdiction. The result was recorded on a master sheet for each town. Finally, the Town Board was asked to identify critical infrastructure within the community. All master sheets compiled at those meetings can be found in Appendix E. A master infrastructure list was compiled for each town (Table 4.15).

Town Board/City Council members then reviewed the goal statements for the Pre-Disaster Mitigation Plan and considered whether certain general activities applied to their community (Tables 5.1 – 5.12). The Board members were then asked to identify potential hazard mitigation projects for their towns. Members then discussed among themselves and staff before determining a timeframe for these projects to be completed in (short-term, medium-term, long-term). Finally, members assigned a priority level (high, medium, low) to each project. The Town Board Presidents, Mayors, and Finance Officers were asked to work with First District Staff to identify who would be in charge of the potential projects and what a projected cost would be. All projects identified at those meetings are included in Table 5.13.

Attendance sign-in sheets and Agendas for each of the above described meetings are included below.

Staff members for the utility providers were asked to review the goal statements and general disaster planning activities, as well as provide the same information provided by small towns regarding specific mitigation projects. As with the data gathered from the smaller towns, all responses gathered from these entities are included in Table 5.1.

Each township was contacted and requested to the identify areas most vulnerable to natural hazards (on a map) and return them to the Emergency Management Director or First District. Those maps are included in Appendix E. For townships that did not return the maps it is assumed that they do not perceive any areas to be more vulnerable than others to natural hazards.

Colman City Council Meeting
Monday, February 10, 2020 @ 6:00 pm
At Colman City Hall

1. **Call City Council Meeting to Order**
2. **Present minutes from January 13th meeting (Motion)**
3. **First District – Pre Disaster Mitigation Program – 6:00 pm**
4. **Shane Waterman – Clark Engineering**
   a. **Drainage Study**
   b. **Hillcrest Industrial Park Project**
5. **Financial Report for January (Motion)**
6. **Present Bills (Motion)**
7. **Vast Broadband – Extension on Franchise Agreement**
8. **Temporary Alcohol Permit – Colman Fire Dept. (Motion)**
9. **Proposal for 2019 Annual Report & 2019 Audit (Motion)**
10. **Community Comments**
11. **Employee Reports**
12. **Committee Reports**
13. **Set Equalization Meeting Date**
14. **Adjourn (Motion)**

The following will be present for all or some of the meeting:

- Payton Schafers ~~**Tom Nealon**~~ **& Luke Muller – First District**
- **Shane Waterman – Clark Engineering**

CC: Gloria VanDuyn

Mike Uhing	**Mike Preheim**	**Roger Broghammer**
Brad Schroeder	**Mitch Clark**	**Troy Smallfield**

MOODY COUNTY PRE-DISASTER MITIGATION PLANNING MEETING

CITY OF COLMAN PDM MEETING

February 10th, 2020

Name	Organization	Email*
Payton Schafers	First District	
Luke Muller	First District	
Mike Pechein	Council Member	
Mike Uhing	Council President	
Grant Groos	Maintenance Supervisor	citymon.572@hotmail.com
Mike Solum	Golf Supervisor	mbs-58@hotmail.com
Troy Smallfield	Council member	
Mitch Clark	Council Member	
Shane Waterman	Clark Engineering	
Roger Broghammer	Council Member	
Michael Haugland	Finance Officer	cityofcolman@iw.net
Gloria VanDuyn	Mayor	vanduyng@ymail.com

City of Colman Council Meeting Minutes
February 10, 2020

City of Colman Council Meeting was called to order by Mayor Gloria Van Duyn on February 10, 2020 at 6:00 pm at Colman City Hall. Council present: Troy Smallfield, Mike Preheim, Mith Clark, Roger Broghammer, and Mike Uhing. Brad Schroeder was on the phone. Also present: Public Works Director Grant Groos, Finance Officer Michael Hauglid, and Golf Supervisor Mike Solum. Also present for all or some of the meeting: Luke Muller and Payton Schafers from First District and Shane Waterman from Clark Engineering.
The minutes from the January 13th meeting were presented. Motion was made by Clark and seconded by Smallfield to approve the minutes as presented. Motion carried.
Luke Muller and Payton Schafers from First District were present to discuss the Pre-Disaster Mitigation Plan with the council. The plan is required for disaster related funding. Every five years, the plan needs to be updated and sent to FEMA for approval. First District helps the county and the cities to do this plan and wanted to meet with the council to go over the plan. Risk assessments the city faces and potential projects were discussed. First District will work more with the city and keep them updated on the final plan and the procedures that will need to be done.
Shane Waterman from Clark Engineering was to discuss various projects.

- Hillcrest Industrial Park Project – Phase 1
    - The contractor for Premier Contracting passed away in January. The family is planning on still continuing the company and will still work on finishing the project with the city. They did request a letter from Clark Engineering and the city to confirm continuing the project. Waterman will draft a letter to send to Premier Contracting.
- I/I Study
    - Waterman commented that they will be submitting a quarterly report to SD DENR as part of the city's permit. This will be required every quarter throughout the study and any projects that will come.
- Drainage Study
    - Waterman submitted the Drainage Study Report to SD DENR at the end of January. DENR requested more information on project options, specifically break downs on costs. Waterman will have the changes done by the end of February and submit it to DENR

Financials for January were presented. Motion was made by Schroeder and seconded by Preheim to approve the financials as presented. Motion carried.
Bills were presented. Motion was made by Uhing and seconded by Smallfield to approve the bills as presented. Motion carried.
34 Stop -$825.84, AmeriPride-$184.44, AT&T-$137.53, Banyon Data Systems-$129.00, Big Sioux Community Water-$2,579.50 , Booster -$350.00, Cash-wa -$178.17, CenturyLink-$73.62, Chester Mechanical -$76.53, City of Colman/utilities-$5,676.71, Clark Engineering-$3,000.00, Colman Building Center -$417.88, Colman Volunteer Fire Dept-$675.00, Computer Services-$45.00, Core & Main-$586.97 , Crossroads-$419.35, Dakota Beverage-$360.20, Dakota Pump & Control-$724.49, Dana Foster-$400.00, Dept of Revenue (Sales Tax)-$7,134.25, East River Electric-$6,888.96, Eng Services-$3,981.75, Fastenal-$73.99, Governor's Inn-$174.00, Grant Groos-$449.99, Great Western Bank-$150.00, Greg's Place-$2,202.40, Heartland-$71,612.36, Johnson Brothers Excavation-$450.00, Johnson Brothers Liquor-$522.60, Justice Fire & Safety-$427.81, Karl's-$179.96, Lake Co International-$6,450.34, MARC-$3,007.97, Moody County

Enterprise-$169.18, Moody County Sheriff-$2,087.87, NASASP-$39.00, OASI-$1,086.27, One Office Solution-$261.49, Payroll-$14,633.41, Randall Lee-$100.00, Republic National Distributing-$516.48, Sams Club-$162.17, SD Asso. Of Rural Water-$405.00 , SDRS-$1,460.00, SDRS Supplemental-$350.00, Shoenrock Plumbing-$198.98, Sioux Valley Energy-$1,062.49, Sturdevant's-$197.64, Sunshine Foods-$243.52, Tim's Repair-$195.00, Titan Machinery-$59.28, Vanco Payment Solutions-$24.75, Vast Broadband-$465.03, Western Area Power Admin-$9,068.94

Vast Broadband Franchise Agreement was discussed. Vast Broadband had sent in a request for a renewal of their franchise agreement last year. Agreement doesn't end until 2021, but Vast sent it in early. Council had tabled it at the time. Council discussed if they could get discounted services for city uses. Mayor Van Duyn will talk to Vast Broadband. Council tabled the agreement until Van Duyn speaks with Vast Broadband.
Temporary Alcohol Permit for Colman Fire Department's Rocky Mountain Oyster Feed on Saturday, February 22nd at the Colman Fire Hall was presented. Motion was made by Uhing and seconded by Broghammer to approve the temporary alcohol permit as presented. Motion carried.

The following is the Colman Volunteer Fire and Rescue Roster for 2020: Fire Chief Jason Landis, 1st Assistant Mike Baumberger, 2nd Assistant Bill Hawkins (EMT), Secretary/Treasurer Misty Anderson (EMT), Safety Officer Mike Gengler, Training Officer Clint Corey, Truck Maintenance Jeff Keyes, Chuck Rentschler (EMT), Lonnie Croon, Wade Quick (EMT), Merle Gulbranson (EMT), Lisa Allen (EMT), Dan Schmidt, Scott Nelson, Justin Landis, Chad Williams, Brook Rentschler, Joe Rhode, Ally Hemmer, Tad Schaefer, Bruce Cramer, Jess Berg, Tye Wangberg, Chad Urban, Jesse Larson, Rob Bowden, Dwayne Taggert, Colt Hawkins, Sheldon Anderson, and Jessica Harper.

Ben Elliot's proposal for the 2019 Annual Report and 2019 Audit was presented to the council. Motion was made by Schroeder and seconded by Uhing to approve the proposal as presented. Motion carried.

There were no community comments.
Employee Reports

- Clean Up Day will be scheduled for late April or early May pending weather
- Upgrading the payloader
- V-plow for snow removal
- Transferring funds from the city's Money Market account to SD FIT for a better interest rate
- Advertising for summer employment
- SDML District Meeting
- Rates for memberships at the golf course
- Financing a woods mower for the golf course
- Clubhouse being opened a couple of nights a week

Committee Reports

- High electrical bills
- December account reconciliation was fine
- Funds in the electrical fund

- Property tax levies
- Council members being employed part time for the city. Should a council member work part time for the city, they can only work up to $5000.00 per year per state statue. City attorney noted that should a council member be employed by the city, they must abstain from any discussion or voting on the department they would be working due to conflicts of interest. This would include decisions on salaries and budget. Council members can be volunteer help as much as they want.
- Burying electrical lines. Council had discussed at the previous meeting not doing any electrical line burying this year due to not getting a second business in the Hillcrest Industrial Park as part of the LIIP Grant. Council decides if the second business comes and the city can receive the monies from the grant, then the city will bury more lines either this summer or fall.
- Mayor and council petitions are due February 28th at 5:00 pm.

Next city council meeting will be on Monday March 9th, 2020 at 6:00 pm. Equalization meeting will be on Monday March 16th, 2020 at 6:00 pm.
Motion was made by Uhing and seconded by Broghammer to adjourn at 8:12 pm. Motion carried.
Attest
Mayor Gloria Van Duyn
Finance Officer Michael Hauglid

MOODY COUNTY PRE-DISASTER MITIGATION PLANNING MEETING
CITY OF COLMAN PUBLIC COMMENT
FEBRUARY 10TH, 2020

- Our city is very active in the summer. We have a campground, golf course, and swimming pool all located in one area. That is one of the most vulnerable areas if we would have a tornado. – Gloria Van Duyn

- We have a Looney Days festival at the end of the summer that brings a lot of people to town. It would be a good idea to look into some kind of outdoor protection shelter. – Roger Broghammer

- The City has gained a few young families, so we have had five new daycares open within the city in the last five years. Those would be one of the first places we would check if a disaster happened. – Michael Hauglid

- The City sometimes experiences ice jams in culverts throughout the community from excess snow and ice, which has become a bigger issue the last couple of years with heavier snows and rapid snow melt in the spring. – Grant Groos

AGENDA
EGAN CITY – REGULAR MEETING
January 15, 2020
6:00 PM

Call to Order

Conflict of Interest Items on current agenda for anyone on the Council -

Approve agenda

Minutes: Approve December 18, 2019 Regular Meeting

Public Comment: Session limited to 30 minutes allowing 3 minutes per citizen

New Business: Moody Co. Planning & Zoning – Truck Route/Road Haul
First Planning District – Pre-Disaster Mitigation Plan
Second Reading and Approval of Ordinance 215 – Fowl
Public Hearing to vacate a portion of Ellsworth Street
Resolution 2020-01 – Vacating Public Ground
Resolution 2020-02 – Correction Numerical Designation
Resolution 2020-03 – Hazardous Mitigation Grant
Transfer funds from General Fund to Sewer Account
Adopt Fee Schedule
Approve 2020 Wages
Approve Fire Department Contracts
Designate official newspaper
Designated Truck Route

Committee Reports:
Compliance/Code Enforcement - 2 Automobile Violations
Maintenance
Parks
Personnel & Financial
Utilities

Approve Bills

Other: Review Correspondence

Next Regular Meeting February 19, 2020 at 6:00 pm

Adjourn

AGENDA SUBJECT TO CHANGE UP TO TWENTY FOUR (24) HOURS PRIOR TO MEETING TIME

MOODY COUNTY PRE-DISASTER MITIGATION PLANNING MEETING

CITY OF EGAN PDM MEETING

JANUARY 15th, 2020

Name	Organization	Email*
Luke Muller	1st District	
Payton Schafers	1st District	
Carl B[illegible]	Co Commis[illegible]	
Kristina Krull	Moody County	
Kendra Erg	Moody County	
Troy Wollman	Moody county S.O.	
Paul Lewis	Moody County	
Brenda Duncan	Egan City	
Co[illegible]	Egan City	
[illegible]	Egan City	
[illegible]	Egan	
Nancy Hansen	Egan	
Brad Judstra	Egan	

EGAN CITY MINUTES
REGULAR MEETING
January 15, 2020

The Board of Trustees of the City of Egan, South Dakota met in regular session on January 15, 2020 6:00pm at the Egan City Hall, 110 W 3rd St, Egan, SD.

Present: Board of Trustee members John Steinhauer, Cody Chamblin, Brad Judstra, Nancy Hansen, and Jerome Olson. Also present: Brenda Duncan-Finance Officer, Kendra Eng-Moody County Planning & Zoning, Paul Lewis-Moody County State's Attorney, Carla Bruning-Moody County Commissioner, Kristina Krull-Moody County Auditor, Luke Mueller and Payton Schafers-First Planning District.

The meeting was called to order by Steinhauer at 6:00pm

Motion by Olson, and seconded by Chamblin, to approve the agenda. All present voted "aye."
Hansen stated she has a conflict of interest on: Public Hearing to vacate a portion of Ellsworth Street and Resolution 2020-01 – Vacating Public Ground.

Motion by Chamblin, and seconded by Judstra, to approve the minutes from December 18, 2019. All present voted "aye".

Public Comment: None

New Business:
Discussion with Moody County personnel on Wildwood Dairy usage of 3rd Street.

Pre-Disaster Mitigation Plan was reviewed with Luke Mueller and Payton Schafers from First District.

Motion by Hansen, and seconded by Steinhauer, to hold second reading and approval of Ordinance 215 – Fowl. All present voted "aye".

Public hearing was held on Vacating Public Ground petition.

Motion by Chamblin, and seconded by Steinhauer, to approve Resolution 2020-01 Vacating Public Ground. Voting "aye" were Steinhauer, Chamblin, Judstra, and Olson. Abstaining- Hansen.

Motion by Steinhauer, and seconded by Chamblin, to approve Resolution 2020-02 Correcting the Numerical Designation of Ordinance No. 158 to Ordinance No. 158.2. All present voted "aye".

Motion by Chamblin, and seconded by Judstra, to approve Resolution 2020-03 Appointing Applicant Agent for the Hazard Mitigation Grant Program. All present voted "aye".

Motion by Steinhauer, and seconded by Chamblin, to transfer $10,961.78 from General Checking account to the Sewer Lagoon Money Market for 2019 payments. All present voted "aye".

Motion by Chamblin, and seconded by Judstra, to adopt the following fee schedule for 2020:

Water: Base rate $19.85 + $3.40 per thousand gallons effective January 1, 2020
Base rate $21.60 + $3.95 per thousand gallons effective July 1, 2020
Water Meter Replacement: $150.00 / New Water Meter & ERT - $250.00
Sewer: Residential $22.00 Commercial $30.00
Lagoon Charge: $8.00
Residential Garbage: $12.06
Utility Deposit: $135.00
Returned Check Fee: $40.00
Late Fees on Utility Billing:
$ 4.00 if not paid by 5:00 pm on the 10th of each month
$35.00 Collection fee after the 20th of each month
$40.00 Disconnection fee after 20th of each month

Labor fees: $45.00 per hour with a one hour minimum
$65.00 per hour with a one hour minimum for after hour labor
Camping: $10.00 per night
City Sales Tax: 2%
Dog Tags: $5.00 per dog neutered/spayed, $10.00 per dog intact, $40.00 per dog non-licensed
Liquor License: $200.00 to serve/sell Liquor on Sundays
$300.00 off Sale Liquor License
$900.00 on Sale Liquor License
Mowing: $125.00 per mow
Notary Service: $2.00 for non Egan City Resident
Building Permits: $10.00 Application Fee + $1.00 per thousand or part of thousand
Conditional Use Permit: $140.00 + Special Meeting Costs - $100.00
Variance Request: $140.00 + Special Meeting Costs - $100.00
Rezoning Request: $140.00 + Special Meeting Costs - $100.00
Vacating Public Ground petition: $140.00 + Special Meeting Costs - $100.00
All present voted "aye".

Motion by Steinhauer, and seconded by Chamblin, to approve the following wages for 2020: Board members- $100.00/month, Finance Officer -$25.00/hour, Tractor Operator - $16.00/hour, Snowplow Operator -$35.00/hour, Truck Operator - $25.00/hour, John Steinhauer - $17.00/hour, Deb Hall - $11.00/hour, Kevin Hammer - $11.00/hour, Donald Hansen - $11.00/hour, Brad Judstra - $11.00/hour. Board of Adjustment members-meetings outside of monthly meeting-$20/meeting. All present voted "aye".

Motion by Hansen, and seconded by Chamblin, to approve Colman, Flandreau, and Trent Fire Departments contracts. All present voted "aye".

Motion by Chamblin, and seconded by Olson, to designate the Moody County Enterprise as the official newspaper. All present voted "aye".

Discussion on designated truck route correspondence to Wildwood Dairy.

Motion by Chamblin, and seconded by Hansen, to approve the financial report. All present voted "aye".

Motion by Chamblin, and seconded by Hansen, to approve the following bills: Big Sioux Water $2,800.02 (Water/water loan); Booster $99.90 (publishing); Brenda Duncan $53.22 (Supplies); Century Link $222.94 (Office/Water/Sewer phone); CitiBusiness Card $36.72 (Supplies); City of Sioux Falls $43.50 (Testing); DENR $50.00 (Permit Fees); Dept of Treasurer $341.42 (Payroll Tax); Ekern's $225.70 (Sr. Center Furnace repairs); Eng Services $970.10 (garbage services); First District $340.48 (Fees); Hydro Tech $2,499.00 (Rental); Intuit $692.25 (Software); Moody County Enterprise $93.83 (Publishing); Moody County Sheriff $70.00 (Return Service Fee); RDC 84.90 (internet); SD Department of Revenue $92.82 (Sales Tax); Tyler Lumber $28.63 (Supplies); Payroll – General $1,937.50, Water $250.00, Sewer $250.00. All present voted "aye".

Correspondence was reviewed. No action taken.

Motion to adjourn at 8:00pm made by Steinhauer, and seconded by Olson. All present voted "aye".

Next Meeting is February 19, 2020 at 6:00pm.

Minutes submitted pending Board approval.

John Steinhauer, Chairman

Attest:
Brenda Duncan, Finance Officer

MOODY COUNTY PRE-DISASTER MITIGATION PLANNING MEETING
CITY OF EGAN PUBLIC COMMENT
JANURAY 15th, 2020

- Old fire station/new city hall acts as emergency shelter and houses cots, blankets, and first aid for emergencies. – Brenda Duncan

- Improvements the city made: new siding and insulation on senior center, new scoreboard for baseball field, new pump for lift station. – Nancy Hansen

- In the process of applying for grant for portable generator for lift station – Brenda Duncan

- Problem with drainage along the road. Flooding coming into yards, basements, and down alleys more than usual. – Cody Chamblin

City of Flandreau
City Council Meeting

Agenda

6:15 p.m., Monday
March 16th, 2020
City Council Chambers
1005 W. Elm Avenue
Flandreau, SD

Meeting called by:	Mayor Bunrud
Type of meeting:	Regular

Agenda topics

	Pledge of Allegiance	Finance Officer Gundvaldson
2	Adopt Agenda	
6:15 p.m.	Convene Local Board of Equalization ➢ No Appeals were submitted	Local Board of Equalization
	Adjourn Local Board of Equalization	Local Board of Equalization
6:30 p.m.	Convene City Council Meeting	
2	Approve Minutes – March 2nd, 2020	
2	Approve Bills for City	
	Visitors to be Heard	

Visitors to be Heard is the opportunity for persons to address the Council on items not on the Agenda. If the item can be handled administratively without Council action, the Mayor will refer it to the City Administrator. If the item requires Council action, it will be scheduled for an upcoming meeting. Persons wishing to comment on items on the Agenda shall request to speak following presentation of the agenda item and after the Mayor opens the item up for public comment.

	Presentations	
10	Pre-Disaster Mitigation Plan	Todd Kays

	Administrative Reports	
5	Mayor's Report	Mayor Bonrud
5	City Administrator's Report	Jeff Pederson
	Approve Administrative Reports	
	Old Business	
	None	
	New Business	
5	Resolution 2020-02, A Resolution Designating Certain Projects from Proposed Capital Improvements Plan for Immediate Implementation	
5	Agreement for Professional Services – Helms & Associates	
	Council Comments	
15	Executive Session - Personnel	
Special notes:	Other business properly referred to the City Council.	

Jeff Pederson
City Administrator

Distribution:
Mayor Bonrud
Alderman Bjerke
Alderman Pesall
Alderman Sutton
Alderman Tufty
Alderman Unger
Alderman Whitman

Cc:
Newspaper: Moody County Enterprise
Radio: Carol Kiecksee

MOODY COUNTY PRE-DISASTER MITIGATION PLANNING TEAM MEETING

CITY OF FLANDREAU PDM MEETING

March 16th, 2020

Name	Organization	Email*
Todd Kays	1st District	
Payton Schafers	1st District	
Kay Mutschelknaus		
Jeffrey C Nagel		
Donald Whitman		
[illegible]	1st District	
MARK R. POHRUD	Flandreau Mayor	
N. Bob Pesall	3rd Ward	
JASON UNLER	2ND WARD / CITY COUNCIL	
BRAD BJERKE	3RD WARD ALDERMAN	
Jeff Pederson	City Administrator	
Amy Whitman		
Mary Beth Smith		
Karen Lundvaldson	Finance Officer	
[illegible]		
Kelley Ramsdell	FDC	
Curtis [illegible]		
Michael Fargen	Retired	

CITY OF FLANDREAU
1005 W. Elm Avenue Flandreau, SD 57028-1404
COUNCIL PROCEEDINGS
March 16th, 2020

The City Council of the City of Flandreau, South Dakota, met in regular session on Monday, March 16th, 2020 at 6:15 p.m. at the City Council Chambers, 1005 W. Elm Avenue, Flandreau, SD.

Present: Mayor Mark Bonrud. Aldermen: Brad Bjerke, Bob Pesall, Dan Sutton, Karen Tufty, Jason Unger (6:25 p.m.), and Donald Whitman. Absent: None. Also present were City Administrator Jeff Pederson; and Finance Officer Karen Gundvaldson.

The proposed agenda was reviewed. Motion by Tufty and seconded by Whitman to adopt the proposed agenda. The following members voted aye: Bjerke, Pesall, Sutton, Tufty, and Whitman. Nays: None. Absent: Unger. Motion carried.

The Local Board of Equalization convened at 6:15 p.m. The City Council convened at 6:30 p.m. Motion by Sutton and seconded by Tufty to approve the minutes of March 2nd, 2020. The following members voted aye: Bjerke, Pesall, Sutton, Tufty, Unger, and Whitman. Nays: None. Absent: None. Motion carried.

Motion by Whitman and seconded by Pesall to allow the following claims for the City and to pay them: (21087-21088) Payroll 3/11/2020: general, 14,286.21; 3rd penny, 231.64; water, 3,687.73; electric, 7,398.81; sewer, 3,327.34; airport, 169.40; solid waste, 254.10; (21089) Ahlers Automotive, repairs, 874.96; Avera Flandreau Medical Clinic, exam/test, 197.00; Avera Heart Hospital of South Dakota, AED battery and pads, 165.00; Banner Associates, professional fees, 847.00; Best Western Ramkota Hotel Watertown, conference, 91.99; Big Sioux Comm Water System, water purchase/usage, 14,286.32; Big Sioux Comm Water System, deposit & rental refund, 350.00; Border States Electric Supply, meters/supplies, 866.40; Bruning & Lewis Law Firm, professional fees, 1,237.50; Cardmember Services, conference/supplies, 1,316.21; Christiansen Complete Water, supplies, 26.05; Colonial Research Chemical Corp., supplies, 586.25; Cybercoach, repairs/contract, 7,520.39; Darren & Allison Hamilton, deposit refund, 250.00; David Schliinz, conference, 90.37; Ekern Home Equipment, repairs/supplies, 699.72; Elite Business Systems, contract/supplies, 335.88; FSST, utility taxes collected, 362.72; Galls, uniforms, 56.32; Great America Financial SVCS., contract, 190.55; Greg's Welding, supplies, 100.00; Hillyard/Sioux Falls, supplies, 1,076.36; Justice Fire & Safety, repairs, 218.50; M &H Communications, repairs & supplies, 2,825.00; M & T Fire and Safety, supplies, 830.00; Maynards, supplies, 74.59; Metron-Farnier, meters, 8,113.48; MidAmerican Energy, gas bill, 2,782.05; MidAmerican Research Chemical, supplies, 413.30; Moody County Enterprise, advertising, 229.29; Office Peeps, supplies, 58.74; Ottertail Power Company, airport electric, 454.63; Pitney Bowes-Leasing, qtly charges, 504.63; Postmaster, postage, 265.00; Powers Oil Co., diesel fuel, 375.52; 2 Ramsdell F&M, propane, 437.36; River's Edge Cooperative, gas/deposit and rental refund, 2,814.50; SD City Management Assoc., conference, 125.00; SD Firefighters Assoc., membership dues, 650.00; SD Municipal League, professional fees, 1,500.00; SD Supplemental Retirement Plan, retirement, 322.31; Sioux Valley Energy, utilities, 180.00; Sioux Valley Southwestern Electric Coop, deposit/rental/cleaning refund, 450.00; Sparkle Car Wash, police vehicle wash, 21.83; Sturdevant's Auto Supply, supplies, 561.92; Vadim Municipal Software, contract, 5.44; Verizon Wireless, jet packs/cell phone, 377.50; Waxdahl NAPA Plus, repairs/oil, 234.60; (21139) February EFTs: Dakotacare, health insurance,

18,850.69; EFTPS, taxes, 18,313.33; Missouri River Energy Services, energy cost, 129,151.84; SD State Treas-Sales Tax, taxes, 10,513.32; US Dept. of Agriculture, water bond payment, 3,381.00; US Dept. of Agriculture, 2019 water & sewer payment, 21,487.00. The following members voted aye: Bjerke, Pesall, Sutton, Tufty, Unger, and Whitman. Nays: None. Absent: None. Motion carried.

There were no Visitors to be Heard.
Todd Kays, Executive Director of First Planning District was present to conduct a public engagement component involving the Pre-Disaster Mitigation Plan required every five years in order to qualify for funding through the FEMA Hazard Mitigation Grant Program. The Plan includes an inventory of hazard threats as well as critical facilities and infrastructure in Flandreau. Desired updates and revisions were discussed. After the proposed plan is reviewed and approved by FEMA, it will return to Council for approval by Resolution.

The Mayor and City Administrator both brought forth discussion regarding upcoming Council meetings and the possibility of closing them to the public due to COVID-19 risk. Meeting via telephone conference was also discussed. The William J. Janklow Community Center is closed for public events through the end of April. Decision to conduct Council meetings by telephone will be made by the Mayor and City Administrator.

Motion by Pesall and seconded by Unger to approve the Administrative Reports. The following members voted aye: Bjerke, Pesall, Sutton, Tufty, Unger, and Whitman. Nays: None. Absent: None. Motion carried.

Old Business: None.
New Business: Motion by Unger and seconded by Bjerke to adopt Resolution No. 2020-02, A Resolution Designating Certain Projects from Proposed Capital Improvements Plan for Immediate Implementation, with the addition of a digital audio package to live stream and archive City Council meetings, and set aside funds for the annual software subscription for two years. The following members voted aye: Bjerke, Pesall, Sutton, Tufty, Unger, and Whitman. Nays: None. Absent: None. Motion carried.

Motion by Bjerke and seconded by Whitman to approve Agreement for Professional Services for Airport Project Number AIP 3-46-0077-11-2020 with Helms & Associates Corporation. The following members voted aye: Bjerke, Pesall, Sutton, Tufty, Unger, and Whitman. Nays: None. Absent: None. Motion carried.

There were no Council Comments.
Motion by Sutton and seconded by Bjerke to go into executive session for a personnel matter at 7:25 p.m. The following members voted aye: Bjerke, Pesall, Sutton, Tufty, Unger, and Whitman. Nays: None. Absent: None. Motion carried.

Motion by Sutton and seconded by Pesall to come out of executive session at 7:40 p.m. The following members voted aye: Bjerke, Pesall, Sutton, Tufty, Unger, and Whitman. Nays: None. Absent: None. Motion carried.

The Mayor declared the meeting adjourned at 7:41 p.m.

Mark Bonrud Mayor

ATTEST: Jeff Pederson City Administrator

MOODY COUNTY PRE-DISASTER MITIGATION PLANNING MEETING
CITY OF FLANDREAU PUBLIC COMMENT
MARCH 16TH, 2020

- The city recently developed an emergency alert system called Code Red. Could we include education for the public as a HMGP project? – Brad Bjerke

- What is HMGP? – Jason Unger

- We should add the new SRE (Snow Removal Equipment) building to the critical infrastructure list. – Don Whitman

- The emergency sirens have to be replaced after a certain amount of time. We should reach out to Terry Albers (Moody County Emergency Management) for the status of our sirens. – Mark Bonrud

- Should the Wicoicaga Otipi Community Center be listed as critical infrastructure even though it is owned by the Flandreau Santee Sioux Tribe? – Brad Bjerke

- I would recommend adding home acquisition to our project list because of the significant flooding part of the city experienced last year. – Jeff Pederson

- The city wants limited development in the floodplain. I believe we only granted one new structure there in the last 5-10 years. – Don Whitman

Trent
Town Board Meeting Agenda
January 14, 2020

Town of Trent
PO Box 754
Trent, SD 57065
605-428-5160
trenttown@siouxvalley.net

January 14, 2020
Tuesday
5:30pm

Meeting Agenda

- 1st District – Pre-Disaster Mitigation Plan
- Election Date Change – Motion to June 2, 2020
-
-
- Bills

The Town of Trent is an Equal Opportunity Employer and Provider

MOODY COUNTY PRE-DISASTER MITIGATION PLANNING MEETING

TOWN OF TRENT PDM MEETING

JANUARY 14th, 2020

Name	Organization	Email*	Title
[redacted]	[redacted]		[redacted]
Todd Kass	1st District		
Payton Schafers	1st District		
Rich Noord	Trent Council		
Dwane Erickson	TRENT Council		
[illegible]	Trent Council		Board Pres.
Tom Scheff	Trent Fire Dept		
Jerry Elverud	Trent Maintenance		
Kim Nelson	Finance Officer - Trent	trenttown@siouxvalley.net	

TRENT MEETING MINUTES
January 14, 2020

The Town of Trent Council met in regular session on Tuesday, January 14, 2020 at 5:30 pm. Members present were Damm, Nord, Erickson and Nelson, FO. Also attending from the 1st District Association of Local Governments was Todd Kays and Payton Schafers, Trent Maintenance, Jeremy Elverud and Trent Fire Chief Tom Scherff. No other observers were present.

Damm called the meeting to order at 5:30 pm. The agenda was reviewed. With the addition of a couple of housekeeping items, Nord motioned to approve, seconded by Erickson. Motion to proceed with the agenda carried.

Nelson read the December meeting minutes, with no additions or corrections, Erickson motioned to approve, seconded by Nord, motion carried.

Mr. Kays reviewed with council the Pre-Disaster Mitigation Plan for the Town of Trent. This plan is updated every five years under the *Disaster Mitigation Act of 2000.* Every jurisdiction that wishes to qualify for federal disaster mitigation grant funds must have a FEMA approved plan. The council reviewed the risk of possible hazard and critical infrastructure to protect. A sample is available in the town office for anyone wishing a copy. The finalized plan should be ready by the end of April 2020.

Nelson received approval from Moody County to combine the normal April Municipal Election with the June 2, 2020 Primary Election this year. Nord motioned to move the Municipal Election to June 2, 2020, seconded by Erickson. Motion carried. Damm called for a vote, council voted 3-0 to move the Municipal Election date.

The Moody County Enterprise was designated as the newspaper of official record for Trent by Nord, seconded by Erickson.
Nord motioned to keep the salaries as follows:
Council Trustees - $100.00 per month
Finance Officer - $750.00 per month
Water, Sewer Maintenance - $600.00 per month
Snow Plowing, General Maintenance - $25.00 per hour
Mowing - $15.00 per hour
Seconded by Erickson, motion carried.

Nelson requested the February Meeting be moved to Thursday, February 13, 2020. Nord motioned to approve, seconded by Erickson.

The following bills were read for approval:
USDA $461.00 water, Staples $246.48 gen, Walmart $53.15 gen/gym, Otter Tail Power $652.62 gen/water/sewer, Postmaster $110.00 gen/sewer, MC Auditor $1616.00 gen/police, SDPAA, 3722.81 gen, DENR $50.00 sewer, Schwebach Ins $5922.00 gen/fire, Big Sioux Water $1204.74 water, Golden West $108.82 gen, City of SF $43.50 water, MC Enterprise $20.52 gen, Jeremy Elverud $554.10 sewer, Kim Nelson $692.62 gen, SD State Treasurer $3238.93 gen, SD Unemploy Ins $15.17 gen, US Treasury $892.95 gen, Eng Services $1013.70 garbage.
Nord motioned to approve, seconded by Erickson. Motion carried.

With no further business, Nord motioned to adjourn, seconded by Erickson. Meeting adjourned at 6:35 pm. Next regular meeting will be held **THURSDAY, FEBRUARY 13, 2020** at 5:30 pm.

Kimberly A. Nelson, FO

MOODY COUNTY PRE-DISASTER MITIGATION PLANNING MEETING
CITY OF TRENT PUBLIC COMMENT
JANURAY 14th, 2020

- Old school gym is not considered an official shelter, but the City opened the building as a shelter base last year post flooding. – Kim Nelson

- Currently, poor communication between the town and County. Ditches along main road (3rd Street) getting shallower causing water to pool and flood. We need to work with the County on removing built-up silt. – Jeremy Elverud

- Problems with lagoons have decreased, but issues still exist with inundation in the third pool. – Tom Scherff

Town of Ward
Town Board Meeting
February 10th, 2020

AGENDA

1. **Call to Order**
2. **Roll Call**
3. **Last Month's Minutes**
4. **Water Department**
5. **Animal Control**
6. **Business**
    a. **First District**
    b. **Monday Night Supper**
    c. **Tiling**
    d. **Landscape between Hall and Martens**
    e. **Camera Proposal**
    f. **Equalization March 16th**
7. **Citizen Comments**
8. **Bills**
9. **Adjourn**

MEETING: February 10, 2020 7:00 PM

MOODY COUNTY PRE-DISASTER MITIGATION PLANNING MEETING

TOWN OF WARD PDM MEETING

February 10th, 2020

Name	Organization	Email*
Dayton Schafers	First District	
Luke Muller	First District	
Geoffrey Duckpeck		
Tom Kampmann		
Kathy Baker		
Charity Kuehl	Finance Clerk	ckuehl65@gmail.com
Tom Jorgensen	Ward	tomovert3@yahoo.com
Scott Hardberg	ward Trustee	littlejoe1975@yahoo.com
Quentin Reuter	Trustee	
Clair Barthel	Water Superintendent	

Ward Town Meeting Minutes

309 223rd Street
Ward, SD 57026
Phone 605-542-7788

Regular Council meeting was held February 10, 2020 7:00 p.m. at the Community Center.

Members present: Trustees: Scott Handberg, Arlette Reeves, Tom Jorgensen and Charity Kuehl FO. Also present was Clair Barthel, Tom Kampmann, First District (Luke and Payton), Geoffry Drapeau, and Kathy Baker.

Minutes were approved from last month: Reeves made a motion 2nd by Jorgensen.

Water Department: Everything is working well at the pump house.

Animal Control: Nothing. Asked about the kennel license.

Business: Business: First Monday Supper- The next supper will be March 2nd watch for signs. We have good turnouts and good fellowship. Thanks to all in attendance.

First District was present to go over disaster 5 year plan.

Tiling: Tom had talked to Scott Knudson. We will be meeting February 24th to get bidset done.

Landscaping: There will be no mowing between the community center and Doug Martins.

Camera Proposal: Tabled until next meeting.

Equalization: The meeting will be held March 16th at 7:00.

Bills were presented and approved. Reeves made a motion to pay said bills 2nd by Clair Barthel $143.50; Charity Kuehl $78.50; Geoffry Drapeau $60.00: Eng Services $152.60; Otter Tail Power $673.53; Moody County Enterprise $40.02; SD One Call $3.15; Moody County $160.00; Stoltzfus Farms $1,475.00; and Arlette Reeves $8.49.

No further business, Reeves made a motion to adjourn 2nd by Jorgensen.

Next Council meeting will be held March 16, 2020, 7:00 p.m. at the Community Center.

Charity Kuehl,
Finance Officer

MOODY COUNTY PRE-DISASTER MITIGATION PLANNING MEETING
TOWN OF WARD PUBLIC COMMENT
FEBRUARY 10TH, 2020

- The town has a high-water table, so our flooding issues come from groundwater not river/stream flooding. But we are in the process of installing into tiling options to move water through town. We are hoping to start by the springtime (2020). – Scott Handberg

- We rely on County plows to clear the roads during heavy snow events. Sometimes, we are stranded in town for a couple days before they come. Two weeks ago, we were stuck in town for 2 days. There is a local farmer that will plow the local streets sometimes. – Kathy Baker

- Every year we have communication interruptions, at least once. Ottertail (electric power) has expressed no interest in helping us burying lines coming into town. – Charity Kuehl

- The closest substation is a mile and a half west of town and all the lines coming into town are above ground. That's the main reason we have problems during winter storms. – Chris Barthel

MOODY COUNTY PRE-DISASTER MITIGATION
MOODY COUNTY TOWNSHIP MEETING
FEBRUARY 26, 2020

Township Meeting 2/26/2020 1:00 PM

	Name	Organization
1	Gary McClark	Alliance
2	Lawrence Johnson	Blinsmon
3	Buck Schaaek	Fremont
4	Mike Kiechow	Union
5	Dan Knuth	Spring Creek
6	Bruce Cramer	Colman T.S.
7	Brad Hemmer	Egan T.S.
8	Tim Guss	Enterprise
9	Harold Schaaemann	Ward
10	Todd Sanderson	Ward Township
11	Steve Doyle	Jefferson
12	Todd Intermill	Jefferson
13	Alan Warner	Union
14	Joe Hinrichs	Blinsmon
15	Randy Hemmer	Egan
16	Stuart Redting	Flandreau
17	Merlyn Gropp	Colman
18	Lloyd Huckell	Flandreau
19	Chris Geraets	Enterprise
20	Kevin Michel	Lyons

	Name	Organization
21	Darla Lentsch	Fremont
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		

Appendix D - Hazard Identification/Vulnerability Worksheets

Appendix D includes master worksheets for Hazard Identification and Vulnerability for jurisdictions compiled as described in Appendix C. Lists were gathered by Sioux Valley Energy and Moody County Emergency Management Staff for their respective entities and at meetings for the other communities as described below:

Entity	**Date**
Colman	February 10, 2020
Egan	January 15, 2020
Flandreau	March 16, 2020
Trent	January 14, 2020
Ward	February 10, 2020

Master worksheets for Hazard Identification and Vulnerability for jurisdictions below. The probability of each hazard event differs from each community and overall county area based upon the local governing body opinions of the probability of an event occurring. Appendix D represents a subjective analysis of opinions regarding hazard identification and vulnerabilities by residents of the communities. The empirical data regarding probability of hazards is discussed in the hazard profile in Chapter 4.

Moody County PDM
Worksheet #1 (Moody County)
Risk Assessment Worksheet – Hazard Identification

What is the probability of occurrence of the following hazards?

Hazard	**High Probability to Occur** (At least once in a year)	**Low Probability to Occur** (Hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis)	**Unlikely to Occur** (Hazards or disasters that have never occurred in the area before and are unlikely to occur)
Dam Failure		**X**	
Drought	**X**		
Earthquake			**X**
Extreme Cold	**X**		
Extreme Heat	**X**		
Flood		**X**	
Freezing Rain/Sleet/Ice	**X**		
Hail	**X**		
Heavy Rain	**X**		
Heavy Snow	**X**		
Ice Jam		**X**	
Lightning	**X**		
Rapid Snow Melt	**X**		
Strong Winds	**X**		
Subsidence			**X**
Thunderstorm	**X**		
Tornado		**X**	
Urban Fire		**X**	
Wildfire			**X**

Moody County PDM
Worksheet #2 (Moody County)
Risk Assessment Worksheet – Hazard Vulnerability

How vulnerable is the community from the following hazard? In other words if the hazard occurs is there a potential to impact the community? If so, what would be impacted?

Hazard	**High Vulnerability** Significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and/or regular occurrence)	**Medium Vulnerability** Moderate damage potential (causing partial damage to 5-10% of the jurisdiction, and irregular occurrence)	**Low Vulnerability** Little damage potential (minor damage to less than 5% of the jurisdiction)	**NA** Not a hazard to the jurisdiction
Dam Failure			**X**	
Drought	**X**			
Earthquake				**X**
Extreme Cold		**X**		
Extreme Heat		**X**		
Flood		**X**		
Freezing Rain/Sleet/Ice	**X**			
Hail		**X**		
Heavy Rain	**X**			
Heavy Snow	**X**			
Ice Jam		**X**		
Lightning	**X**			
Rapid Snow Melt	**X**			
Strong Winds	**X**			
Thunderstorm	**X**			
Tornado		**X**		
Urban Fire		**X**		
Wildfire		**X**		

Moody County PDM
Worksheet #1 (Colman)
Risk Assessment Worksheet – Hazard Identification

What is the probability of occurrence of the following hazards?

Hazard	**High Probability to Occur** (At least once in a year)	**Low Probability to Occur** (Hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis)	**Unlikely to Occur** (Hazards or disasters that have never occurred in the area before and are unlikely to occur)
Dam Failure			**X**
Drought		**X**	
Earthquake			**X**
Extreme Cold	**X**		
Extreme Heat	**X**		
Flood	**X**		
Freezing Rain/Sleet/Ice	**X**		
Hail	**X**		
Heavy Rain	**X**		
Heavy Snow	**X**		
Ice Jam		**X**	
Lightning	**X**		
Rapid Snow Melt		**X**	
Strong Winds	**X**		
Subsidence			**X**
Thunderstorm	**X**		
Tornado		**X**	
Urban Fire		**X**	
Wildfire			**X**

Moody County PDM
Worksheet #2 (Colman)
Risk Assessment Worksheet – Hazard Vulnerability

How vulnerable is the community from the following hazard? In other words if the hazard occurs is there a potential to impact the community? If so, what would be impacted?

Hazard	**High Vulnerability** Significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and/or regular occurrence)	**Medium Vulnerability** Moderate damage potential (causing partial damage to 5-10% of the jurisdiction, and irregular occurrence)	**Low Vulnerability** Little damage potential (minor damage to less than 5% of the jurisdiction)	**NA** Not a hazard to the jurisdiction
Dam Failure			**X**	
Drought			**X**	
Earthquake				**X**
Extreme Cold			**X**	
Extreme Heat			**X**	
Flood			**X**	
Freezing Rain/Sleet/Ice		**X**		
Hail			**X**	
Heavy Rain			**X**	
Heavy Snow			**X**	
Ice Jam				**X**
Lightning			**X**	
Rapid Snow Melt		**X**		
Strong Winds		**X**		
Subsidence				**X**
Thunderstorm			**X**	
Tornado	**X**			
Urban Fire		**X**		
Wildfire				**X**

Moody County PDM
Worksheet #1 (Egan)
Risk Assessment Worksheet – Hazard Identification

What is the probability of occurrence of the following hazards?

Hazard	**High Probability to Occur** (At least once in a year)	**Low Probability to Occur** (Hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis)	**Unlikely to Occur** (Hazards or disasters that have never occurred in the area before and are unlikely to occur)
Dam Failure			**X**
Drought		**X**	
Earthquake			**X**
Extreme Cold	**X**		
Extreme Heat	**X**		
Flood	**X**		
Freezing Rain/Sleet/Ice	**X**		
Hail	**X**		
Heavy Rain	**X**		
Heavy Snow	**X**		
Ice Jam			**X**
Lightning	**X**		
Rapid Snow Melt	**X**		
Strong Winds	**X**		
Subsidence			**X**
Thunderstorm	**X**		
Tornado		**X**	
Urban Fire		**X**	
Wildfire			**X**

Moody County PDM
Worksheet #2 (Egan)
Risk Assessment Worksheet – Hazard Vulnerability

How vulnerable is the community from the following hazard? In other words if the hazard occurs is there a potential to impact the community? If so, what would be impacted?

Hazard	**High Vulnerability** Significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and/or regular occurrence)	**Medium Vulnerability** Moderate damage potential (causing partial damage to 5-10% of the jurisdiction, and irregular occurrence)	**Low Vulnerability** Little damage potential (minor damage to less than 5% of the jurisdiction)	**NA** Not a hazard to the jurisdiction
Dam Failure				**X**
Drought			**X**	
Earthquake				**X**
Extreme Cold			**X**	
Extreme Heat			**X**	
Flood		**X**		
Freezing Rain/Sleet/Ice		**X**		
Hail			**X**	
Heavy Rain	**X**			
Heavy Snow			**X**	
Ice Jam				**X**
Lightning		**X**		
Rapid Snow Melt		**X**		
Strong Winds		**X**		
Subsidence				**X**
Thunderstorm		**X**		
Tornado	**X**			
Urban Fire			**X**	
Wildfire			**X**	

Moody County PDM
Worksheet #1 (Flandreau)
Risk Assessment Worksheet – Hazard Identification

What is the probability of occurrence of the following hazards?

Hazard	**High Probability to Occur** (At least once in a year)	**Low Probability to Occur** (Hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis)	**Unlikely to Occur** (Hazards or disasters that have never occurred in the area before and are unlikely to occur)
Dam Failure		**X**	
Drought	**X**		
Earthquake			**X**
Extreme Cold	**X**		
Extreme Heat	**X**		
Flood	**X**		
Freezing Rain/Sleet/Ice	**X**		
Hail	**X**		
Heavy Rain	**X**		
Heavy Snow	**X**		
Ice Jam	**X**		
Lightning	**X**		
Rapid Snow Melt	**X**		
Strong Winds	**X**		
Subsidence			**X**
Thunderstorm	**X**		
Tornado		**X**	
Urban Fire		**X**	
Wildfire		**X**	

Moody County PDM
Worksheet #2 City of (Flandreau)
Risk Assessment Worksheet – Hazard Vulnerability

How vulnerable is the community from the following hazard? In other words if the hazard occurs is there a potential to impact the community? If so, what would be impacted?

Hazard	**High Vulnerability** Significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and/or regular occurrence)	**Medium Vulnerability** Moderate damage potential (causing partial damage to 5-10% of the jurisdiction, and irregular occurrence)	**Low Vulnerability** Little damage potential (minor damage to less than 5% of the jurisdiction)	**NA** Not a hazard to the jurisdiction
Dam Failure			**X**	
Drought		**X**		
Earthquake				**X**
Extreme Cold		**X**		
Extreme Heat		**X**		
Flood		**X**		
Freezing Rain/Sleet/Ice			**X**	
Hail			**X**	
Heavy Rain			**X**	
Heavy Snow			**X**	
Ice Jam			**X**	
Lightning			**X**	
Rapid Snow Melt			**X**	
Strong Winds		**X**		
Subsidence				**X**
Thunderstorm			**X**	
Tornado	**X**			
Urban Fire	**X**			
Wildfire			**X**	

Moody County PDM
Worksheet #1 (Trent)
Risk Assessment Worksheet – Hazard Identification

What is the probability of occurrence of the following hazards?

Hazard	**High Probability to Occur** (At least once in a year)	**Low Probability to Occur** (Hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis)	**Unlikely to Occur** (Hazards or disasters that have never occurred in the area before and are unlikely to occur)
Dam Failure			**X**
Drought		**X**	
Earthquake			**X**
Extreme Cold	**X**		
Extreme Heat	**X**		
Flood		**X**	
Freezing Rain/Sleet/Ice	**X**		
Hail		**X**	
Heavy Rain		**X**	
Heavy Snow		**X**	
Ice Jam		**X**	
Lightning	**X**		
Rapid Snow Melt		**X**	
Strong Winds	**X**		
Subsidence			**X**
Thunderstorm	**X**		
Tornado		**X**	
Urban Fire		**X**	
Wildfire			**X**

Moody County PDM
Worksheet #2 (Trent)
Risk Assessment Worksheet – Hazard Vulnerability

How vulnerable is the community from the following hazard? In other words if the hazard occurs is there a potential to impact the community? If so, what would be impacted?

Hazard	**High Vulnerability** Significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and/or regular occurrence)	**Medium Vulnerability** Moderate damage potential (causing partial damage to 5-10% of the jurisdiction, and irregular occurrence)	**Low Vulnerability** Little damage potential (minor damage to less than 5% of the jurisdiction)	**NA** Not a hazard to the jurisdiction
Dam Failure				**X**
Drought			**X**	
Earthquake				**X**
Extreme Cold			**X**	
Extreme Heat			**X**	
Flood	**X**			
Freezing Rain/Sleet/Ice		**X**		
Hail		**X**		
Heavy Rain		**X**		
Heavy Snow		**X**		
Ice Jam			**X**	
Lightning			**X**	
Rapid Snow Melt			**X**	
Strong Winds		**X**		
Subsidence				**X**
Thunderstorm		**X**		
Tornado	**X**			
Urban Fire			**X**	
Wildfire				**X**

Moody County PDM
Worksheet #1 (Ward)
Risk Assessment Worksheet – Hazard Identification

What is the probability of occurrence of the following hazards?

Hazard	**High Probability to Occur** (At least once in a year)	**Low Probability to Occur** (Hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis)	**Unlikely to Occur** (Hazards or disasters that have never occurred in the area before and are unlikely to occur)
Dam Failure			**X**
Drought		**X**	
Earthquake			**X**
Extreme Cold	**X**		
Extreme Heat	**X**		
Flood		**X**	
Freezing Rain/Sleet/Ice	**X**		
Hail		**X**	
Heavy Rain	**X**		
Heavy Snow	**X**		
Ice Jam			**X**
Lightning	**X**		
Rapid Snow Melt		**X**	
Strong Winds	**X**		
Subsidence			**X**
Thunderstorm	**X**		
Tornado	**X**		
Urban Fire		**X**	
Wildfire		**X**	

Moody County PDM
Worksheet #2 (Ward)
Risk Assessment Worksheet – Hazard Vulnerability

How vulnerable is the community from the following hazard? In other words if the hazard occurs is there a potential to impact the community? If so, what would be impacted?

Hazard	**High Vulnerability** Significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and/or regular occurrence)	**Medium Vulnerability** Moderate damage potential (causing partial damage to 5-10% of the jurisdiction, and irregular occurrence)	**Low Vulnerability** Little damage potential (minor damage to less than 5% of the jurisdiction)	**NA** Not a hazard to the jurisdiction
Dam Failure				**X**
Drought			**X**	
Earthquake				**X**
Extreme Cold		**X**		
Extreme Heat		**X**		
Flood		**X**		
Freezing Rain/Sleet/Ice	**X**			
Hail	**X**			
Heavy Rain	**X**			
Heavy Snow	**X**			
Ice Jam				**X**
Lightning		**X**		
Rapid Snow Melt		**X**		
Strong Winds	**X**			
Subsidence				**X**
Thunderstorm	**X**			
Tornado	**X**			
Urban Fire			**X**	
Wildfire			**X**	

Moody County PDM
Worksheet #1 (Sioux Valley Energy)
Risk Assessment Worksheet – Hazard Identification

What is the probability of occurrence of the following hazards?

Hazard	**High Probability to Occur** (At least once in a year)	**Low Probability to Occur** (Hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis)	**Unlikely to Occur** (Hazards or disasters that have never occurred in the area before and are unlikely to occur)
Dam Failure			**X**
Drought		**X**	
Earthquake			**X**
Extreme Cold	**X**		
Extreme Heat	**X**		
Flood		**X**	
Freezing Rain/Sleet/Ice	**X**		
Hail	**X**		
Heavy Rain	**X**		
Heavy Snow	**X**		
Ice Jam		**X**	
Lightning	**X**		
Rapid Snow Melt		**X**	
Strong Winds	**X**		
Subsidence			**X**
Thunderstorm	**X**		
Tornado		**X**	
Urban Fire		**X**	
Wildfire		**X**	

Moody County PDM
Worksheet #2 (Sioux Valley Energy)
Risk Assessment Worksheet – Hazard Vulnerability

How vulnerable is the community from the following hazard? In other words if the hazard occurs is there a potential to impact the community? If so, what would be impacted?

Hazard	**High Vulnerability** Significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and/or regular occurrence)	**Medium Vulnerability** Moderate damage potential (causing partial damage to 5-10% of the jurisdiction, and irregular occurrence)	**Low Vulnerability** Little damage potential (minor damage to less than 5% of the jurisdiction)	**NA** Not a hazard to the jurisdiction
Dam Failure			**X**	
Drought				**X**
Earthquake				**X**
Extreme Cold			**X**	
Extreme Heat			**X**	
Flood			**X**	
Freezing Rain/Sleet/Ice	**X**			
Hail			**X**	
Heavy Rain			**X**	
Heavy Snow		**X**		
Ice Jam			**X**	
Lightning			**X**	
Rapid Snow Melt			**X**	
Strong Winds	**X**			
Subsidence				**X**
Thunderstorm		**X**		
Tornado		**X**		
Urban Fire				**X**
Wildfire			**X**	

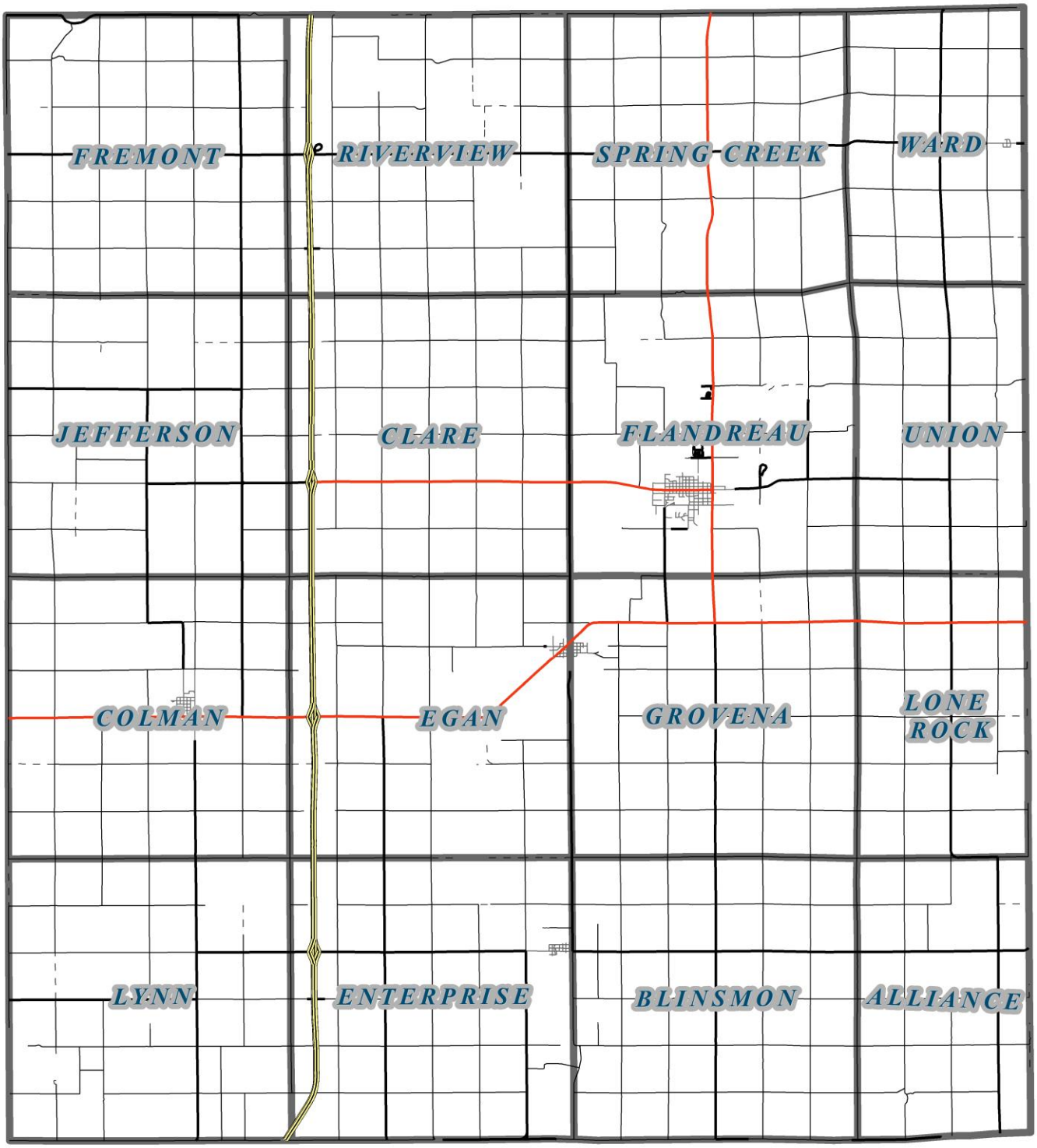
Appendix E
Township Vulnerable and Potential Mitigation Project Site Maps

On February 26, 2020, First District attended the yearly township meeting in the City of Flandreau to request information regarding critical infrastructure and identify any areas within the township which were most vulnerable to natural hazards, especially flooding. Eleven out of the sixteen townships were present. The Emergency Management Director for Moody County kept the maps for the townships that did not attend and reached out to their supervisors. Each township was contacted on March 13th, 2020 and reminded to return updated maps. It was assumed that any townships which did not respond to the information request had no critical infrastructure or vulnerable areas which currently may require mitigation activities. Of the 16 Townships contacted, 11 were returned with vulnerable areas identified (see table below).

Township Name	Response
Alliance	Returned /Identified vulnerabilities
Blinsmon	Returned /Identified vulnerabilities
Clare	Not returned
Colman	Returned /Identified vulnerabilities
Egan	Not returned
Enterprise	Returned /Identified vulnerabilities
Flandreau	Returned /Identified vulnerabilities
Fremont	Returned /Identified vulnerabilities
Grovena	Not returned
Jefferson	Returned /Identified vulnerabilities
Lone Rock	Returned /Identified vulnerabilities
Lynn	Returned /Identified vulnerabilities
Riverview	Returned /Identified vulnerabilities
Spring Creek	Returned /Identified vulnerabilities
Union	Not returned
Ward	Not returned

Maps identifying vulnerable areas for those townships which identified such areas are shown below.

Moody County Townships



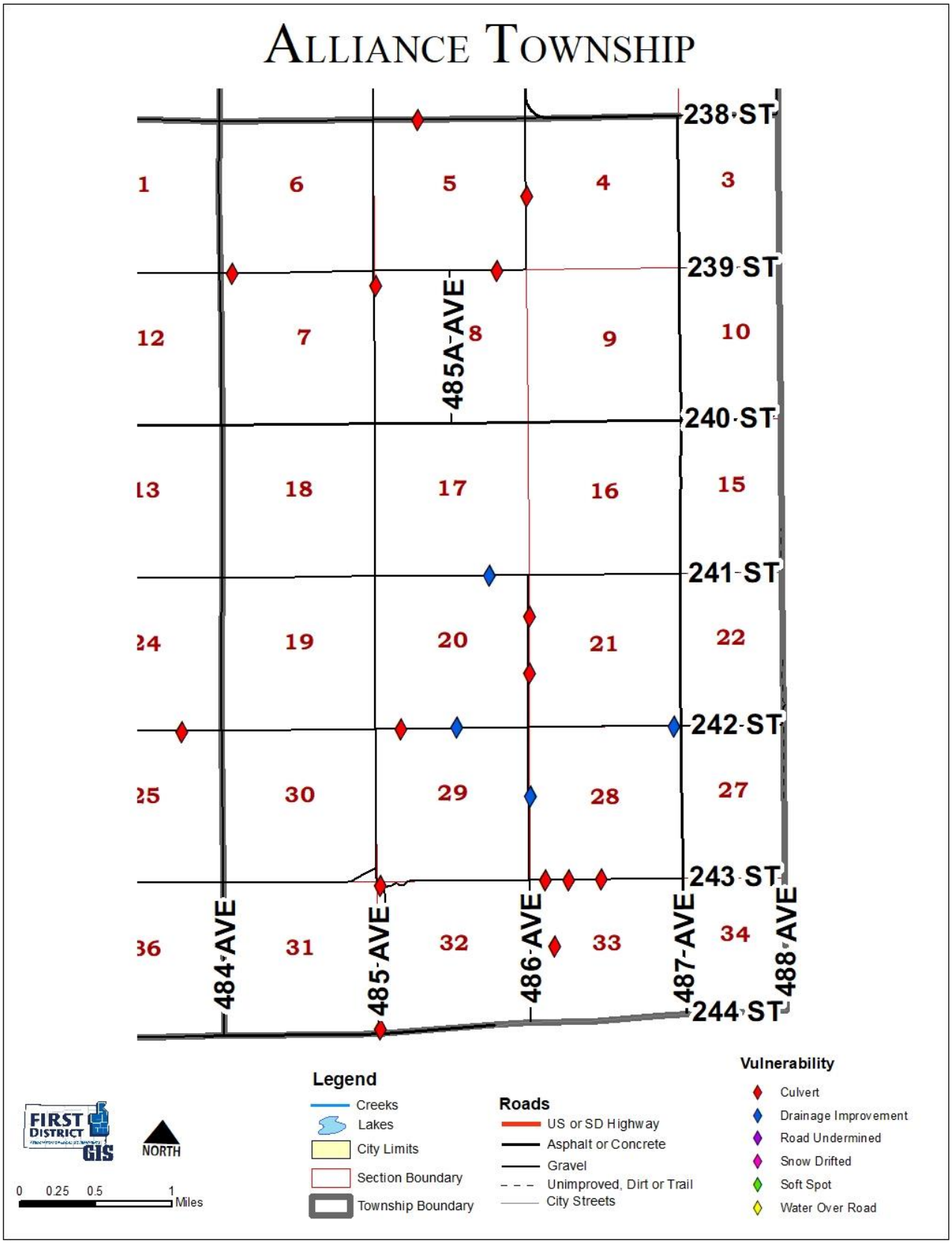
Legend Township Boundary

Roads
- Interstate 29
- US or SD Highway
- Asphalt or Concrete
- Gravel
- Unimproved, Dirt or Trail
- City Streets

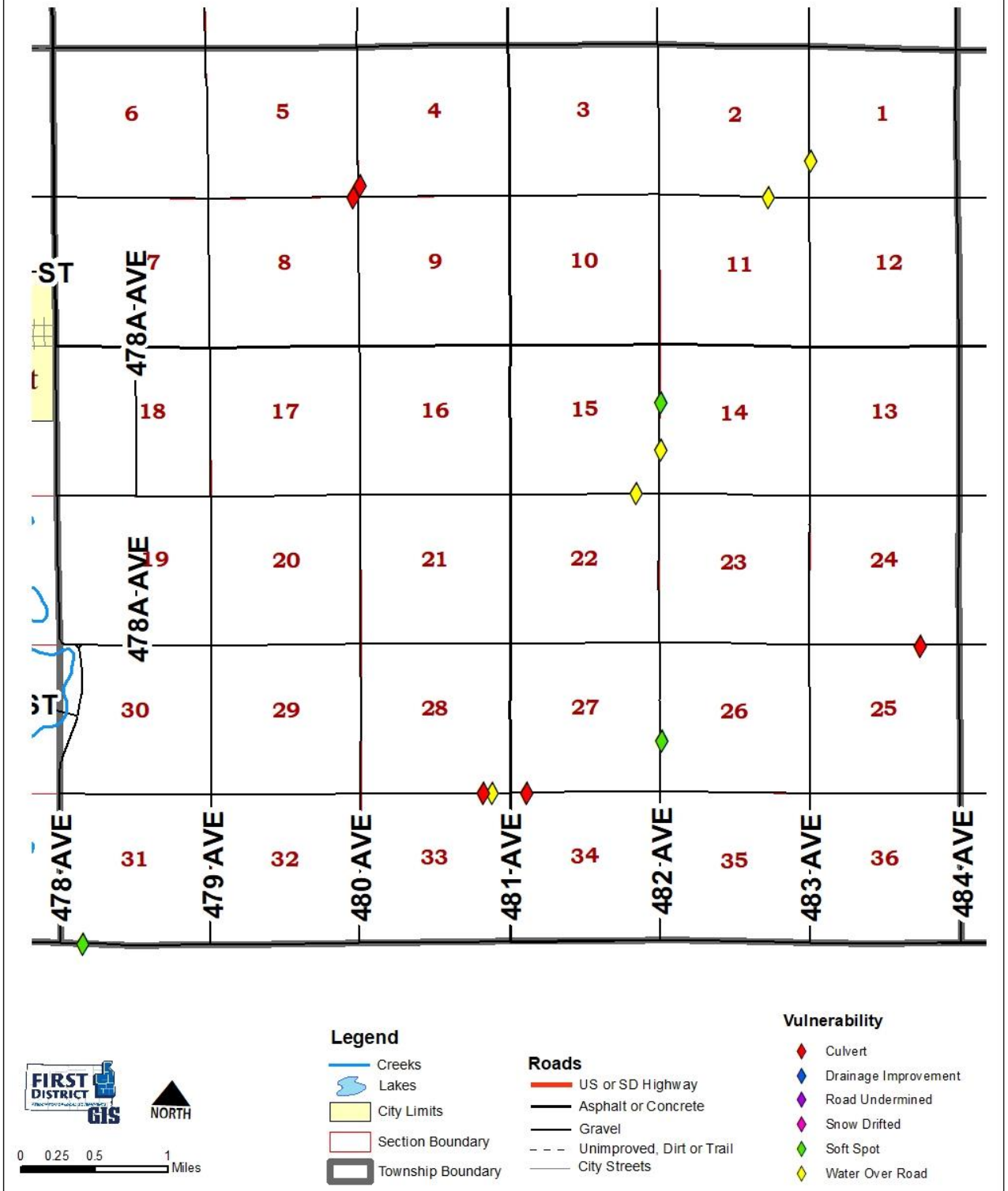
NORTH

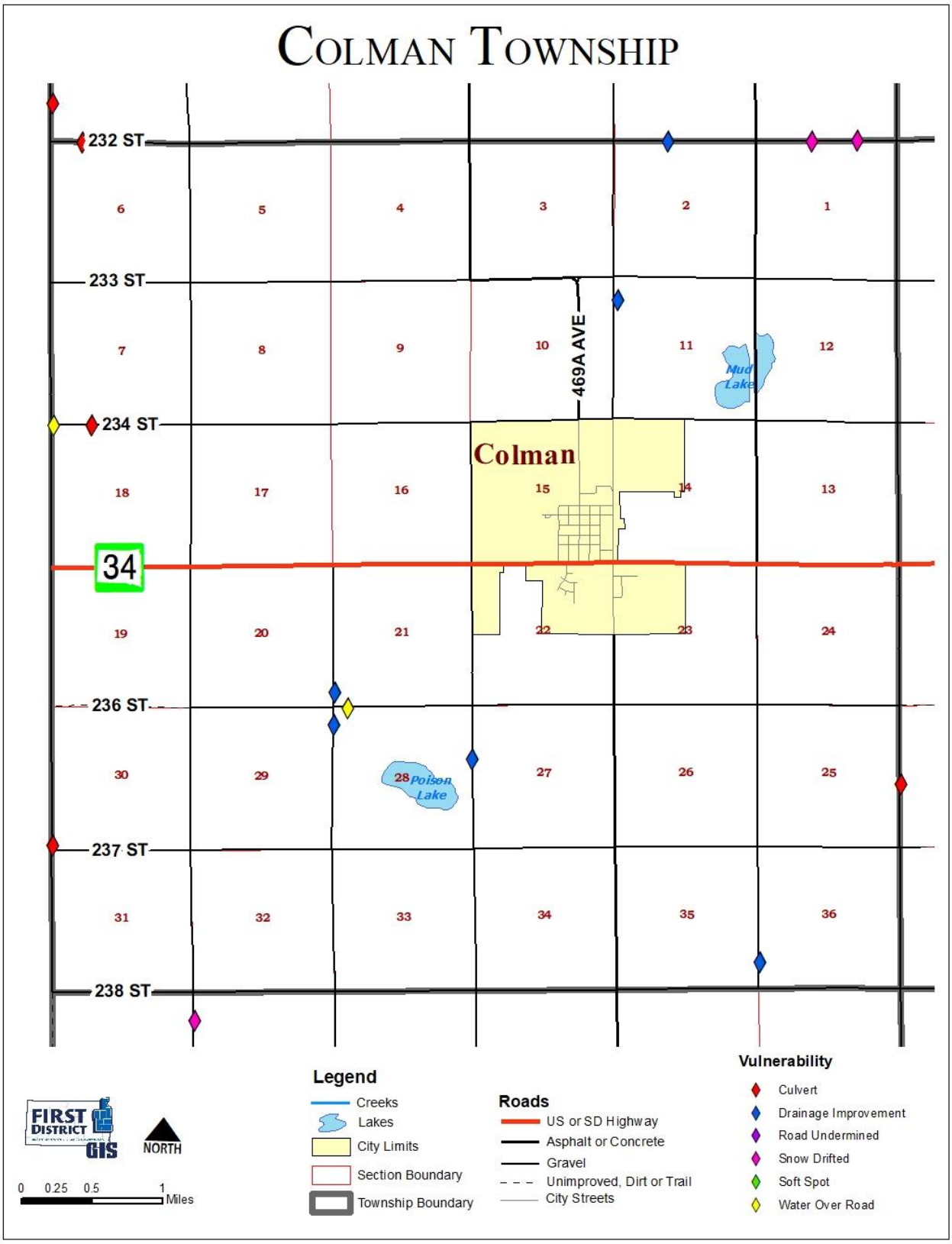
FIRST DISTRICT

0 1 2 4 Miles

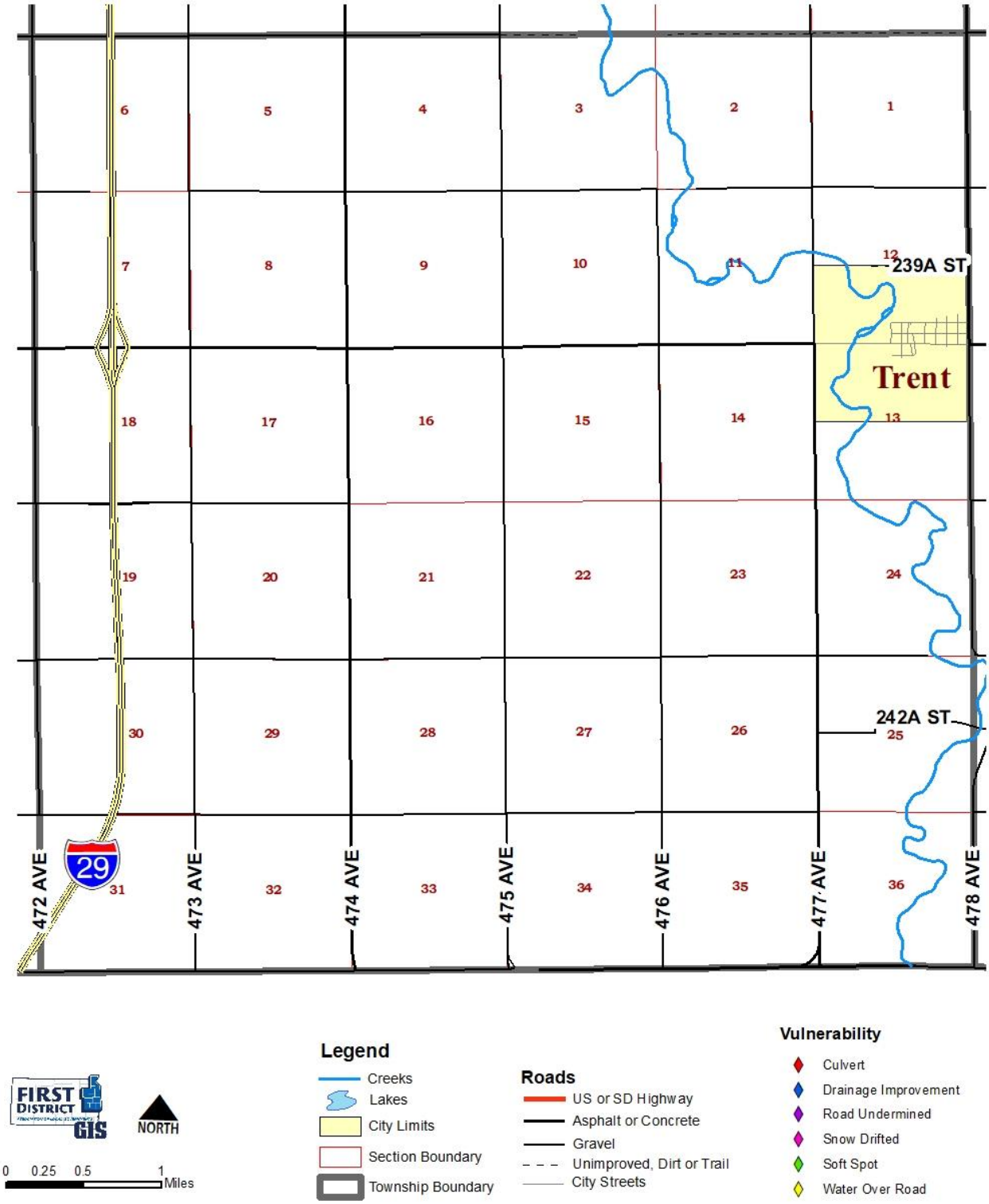

ALLIANCE TOWNSHIP
238 ST
239 ST
240 ST
241 ST
242 ST
243 ST
244 ST
484 AVE
485 AVE
485A AVE
486 AVE
487 AVE
488 AVE
1
6
5
4
3
12
7
8
9
10
13
18
17
16
15
24
19
20
21
22
25
30
29
28
27
36
31
32
33
34
Legend
Creeks
Lakes
City Limits
Section Boundary
Township Boundary
Roads
US or SD Highway
Asphalt or Concrete
Gravel
Unimproved, Dirt or Trail
City Streets
Vulnerability
Culvert
Drainage Improvement
Road Undermined
Snow Drifted
Soft Spot
Water Over Road
FIRST DISTRICT GIS
NORTH
0 0.25 0.5 1 Miles

Blinsmon Township

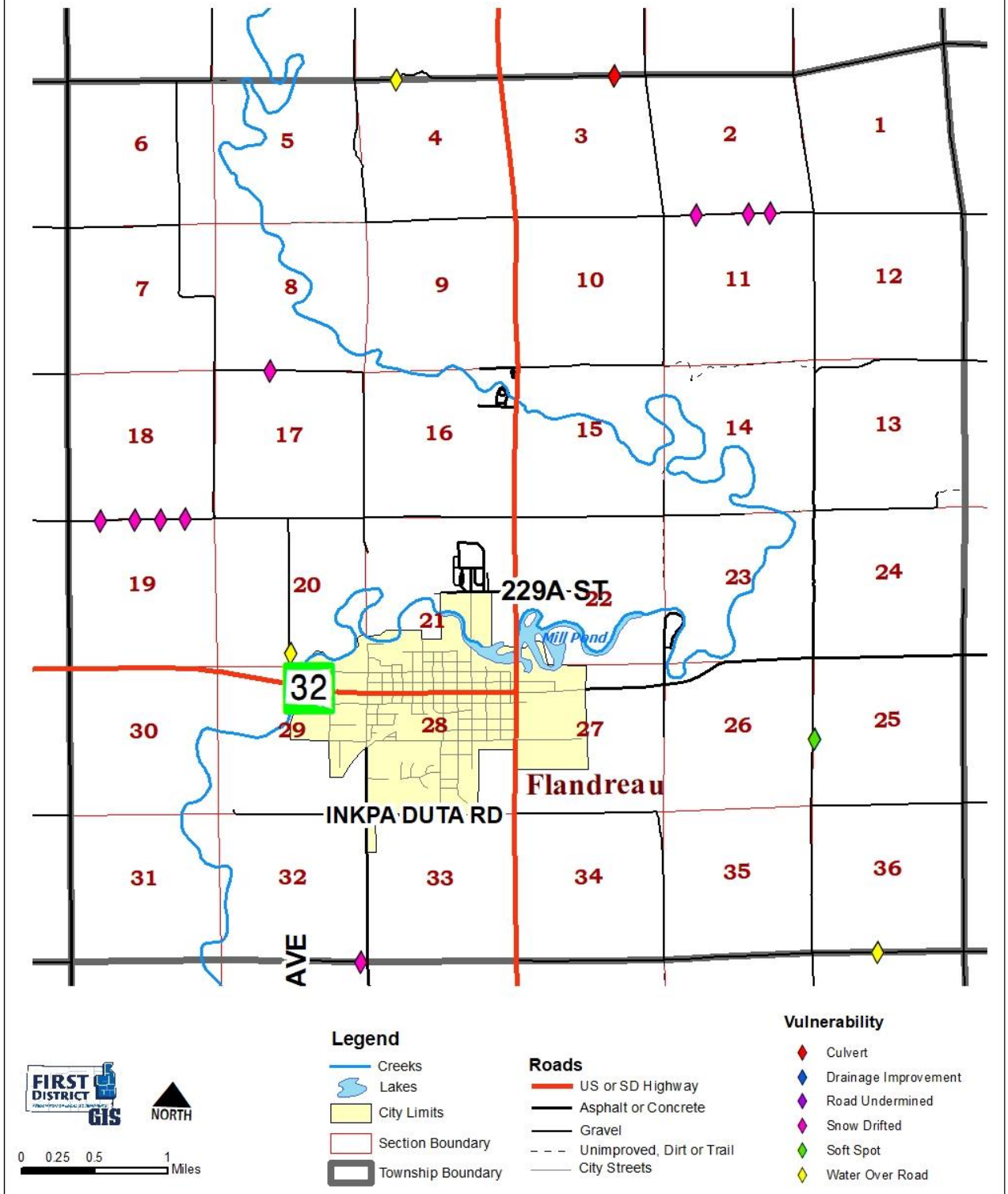



COLMAN TOWNSHIP
232 ST
233 ST
234 ST
236 ST
237 ST
238 ST
469A AVE
34
Colman
Mud Lake
Poison Lake
6
5
4
3
2
1
7
8
9
10
11
12
18
17
16
15
14
13
19
20
21
22
23
24
30
29
28
27
26
25
31
32
33
34
35
36
FIRST DISTRICT GIS
NORTH
0 0.25 0.5 1 Miles
Legend
Creeks
Lakes
City Limits
Section Boundary
Township Boundary
Roads
US or SD Highway
Asphalt or Concrete
Gravel
Unimproved, Dirt or Trail
City Streets
Vulnerability
Culvert
Drainage Improvement
Road Undermined
Snow Drifted
Soft Spot
Water Over Road

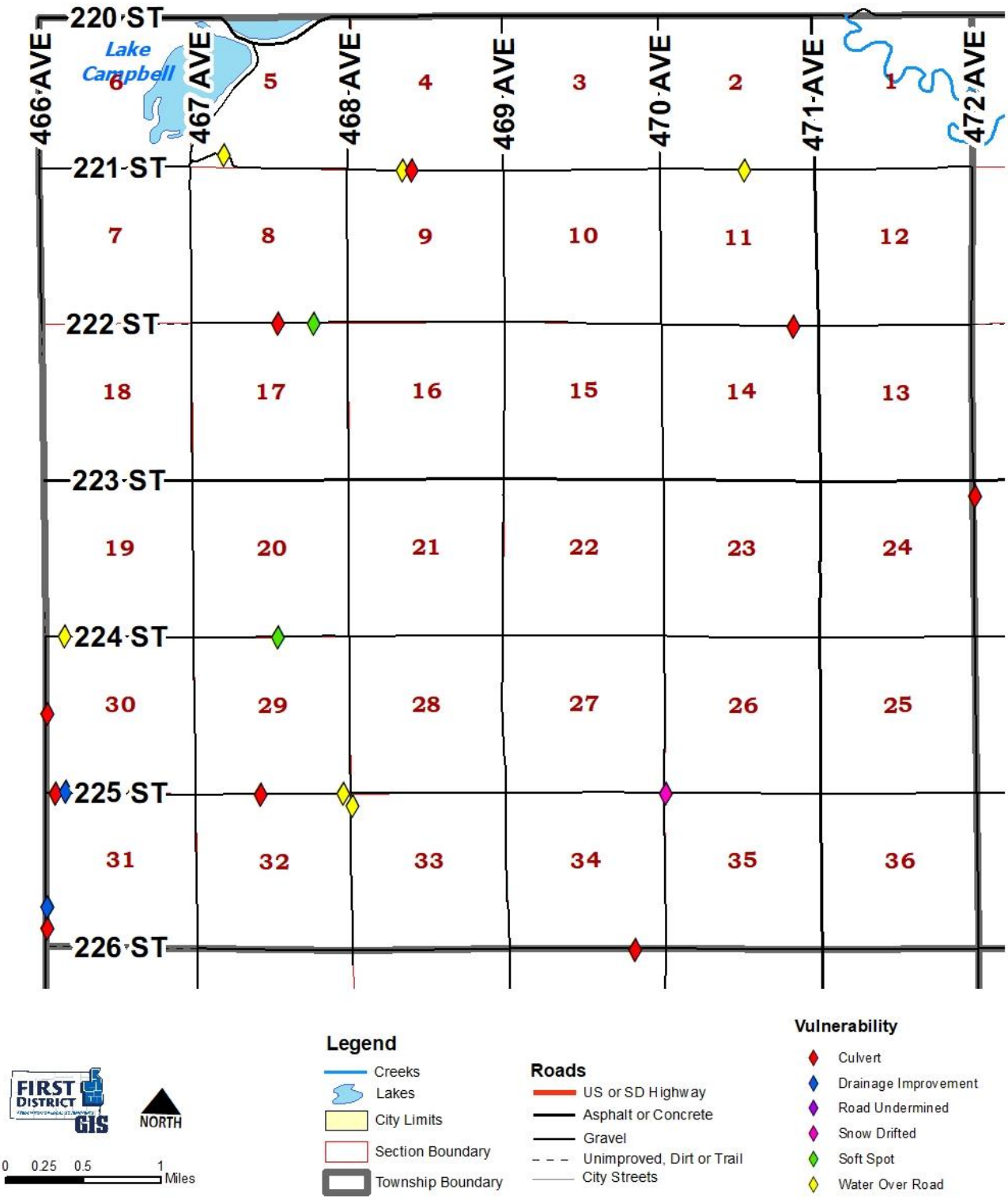
ENTERPRISE TOWNSHIP



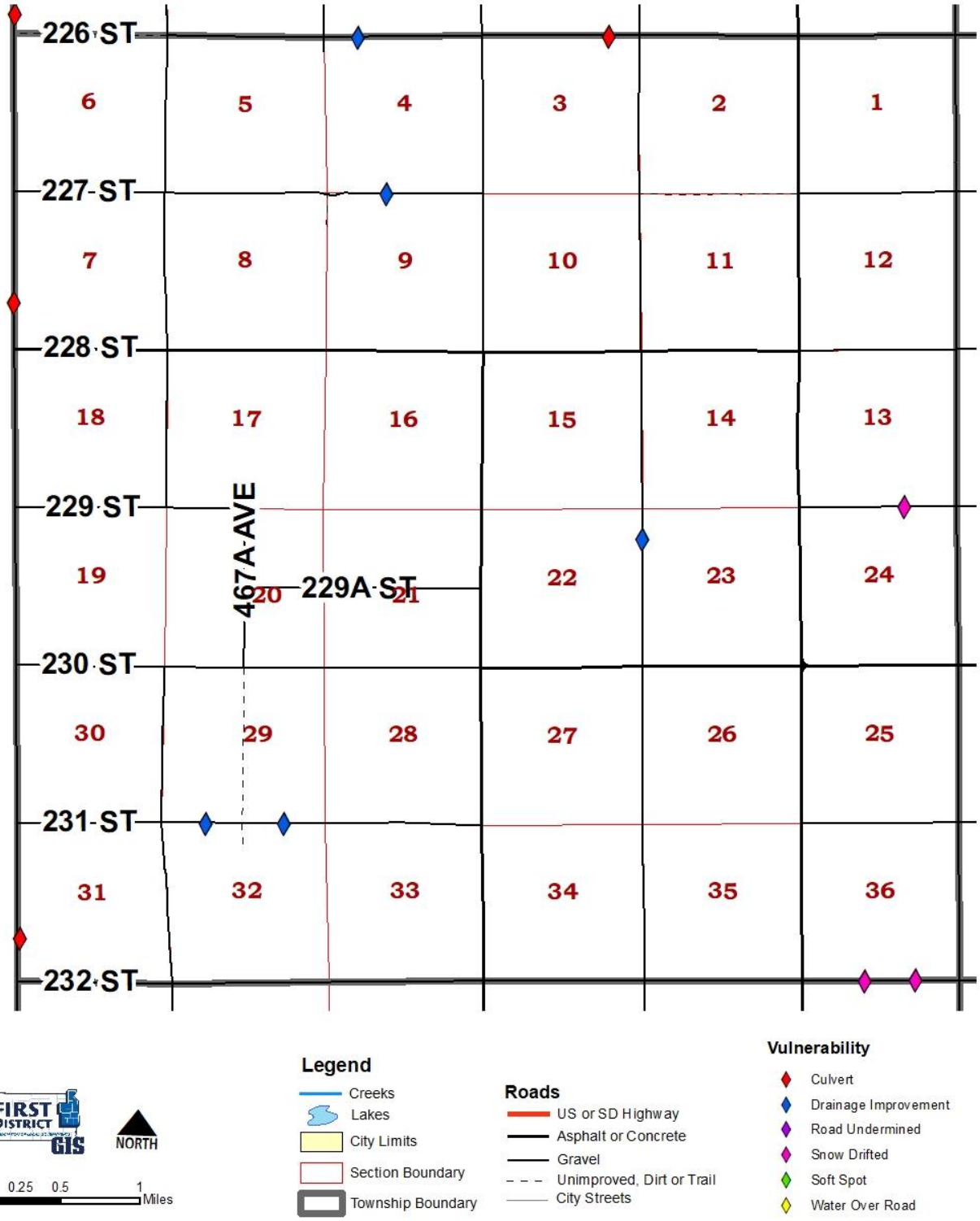
FLANDREAU TOWNSHIP



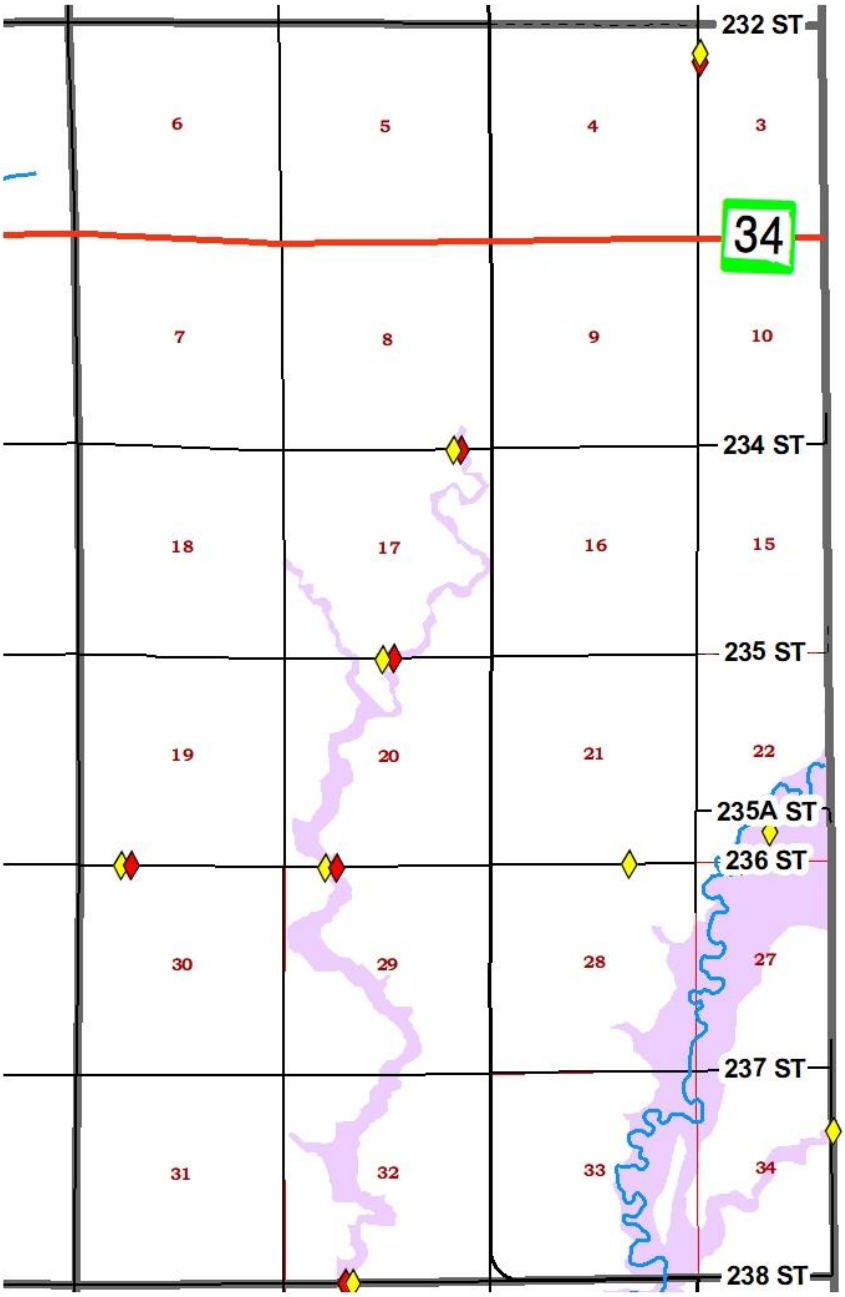
FREMONT TOWNSHIP



JEFFERSON TOWNSHIP



Lone Rock Township



FIRST DISTRICT GIS

NORTH

0 0.25 0.5 1 Miles

Legend

- Creeks
- Lakes
- City Limits
- Section Boundary
- Township Boundary

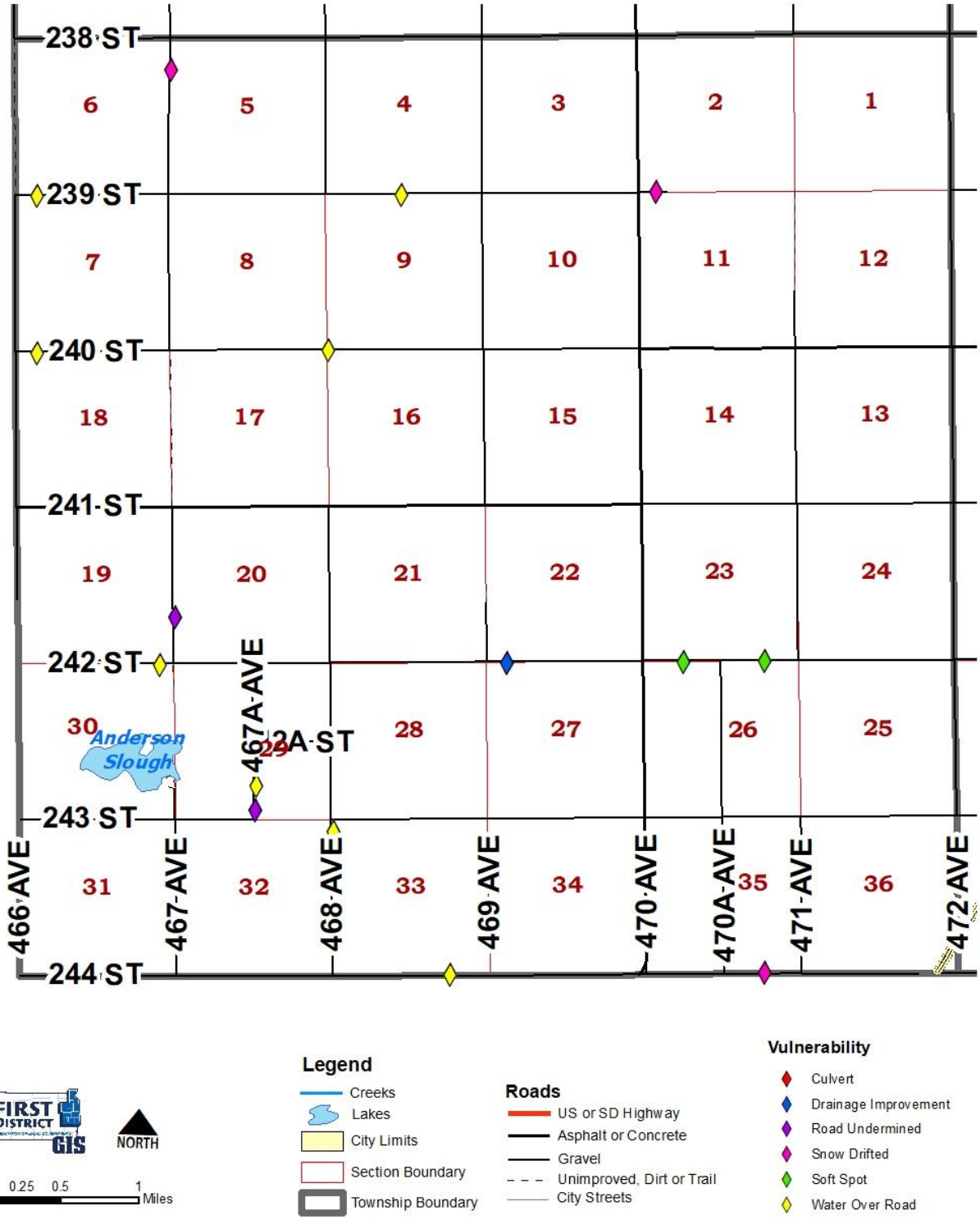
Roads

- US or SD Highway
- Asphalt or Concrete
- Gravel
- Unimproved, Dirt or Trail
- City Streets

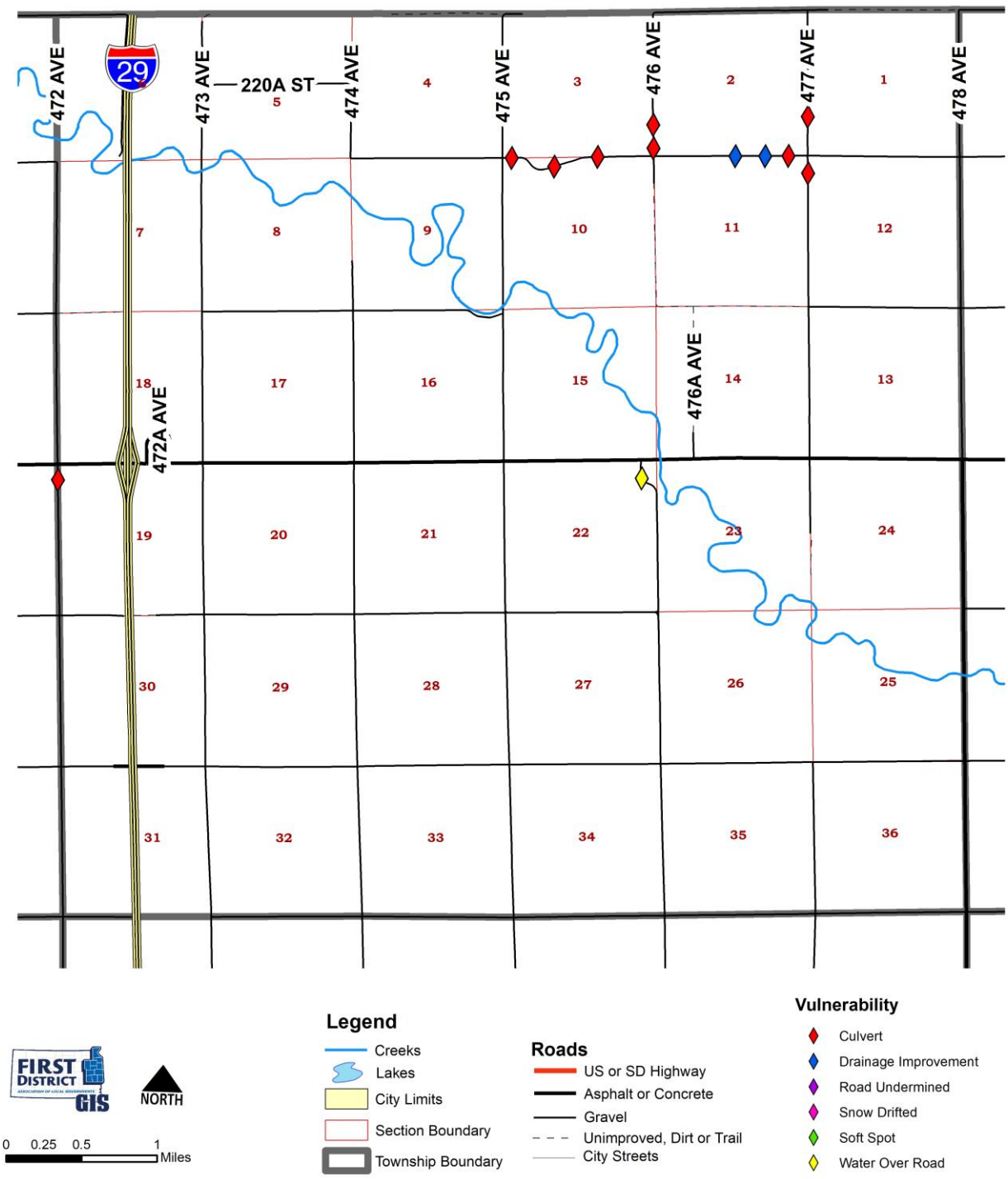
Vulnerability

- Culvert
- Drainage Improvement
- Road Undermined
- Snow Drifted
- Soft Spot
- Water Over Road

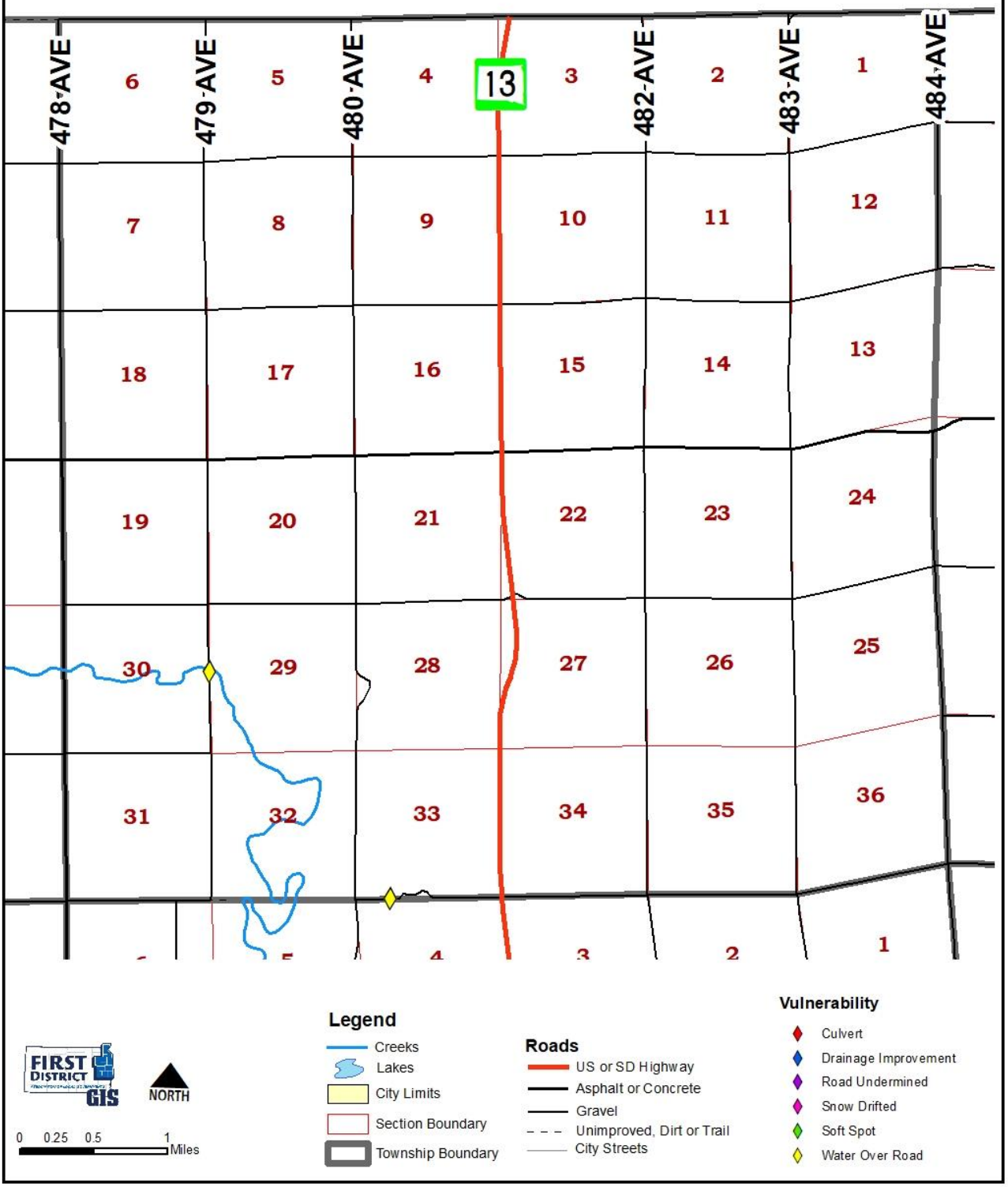
Lynn Township



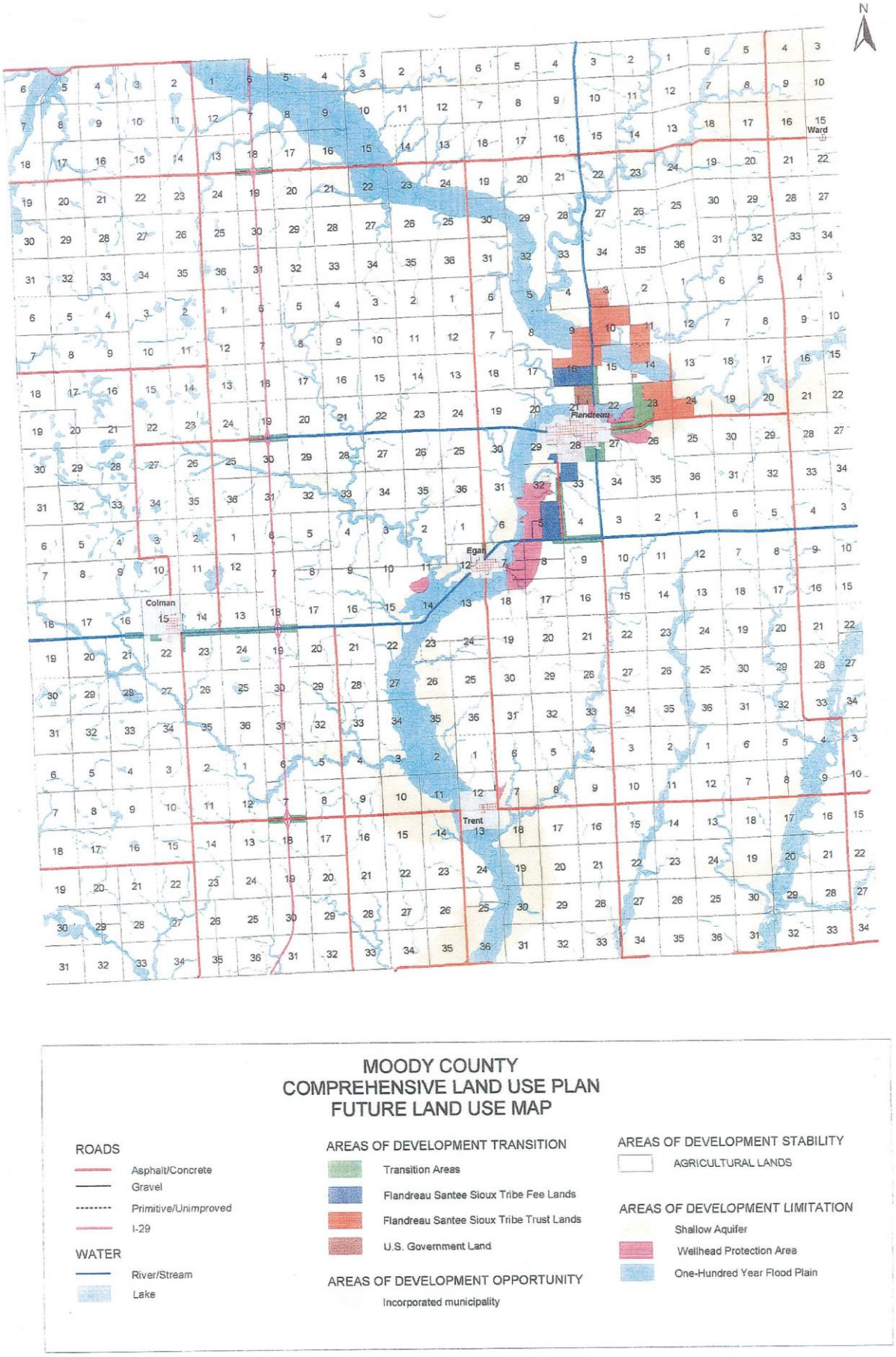
RIVERVIEW TOWNSHIP

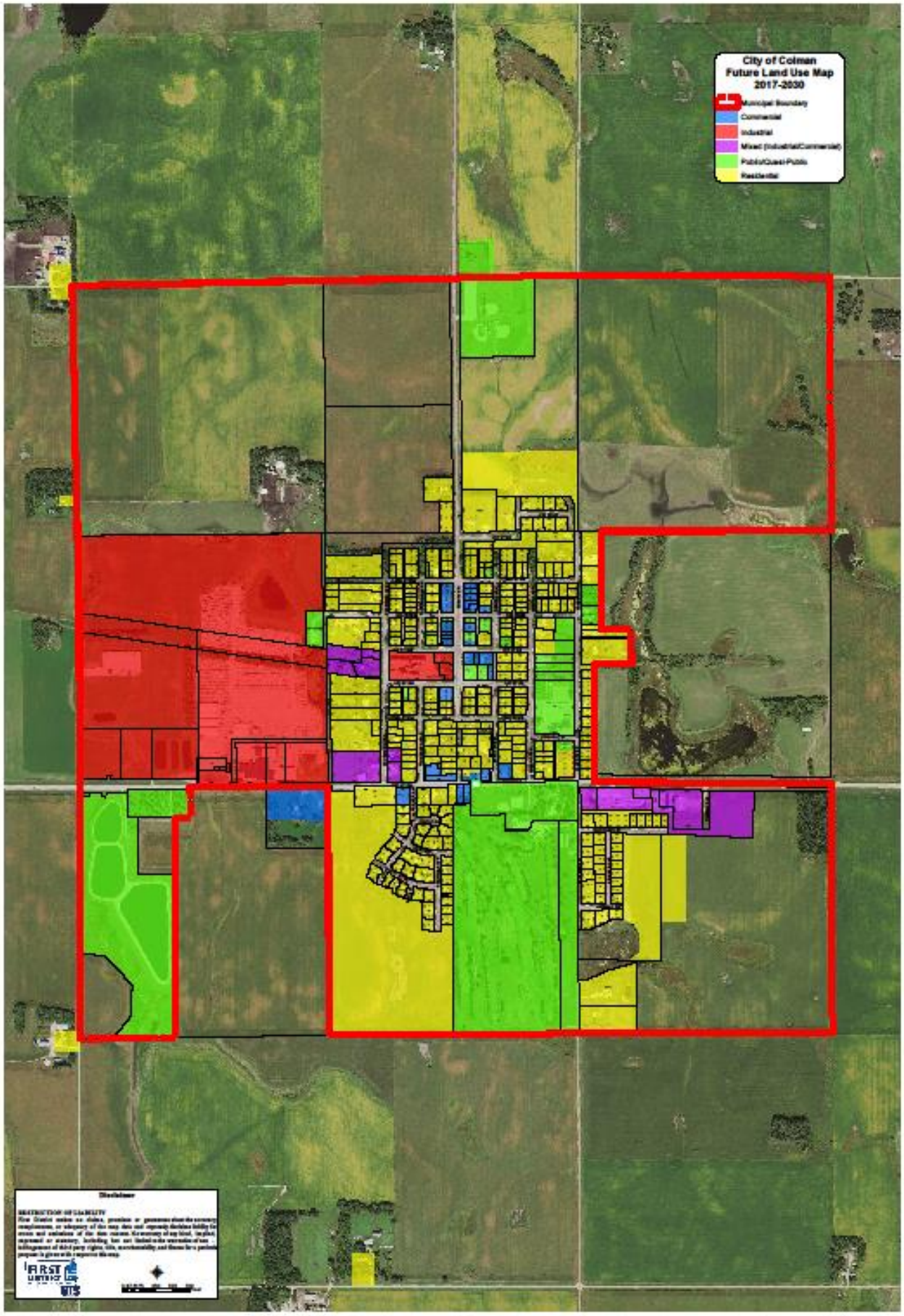


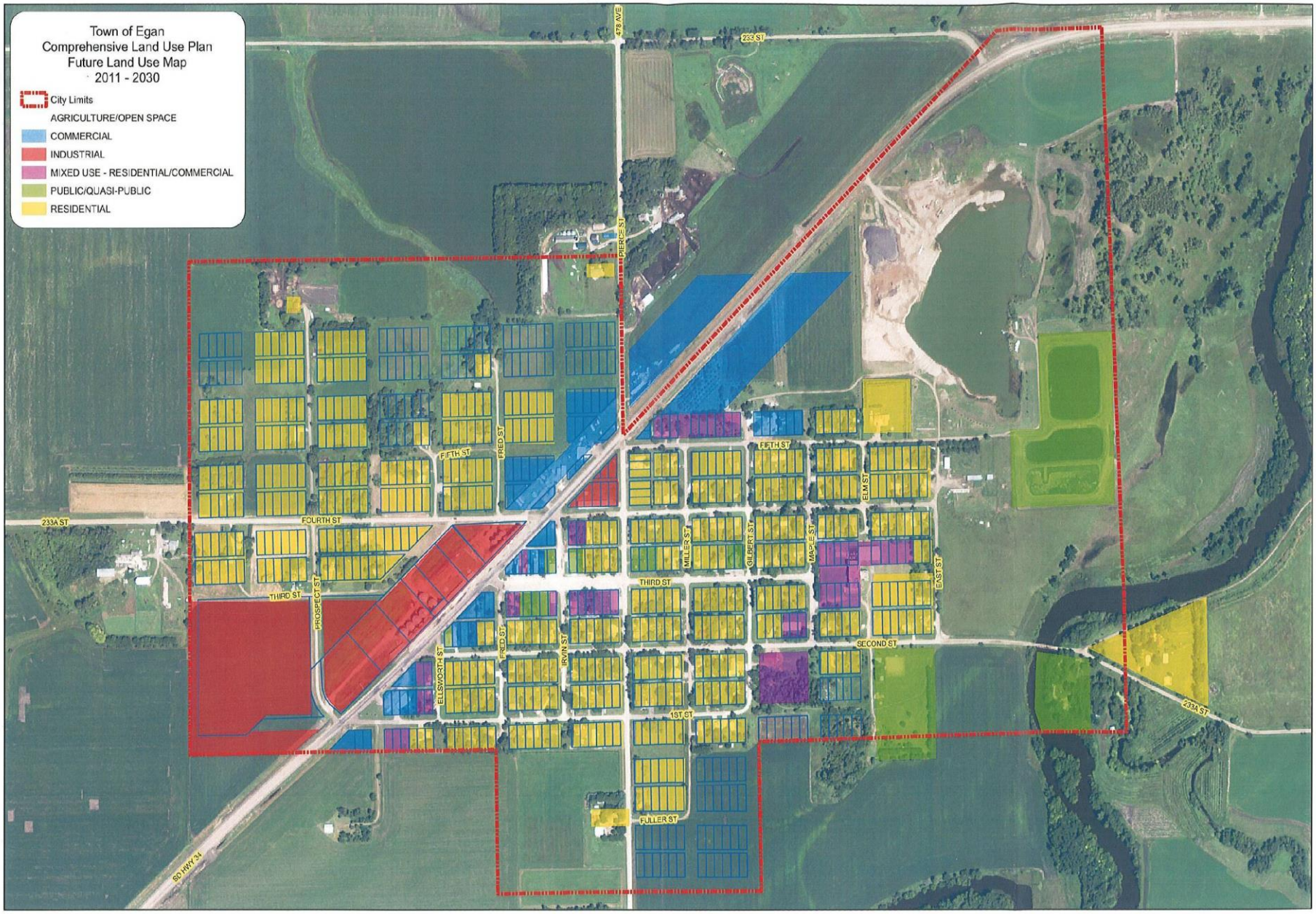
Spring Creek Township

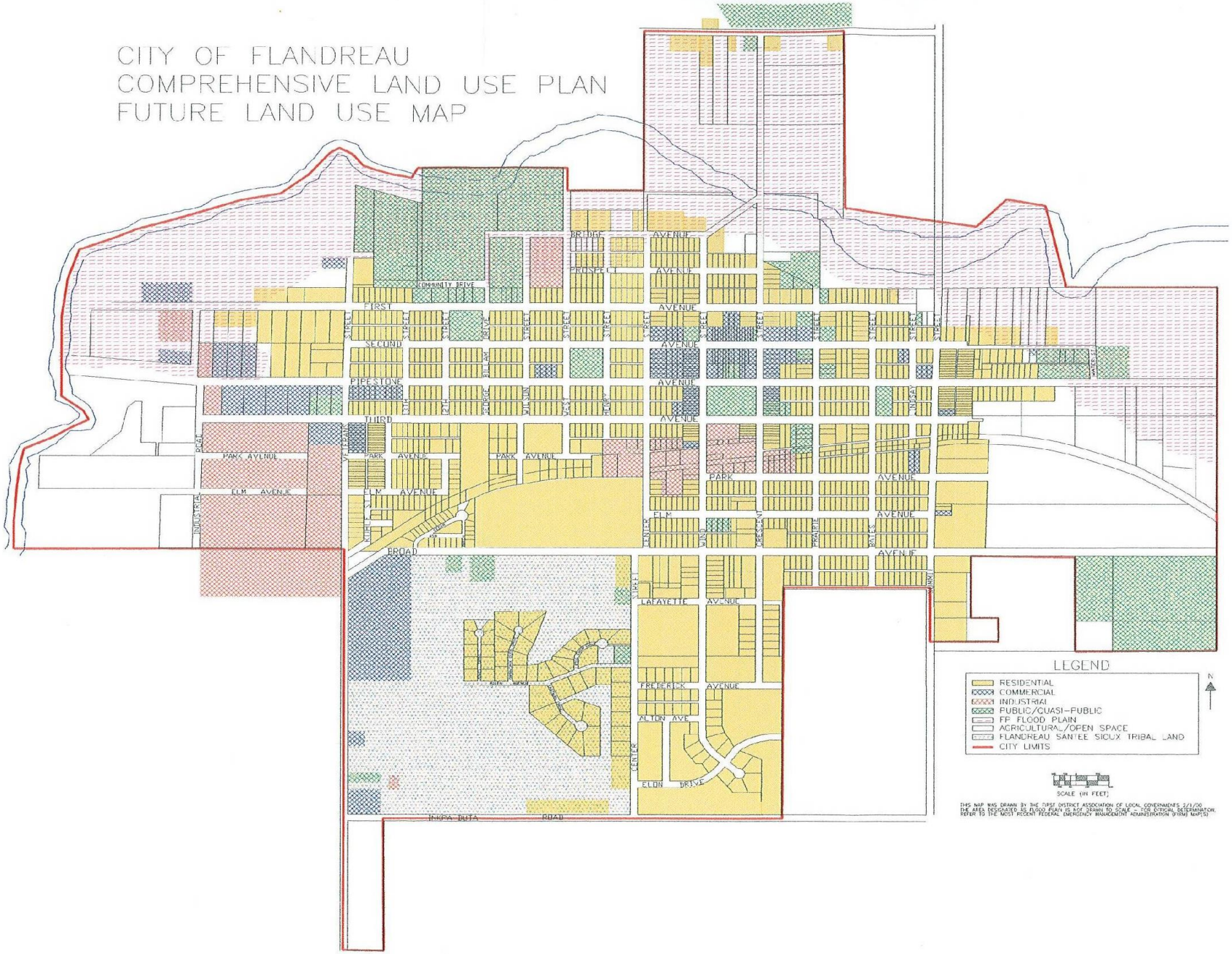


Appendix F – Comprehensive Land Use Maps

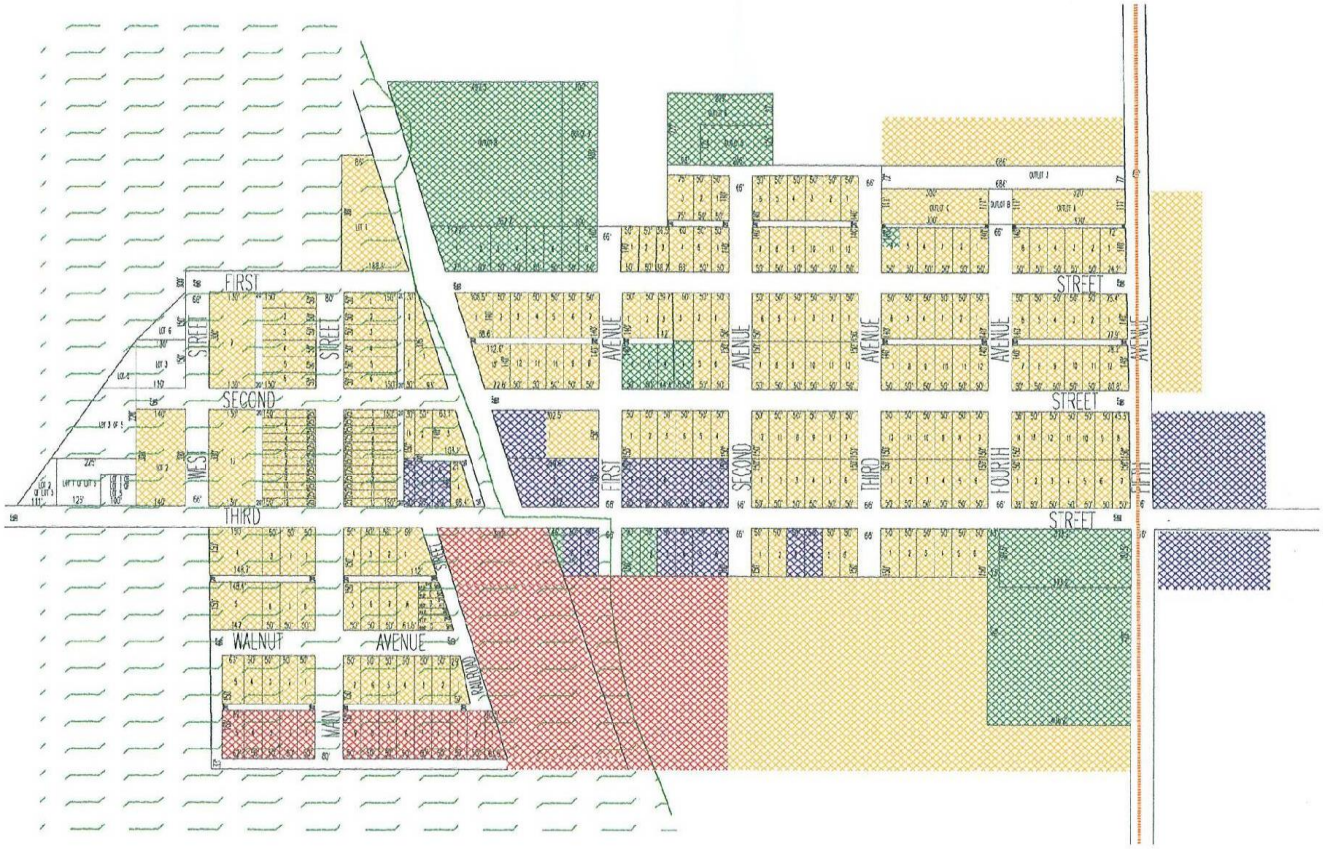

N
Ward
Flandreau
Egan
Colman
Trent
MOODY COUNTY
COMPREHENSIVE LAND USE PLAN
FUTURE LAND USE MAP
ROADS
Asphalt/Concrete
Gravel
Primitive/Unimproved
I-29
WATER
River/Stream
Lake
AREAS OF DEVELOPMENT TRANSITION
Transition Areas
Flandreau Santee Sioux Tribe Fee Lands
Flandreau Santee Sioux Tribe Trust Lands
U.S. Government Land
AREAS OF DEVELOPMENT OPPORTUNITY
Incorporated municipality
AREAS OF DEVELOPMENT STABILITY
AGRICULTURAL LANDS
AREAS OF DEVELOPMENT LIMITATION
Shallow Aquifer
Wellhead Protection Area
One-Hundred Year Flood Plain


City of Colman
Future Land Use Map
2017-2030
Municipal Boundary
Commercial
Industrial
Mixed (Industrial/Commercial)
Public/Quasi-Public
Residential
Disclaimer


Town of Egan
Comprehensive Land Use Plan
Future Land Use Map
2011 - 2030
City Limits
AGRICULTURE/OPEN SPACE
COMMERCIAL
INDUSTRIAL
MIXED USE - RESIDENTIAL/COMMERCIAL
PUBLIC/QUASI-PUBLIC
RESIDENTIAL
478 AVE
232 ST
PIERCE ST
FIFTH ST
FRED ST
FOURTH ST
233A ST
THIRD ST
PROSPECT ST
ELLSWORTH ST
IRVIN ST
MILLER ST
GILBERT ST
MAPLE ST
ELM ST
EAST ST
SECOND ST
1ST ST
FULLER ST
SD HWY 34


CITY OF FLANDREAU
COMPREHENSIVE LAND USE PLAN
FUTURE LAND USE MAP
BRIDGE AVENUE
PROSPECT AVENUE
COMMUNITY DRIVE
FIRST AVENUE
SECOND AVENUE
PIPESTONE AVENUE
THIRD AVENUE
PARK AVENUE
ELM AVENUE
ROAD
LAFAYETTE AVENUE
FREDERICK AVENUE
ALTON AVE
ELON DRIVE
INKPA DUTA ROAD
LEGEND
RESIDENTIAL
COMMERCIAL
INDUSTRIAL
PUBLIC/QUASI-PUBLIC
FF FLOOD PLAIN
AGRICULTURAL/OPEN SPACE
FLANDREAU SANTEE SIOUX TRIBAL LAND
CITY LIMITS
N
SCALE (IN FEET)

TOWN OF TRENT
COMPREHENSIVE LAND USE PLAN
FUTURE LAND USE MAP B 1998–2010



RESIDENTIAL
COMMECIAL
INDUSTRIAL
FLOOD PLAIN
AGRICULTURAL/OPEN SPACE
PUBLIC/QUASI-PUBLIC
CITY LIMITS

100 0 200
150 50 100 300
SCALE IN FEET

N

THIS MAP WAS DRAWN BY THE FIRST DISTRICT ASSOCIATION OF LOCAL GOVERNMENTS – MARCH 1, 1998.
*NOTE – THE FLOOD PLAN IS NOT DRAWN TO SCALE – PLEASE SEE DECEMBER 6, 1974 HUD FLOOD HAZARD BOUNDARY MAP

Appendix G
Review of 2014 PDM Mitigation Project Implementation

COMMUNITY	POTENTIAL MITIGATION PROJECTS	HAZARD	PRIORITY RANK	INCLUDED IN 2020 PLAN?	STATUS
City of Colman	Purchase Portable Back-up Generator for Critical Infrastructure	Severe Weather Hazards (summer and Winter)	High	No	Project completed.
City of Colman	Bury overhead 3 Phase power lines in community.	Severe Weather Hazards (summer and Winter)	High	Yes	A portion of project has been completed. Remaining project has started, still necessary as conditions warrant.
City of Colman	Study and implement storm water drainage improvements throughout the community.	Flooding	High	Yes	Project has started, still necessary as conditions warrant.
City of Egan	Purchase Portable Back-up Generator for Critical Infrastructure.	Severe Weather Hazards (Summer and Winter)	High	Yes	Project has started, still necessary as conditions warrant.
City of Flandreau	Bury overhead 3 Phase power lines in community.	Severe Weather Hazards (Summer and Winter)	High	No	Project completed.
City of Flandreau	Purchase fixed generator for the Armory.	Severe Weather Hazards (Summer and Winter)	Medium	No	Project completed.
City of Flandreau	Construction of Tornado Shelter at campground and East end of the community.	Tornado	Medium	No	Project completed.
City of Flandreau	Construct 8” waterline to serve hospital.	Severe Weather Hazards (Summer and Winter)	High	No	Project Completed.

COMMUNITY	POTENTIAL MITIGATION PROJECTS	HAZARD	PRIORITY RANK	INCLUDED IN 2020 PLAN?	STATUS
Town of Trent	Make improvements to Sanitary Sewer Lagoon (Rip Rap).	Severe Weather Hazards (Summer and Winter)	High	Yes	Project has started, still necessary as conditions warrant.
Town of Trent	Purchase Portable Back-up Generator for Critical Infrastructure.	Severe Weather Hazards (Summer and Winter)	Low	No	Project completed.
Town of Ward	Purchase of Portable Back-up Generator for Critical Infrastructure.	Severe Weather Hazards (Summer and Winter)	Low	No	Project completed.
Moody County	Bridge Erosion Projects – Rip Rap	Flooding	High	Yes	Still necessary as conditions warrant.
All Areas	Proper Land Use Study	Flooding	High	Yes	Still necessary as conditions warrant.
All Areas	FireTrain/Prevent	Urban/ Wild Fire	High	Yes	Still necessary as conditions warrant.

Appendix H - References

Moody County Comprehensive Land Use Plan and Zoning Ordinance – First District Association of Local Governments, 2014.

Moody County Multi-Hazard Mitigation Plan, 2014.

City of Colman Comprehensive Land Use Plan and Zoning Ordinance - First District Association of Local Governments, 2017.

City of Egan Comprehensive Land Use Plan and Zoning Ordinance - First District Association of Local Governments, 2011.

City of Flandreau Comprehensive Land Use Plan and Zoning Ordinance - First District Association of Local Governments, 2000.

Town of Trent Comprehensive Land Use Plan and Zoning Ordinance - First District Association of Local Governments, 1998.

Local Hazard Mitigation Planning Tool. 2011. Federal Emergency Management Agency.

Discovery Report Moody County, South Dakota. 2016. Federal Emergency Management Agency Region VIII and South Dakota Office of Emergency Management.

NFIP Flood Insurance Rate Maps.

State of South Dakota Hazard Mitigation Plan. South Dakota Office of Emergency Management. 2019.