Lake County
Pre-Disaster Mitigation Plan
2018-2022

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For: Federal Emergency Management Administration

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CHAPTER 1
INTRODUCTION

INTRODUCTION

Lake 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.

The Lake County Board of Commissioners, in conjunction with the South Dakota Office of Emergency Management and the Federal Emergency Management Agency (FEMA), has agreed to update this plan to assist all participating entities in the county in their mission to mitigate losses from natural hazards throughout Lake County, South Dakota and the communities located therein.

This plan is an update of the Pre-Disaster Mitigation Plan (PDM) that was developed by the County in 2013. 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 22 major Disaster Declarations which have occurred fully or partially within the state of South Dakota, including 7 which occurred in 2010. Lake County is no stranger to natural and man-made disasters. All or portions of Lake County have been included in four Presidential Disaster Declarations in the last 10 years. In order to prevent and reduce the cost that is incurred by businesses, citizens, and property owners from these disasters, the Lake County Pre-Disaster Mitigation Plan developed. This plan identifies hazards that occur throughout Lake County and mitigation projects that will aid in preventing and reducing the effects of those disasters on the property and lives within. Special consideration has been given to critical infrastructure throughout the county.

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 Lake 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.

LAKE COUNTY PROFILE

Population

Lake County is located in eastern South Dakota. It borders Kingsbury and Brookings Counties to the north, Moody County to the east, Minnehaha and McCook Counties to the south and Miner County to the west. The county has a geographic area of 575 square miles (land area 563.38 square miles) and its Census 2010 population was 11,200, which averages to 19.88 persons per square mile. Just under seventeen percent of the population is older than age 65. Education levels of persons twenty-five and older include ninety-four percent high school graduates and twenty-two percent college level.

Figure 1.1 contains a map of Lake County. The county seat is Madison, which is situated at the intersection of US Highway 81 and SD Highway 34. 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 populations. The County has experienced a relatively steady population since the 1920s.

Table 1.1: Lake County Municipalities

Name	Population	Location	Elevation	Housing Units
Brant Lake*	70	43 55' 28.9" N 96 56' 15.2" W	1,650	33
Madison	6,474	44 0’ 25.7” N 97 6’ 50.6” W	1,796	2,627
Nunda	43	44 9' 43.9" N 97 1' 3.7" W	1,740	21
Ramona	174	44 7' 10.0" N 97 13' 3.0" W	1,800	81
Wentworth	171	43 59' 49.8" N 96 57' 49.4" W	1,680	75
Chester Village	261	43 53' 41.7" N 96 55' 43.9" W	1,600	108
Unincorporated Areas	4,007			
Lake County	11,200	44 3' 3.1" N 97 7' 45.8" W	1,734	4,483

*Brant Lake was incorporated within the last two years. No Census population count available. According to Town Officials the population is approximately 70 persons.

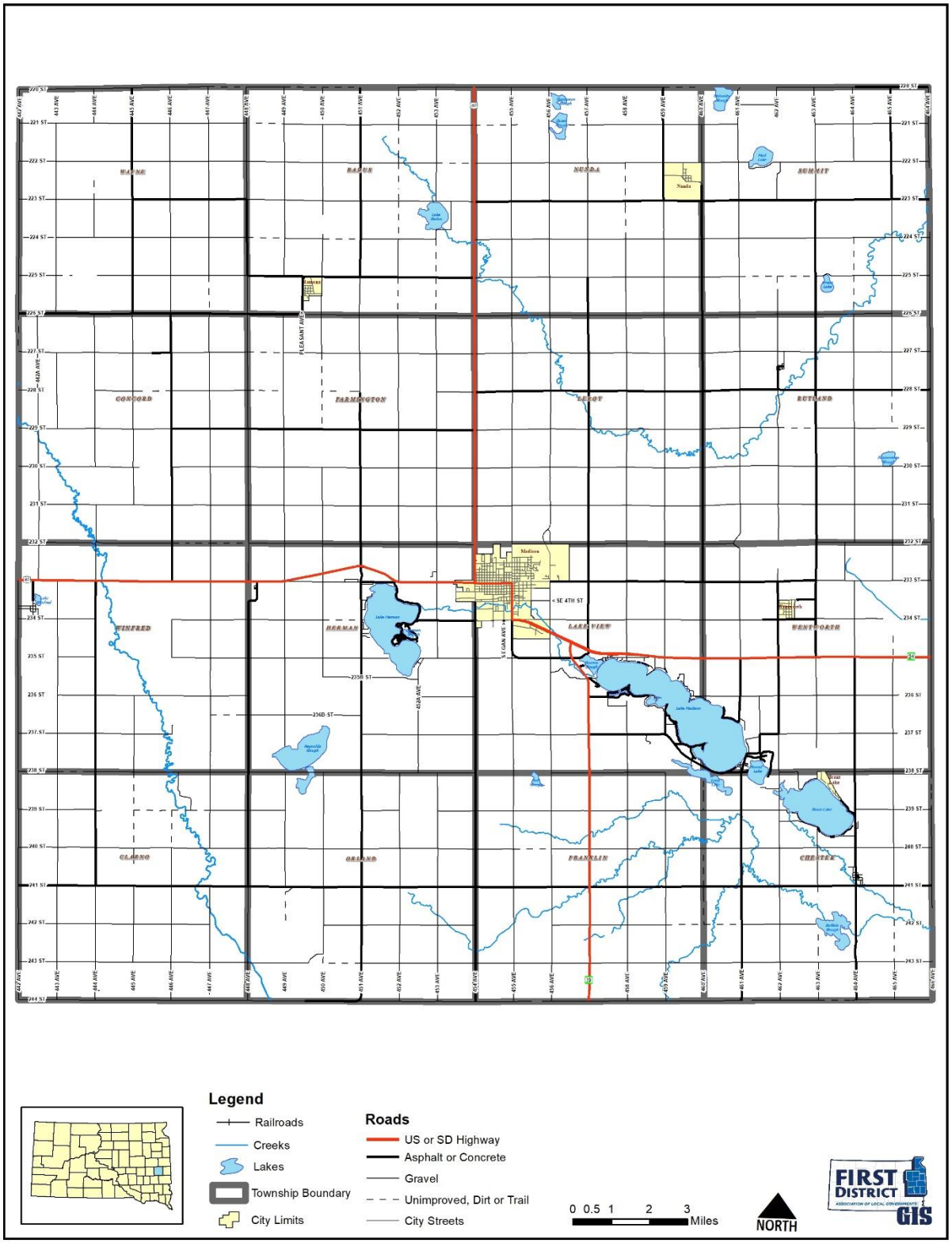
Source: 2010 Census, www.latlong.net, www.usbeacon.com

Table 1.2: Lake County Townships

Source: 2006-2010 ACS US Census Bureau

Township	Population	Township	Population
Badus	90	Le Roy	205
Chester	690	Nunda	75
Clarno	115	Orland	85
Concord	110	Rutland	270
Farmington	235	Summit	180
Franklin	355	Wayne	105
Herman	550	Wentworth	405
Lake View	590	Winfred	215

Figure 1.1 Political Map



Social and Economic Description

Agriculture is the primary business activity in Lake County. While the number of farm and ranching units has decreased over the years, the size of each unit has increased dramatically. The number of acres farmed or ranched has remained fairly stable throughout the years. Light industry is showing growth throughout the county, with most light manufacturing industry advances being made in the Madison area. Most non-agricultural employment is in education, health care, or service industries. Hunting and fishing are popular with residents and non-residents alike. These activities, along with camping and lake use recreation, form the base for most tourism opportunities.

Unemployment rates in South Dakota have slowly declined over the last five years to around 3.5%, while Lake County has an estimated 3.5% unemployment rate over the last five years. According to the 2012-2016 American Community Survey 5-year estimates, approximately 13.8% of the population of Lake County falls below the poverty line. The City of Madison is the largest community in Lake County. Madison serves as the county seat and retail hub of the county. Most of the smaller communities in Lake County serve as bedroom communities and have limited retail and service sectors which provide basic needs to their residents. Madison, Ramona, Chester village and Rutland village have K-12 school facilities located in their community. Madison is also the home of Dakota State University.

Physical Description and Climate

Lake County is located in eastern South Dakota. Adjoining counties include Moody County to the east, Brookings and Kingsbury Counties to the north, Miner County to the west and McCook and Minnehaha Counties to the south. A majority of the land area within Lake County is farmland consisting of grassland, pasture and cropland. Approximately 80% of the County lies within the Big Sioux River watershed, which drains in a southeasterly direction. The Vermillion River watershed covers portions of the northwest and southwest corners of Lake County. Lake 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 25.75 inches, with over 64% 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 37 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 midwinter, 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 high 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 Lake County is the often windy conditions. Average annual wind speed in Lake County is 22.14 mph. The average and peak sustained winds tend to be stronger over higher more exposed terrain. The highest sustained winds tend to occur in the spring and fall, with sustained winds over 40 mph occurring every year. The highest wind gusts often occur with thunderstorms during the summer, with gusts over 60 mph occurring every year. Lake County has reached wind gusts in excess of 80 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 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.

Transportation and Utility Infrastructure

Lake County meets its current transportation needs through a mixture of state and federal highways, railroads, county roads, municipal road systems and township 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.

Major transportation infrastructure in the county includes roads. South Dakota State Highways 34, 19 and US Highway 81 provide the main transportation routes through Lake County. The bulk of the transportation infrastructure includes county highways and township roads that are used for rural transportation involving residents, agricultural products and other commodities.

The County's 1,144-mile road system includes 748 gravel road miles, 339 hard surfaced road miles, 57 primitive/unimproved road miles and 79 bridges. In Lake County, the transportation choices are limited to mostly private automobiles traveling over state and federal highways and county roads.

Lake County has one small airport located in Madison. The airport is used primarily by local pilots, crop sprayers and other light aircraft. The airport does not have any nav-aid service, but provides some flight service capabilities.

The Big Sioux Community and Kingbrook Rural Water Systems serve most of the incorporated communities and most rural residences in Lake County. The Town of Nunda utilizes its own drinking water well. Big Sioux Community Rural Water System (BSCWS) provides bulk water service to the village of Chester, City of Madison and the Town of Wentworth. BSCWS also provides individual water services to the City of Brant Lake, the village of Rutland and many rural residences in the eastern portion of Lake County. Kingbrook Rural Water System (KRWS) provides bulk water service to the Town of Ramona. KRWS provides individual water services to the villages of Franklin, Junius, Orland and Winfred. KRWS also provides individual water services to many of the rural residences in the remaining portions of Lake County not served by BSCWS.

Regarding wastewater disposal, the City of Madison and the Towns of Ramona and Wentworth in Lake County have municipal wastewater collection and treatment systems. The residences in the Town of Nunda utilizes individual septic tank and drain field systems for their wastewater treatment. The Brant Lake Sanitary District (BLSD) provides wastewater disposal services to the residences and cabins around Brant Lake which includes the City of Brant Lake. The Chester Sanitary District (CSD) provides wastewater disposal services to the residences in the village of Chester. The BLSD and CSD utilize a joint facility for the treatment of their wastewater flows. The Lake Madison Sanitary District provides wastewater disposal services to the residences and cabins around Lake Madison and Round Lake. All the other villages and rural residences in Lake County utilize individual septic tanks and drain fields for wastewater treatment. Although residential growth is not expected to be significant in the county, new developments need to be controlled through planning and development guidelines.

Electric power is provided to rural county residents and people in the communities by the Sioux Valley Energy, Xcel Energy and Otter Tail Power Company. The primary telephone companies serving the County's population is Interstate Telephone Company, CenturyLink

Communications Company, Alliance Communication Cooperative and Triotel Communications. 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

Emergency and medical services are available within the county. The main ambulance service is provided by Madison Regional Health System Ambulance and Rescue Service out of Madison, SD. Ambulance services in McCook, Miner and Moody Counties provide emergency services to portions of the County. Medical services are offered at Madison Regional Health System, Bethel Lutheran Home, Heritage Senior Living, Golden Living Center and Madison Care and Rehab in Madison. Plus, the Ramona Assisted Living Center in Ramona. Lake County 911 services are provided through the Lake County 911 Communications Office.

The Lake County Sheriff's Department provides law enforcement for the entire county. Additional law enforcement agencies include the Madison Police Department, the South Dakota Highway Patrol and South Dakota Game, Fish and Parks.

There are fire departments in Chester, Madison, Nunda, Ramona and Wentworth.

CHAPTER 2
PREREQUISITES

ADOPTION BY LOCAL GOVERNING BODY

The local governing body, that oversees the update of the Lake County Pre-Disaster Mitigation Plan, is the Lake County Board of Commissioners. The Commission has tasked the Lake 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 – E2.

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

This plan is a multi-jurisdictional plan which serves the entire geographical area located within the boundaries of Lake County, South Dakota. The County has five incorporated municipalities. All of the incorporated municipalities located within the County elected to participate in the planning process and update of the 2013 PDM. Sioux Valley Energy, Big Sioux Community Rural Water System, and the Lake Madison Sanitary District provided information during the process. Table 2.1 shows the participating local jurisdictions include the following municipalities:

Table 2.1: Plan Participants

Continuing Participants	Do Not Participate*
Brant Lake	Chester village
Madison	Junius village
Nunda	Winfred village
Ramona	Rutland village
Wentworth	Lake Madison Lake Assn.
Lake County	Brant Lake Imp. Assn.
	All 16 Townships

*All villages and townships plus the lake associations were represented at the 2018 Annual Town, Townships and Lake Associations Meeting and are eligible to benefit from future mitigation projects identified by the County.

Non-participating communities are still eligible for hazard mitigation funding, however may not directly apply for assistance. Instead any assistance would need to be applied for on behalf of

the non-participating communities by Lake County. Other non-participants include the Lake Madison Development Association, no estimated population, Brant Lake Improvement Association, no estimated population and the unincorporated communities of Chester, Junius, Rutland and Winfred. Chester is approximately two miles east and seven miles south of Wentworth. Chester has a population of approximately 261 persons. Chester is represented by the Chester Township Board. Chester Township Board provided information but will not participate directly in the PDM update. Junius (six miles) and Winfred (12 miles) lie west of the City of Madison. Rutland is approximately six miles north of Wentworth. These four villages did not directly participate in the PDM update, but they were represented by their local Township Officials.

Most unincorporated villages and 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. All villages are governed by the local township boards and are served by the County whenever necessary. The lake associations and townships were invited to participate in the PDM update and asked to identify vulnerable and critical infrastructure plus potential mitigation projects via mail and return the information to the team for incorporation in the plan. Lake Assn. officials and township supervisors were again asked to provide the above described information at the annual meeting on March 12, 2018. After requests being mailed, and meeting with townships represented at the March 12th meeting, eight out of sixteen townships responded to the request.

The Lake County Commission and each of the listed participating municipalities 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
City of Brant Lake	
City of Madison	
Town of Nunda	
Town of Ramona	
Town of Wentworth	
Lake County Commission	

All of the participating jurisdictions were involved in the plan update. Representatives from each municipality, the County, the Townships, local fire departments, education facilities, utility providers, businesses and media 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 November 13, 2017 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 also presented progress reports when meeting individually with communities. The local jurisdictions have also presented the Resolution of Adoption to their councils 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	Brant Lake	Madison	Nunda	Ramona	Wentworth	Lake 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).	■	■	□	□	■	■

Nature of Participation	Brant Lake	Madison	Nunda	Ramona	Wentworth	Lake County
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 meetings 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 Lake 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. The following staff members of the First District Association of Local Governments were involved in the production of the plan. Greg Maag, Economic Development Officer was the project manager of the plan. Greg Maag attended the PDM Planning Team meetings as the plan was being developed. Assisting Mr. Maag, was Amy Arnold, Geographic Information Systems Planner, who produced all the maps for the plan, Luke Mueller, Planner, directed the floodplain risk analysis (see next section), and completed the county land cover analysis discussed in the previous chapter. 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.

- SD State Fire Marshall Office – provided information on fire calls in the county.

- Tim Schaal, South Dakota State Dam Inspector – 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 Lake 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 received by the county in August of 2017. Once funding was secured, the Lake County Emergency Management Director and the First District acted as the PDM Planning Team began 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 Chairperson of the Lake County Commissioners and Lake 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. 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

Last Name	First Name	Entity Represented	Meeting Attendance		
			Meeting 1	Meeting 2	Meeting 3
Ahlers	Brennen	Wentworth Township	■		
Askren	Mary	Madison Daily Leader	■		
Asmussen	Rodney	Badus Township			
Backus	Wayne	Wentworth Fire Department			
Bergheim	Sue	KJAM Radio			
Books	Peter	Rutland School District			
Boyko	Tom	East River Electric			
Braskamp	Cory	Dakota State University			
Brown	Jeff	Chester Township			
Callies	Gary	Lake County REACT			
Carper	Cody	Rutland Township			
England	Dale	Herman Township			
Fedeler	Dave	Lake County Highway Department			
Fischer	Michael	Oldham-Ramona School District			
Gonyo	Gary	Madison Street Department	■		
Gust	Shelli	Lake County States Attorney Office	■		
Hageman	Roger	Concord Township			

Last Name	First Name	Entity Represented	Meeting Attendance		
			Meeting 1	Meeting 2	Meeting 3
Hansen	Dan	Town of Nunda/Fire Department			
Hansen	Kathy	LEPC Secretary/MRHS	■		
Hegg	Ryan	City of Madison	■		
Heyn	Steve	Chester Fire Department			
Huntrods/ Keefer	Doug/ Kody	Lake County Emergency Manager	■		
Jaton	Steve	Nunda Township			
Jorgenson	Joel	Madison Central School District			
Klingbile	Rodney	Leroy Township			
Krusemark	Stacy	Dakota State University			
Langner	Jim	Farmington Township			
Larson	Heath	Chester Area School			
Lawrence	Brad	Madison Electric Utility Director	■		
Limmer	Lee	Wentworth Township			
Lindsay	Roy	Mayor City of Madison	■		
McCarthy	Tim	Sioux Valley Electric			
Meyer	Justin	Madison Police Department	■		
Miller	Tammy	MRHS CEO			
Minnaert	Kevin	Franklin Township			
Minnaert	Randy	Madison Fire Chief			
Nagel	Myron	Ramona Fire Department	■		
Nielson	Michele	Sioux Valley Energy			
Oines	Nate	East River Electric	■		
Phillips	Dave	City of Brant Lake			
Pickard	Tyler	Summit Township			

Last Name	First Name	Entity Represented	Meeting Attendance		
			Meeting 1	Meeting 2	Meeting 3
Reck	Kory	LEPC President/Dakota Ethanol			
Rook	Tom	Lakeview Township			
Schneider	Dennis	Wayne Township			
Schneider	Jeremiah	MRHS EMS			
Sorenson	Doug	Orland Township			
Terwilliger	Kenneth	Winfred Township			
Thompson	Marty	Clarno Township			
Tolley	Tim	Town of Ramona			
Vogt	Roger	Town of Wentworth			
Walburg	Tim	Lake County Sheriff			
Wegener	Julie	Lake County 911 Communications			
Wollman	Kelli	Lake County Commission Chairperson			

Leadership and guidance in the planning effort and at the planning meetings was provided by the First District staff and the Lake 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 would step in.

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 Extension Building in Madison on November 13, 2017. 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 November 2017 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, other than the 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 local town and PDM Planning Team meetings were collected and incorporated into the plan.

The public was provided several opportunities to comment on the plan during the drafting stages at the PDM Planning Team meetings, Lake County Townships' meeting and local town meetings. The Madison Daily Leader provided media coverage of the November 2017 PDM Team meeting. An article in the newspaper covered the meeting activities and invited the public to participate in the process and provide input for the PDM plan. Primarily, public input included the involvement in hazard assessment and mitigation projects. Those who were most involved were the representatives PDM Planning Team and representatives from the municipalities. The municipalities put the PDM update on the agenda at their regular meeting and allowed people to comment at the meeting. 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 2013 PDM plan did include the necessary requirements found in the current Local Hazard Plan Review Tool (2011). 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 2013 PDM plan was then compared to the plan review tool and any portion of the plan that was not needed to fulfill the tool 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 man-made hazards sections were deleted.
- 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	City Staff/Township Annual Mtg /Survey	Public Notice	Website
Brant Lake	4/9/18	■	□	□	■	□
	Adoption Date	□	□	□	■	□
Madison	5/7/18	■	□	□	■	□
	Adoption Date	□	□	□	■	□
Nunda	2/12/18	■	□	□	■	□
	Adoption Date	□	□	□	■	□
Ramona	2/13/18	■	□	□	■	□
	Adoption Date	□	□	□	■	□
Wentworth	2/14/18	■	□	□	■	□
	Adoption Date	□	□	□	■	□
Lake County	PDM Grant Application 5/2/17	■	□	□	■	□
	11/13/17	□	■	□	■	■
	3/12/18	□	□	■	□	■
	6/12 /18	□	■	□	■	■
	7/ /18	□	■	□	■	■
	Adoption Date	□	□	□	■	□

Risk Identification & Assessment/Mitigation Strategy/Review of Plan

Requirement 201.6(b)(1). Local Mitigation Plan Review Tool – A3.

Requirement 201.6(c)(1). Local Mitigation Plan Review Tool – A1.

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

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 the 2013 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 2013 PDM Risk Assessment and Mitigation Strategies were insufficient and that a comprehensive rewrite of the entire sections were needed. 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 Lake 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 from Lake County, Lake County Townships, rural electric, water and wastewater providers were asked to identify hazards, critical facilities and assess vulnerability within Lake County. In addition, they were asked to develop mitigation activities and review these items with their 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, some of the smaller communities did not have such planning documents. Additionally, the 2013 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, Lake 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 November 2017 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.

At the second meeting, June 12, 2018, 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 2013 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 2013 PDM plan. 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 prioritizing the mitigation actions and discussing 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 and forward the document to the South Dakota Office of Emergency Management for their review and comment. The draft plan was also to be posted on the First District Association of Local Governments and Lake County websites and notices regarding the draft plan emailed to the emergency managers in the neighboring counties of: Brookings, Moody, Minnehaha, McCook, Miner and Kingsbury. Everyone who received an email notice regarding the plan draft was allowed forty-five days to comment on the draft.

The final meeting of the PDM Planning Team was subsequently held in July 2018 to review and discuss 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 FEMA. The final draft of the plan was again posted on the First District Association of Local Governments and Lake County websites.

Table 3.3: Record of Review (Summary)

Existing Program/Policy/Technical Documents	Local Jurisdiction					
	Brant Lake	Madison	Nunda	Ramona	Wentworth	Lake County
Comprehensive Plan	✓	✓	N/A	N/A	✓	✓
Capital Improvement Plan	N/A	✓	N/A	N/A	N/A	N/A
Flood Damage Prevention Ordinance	N/A	✓	N/A	N/A	N/A	✓
Economic Development Plan	✓	✓	✓	✓	✓	✓
Transportation Plan	N/A	✓	N/A	N/A	N/A	✓
Storm water Management/ Drainage Plan	N/A	✓	N/A	N/A	N/A	N/A
Land Use Regulation Near Pipelines	N/A	N/A	N/A	N/A	N/A	N/A
Flood Insurance Studies or Engineering studies for streams	✓	✓	✓	✓	✓	✓
Hazard Vulnerability Analysis (by the local Emergency Management Agency)	C	C	C	C	C	C
Emergency Operations Plan	N/A	N/A	N/A	N/A	N/A	N/A
Zoning Ordinance	✓	✓	N/A	N/A	✓	✓
Building Code	N/A	✓	N/A	N/A	N/A	✓
Site Plan Review	✓	✓	N/A	N/A	✓	✓
Subdivision Ordinance	N/A	✓	N/A	N/A	N/A	✓
Drainage Ordinance	N/A	N/A	N/A	N/A	N/A	✓
Existing Land Use maps	✓	✓	N/A	N/A	✓	✓
Aquifer Protection Ordinance	N/A	✓	N/A	N/A	N/A	✓
State Hazard Mitigation Plan	✓	✓	✓	✓	✓	✓

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 2007, 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 Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (NCDC) Storm Events Database. A summary of the findings for significant hazard occurrences 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

Type of Hazard	# of Occurrences Since 2008	Source
Drought	29	NOAA & U of Neb-Lincoln
Wildfire/Forest Fire	143	NOAA & State Fire Marshall's Office
Flood	12	NOAA
Hail	40	NOAA & SHELDUS
Lightning	0	NOAA
Tornado	6	NOAA & SHELDUS
Temperature Extremes	16	NOAA
Winter Storms	31	NOAA
Thunderstorm and High Wind	49	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	Heavy Snow	Drought	Communication Disruption**	Avalanche	Ice Jam
Extreme Heat	Lightning	Flood	Tornado	Earthquake***	Landslide
Freezing Rain/Sleet/Ice	Strong Winds	Urban Fire	Rapid Snow Melt	Subsidence	Dam Failure
Hail	Thunderstorm	Wild Fire	Utility Interruption**		Transportation Interruption**
Heavy Rain					

**Transportation, utility interruptions and communication disruption are not natural hazards but often occur as a result of natural hazards such as ice storms and strong winds.

***Earthquakes are marked with an asterisk because they occur but are so small that the effects are minimal. Thus, mitigation measures specifically for earthquakes are not a priority.

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 2013 Lake County PDM plan. Most of the descriptions were revised for better clarity. For the purpose of consistency throughout the plan, additional definitions were included to reflect all of the hazards that have a chance of occurring in the area and all of the hazards are alphabetized. For all of the hazards identified the probability of future occurrence is expected to be the same for all of the jurisdictions covered in the PDM.

Blizzards are a snow storm 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.

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.

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. The County has six dams, with all of the dams having a low potential to endanger lives and damage property.

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.

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 Lake County PDM jurisdiction area as temperatures below zero.

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.

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. Heavy, slow moving thunderstorms often produce large amounts of rain. The threat of flooding would be increased during times of high soil moisture.

Freezing Rain/Ice occurs when temperatures drop below thirty degrees Fahrenheit and rain starts to fall. Freezing rain coats objects with ice causing dangerous conditions like 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, weak 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.

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.

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.

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 chances 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 can range up to thirty-four 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 microburst or macroburst 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.

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, isocratic rebound, extraction of natural gas, ground-water 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/hF5=winds 261-318 m/h

F1=winds 73-112 m/hF6=winds greater than 318 m/h

F2=winds 113-157 m/h

F3=winds 158-206 m/h

F4=winds 207-260 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 wild fire 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.

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 will 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 Lake County

Date	Disaster Dec#	Type	Public Assistance Cost
5/22/2007	1702	Severe Storms, Tornadoes and Flooding	6,226,611
5/21/2008	1759	Severe Winter Storm and Record and Near Record Snow	7,826,995
7/8/2008	1774	Severe Storms and Flooding	4,716,310
12/11/2008	1811	Severe Winter Storm and Record and Near Record Snow	5,825,275
6/15/2009	1844	Severe Storms and Flooding	5,306,807
3/8/2010	1886	Severe Winter Storm and Snowstorm	874,819
3/9/2010	1887	Severe Winter Storm	49,063,928
5/12/2010	1914	Severe Winter Storm	1,862,942
5/12/2010	1915	Flooding	21,508,831
7/28/2010	1929	Severe Storms, Tornadoes and Flooding	666,648
9/22/2010	1938	Severe Storms and Flooding	5,409,356
11/1/2010	1947	Severe Storms and Flooding	1,081,116
5/12/2011	1984	Flooding	52,127,175
5/9/2013	4115	Severe Winter Storm and Snowstorm	8,234,543
6/27/2013	4125	Severe Storms, Tornadoes and Flooding	1,215,685

Date	Disaster Dec#	Type	Public Assistance Cost
8/1/2013	4137	Severe Storms, Tornadoes and Flooding	1,159,416
11/7/2013	4155	Severe Winter Storm, Snowstorm and Flooding	43,017,781
7/27/2014	4186	Severe Storms, Tornadoes and Flooding	11,080,636
7/30/2015	4233	Severe Storms, Tornadoes, Straight-line Winds and Flooding	3,076,674
2/1/2017	4298	Severe Winter Storm	9,576,235

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

While the PDM Planning Team reviewed all hazard occurrences that have been reported in the last 10 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 2013 PDM was drafted.

DAM FAILURE

Dam breach or failure is of lesser concern for the citizens of the County than flooding. Lake County has a number of structures which control or regulate flow from one water body to another. South Dakota Department of Environment and Natural Resources identifies six dams in the County (Table 4.4 listed below). None of the dams are listed as vulnerable to failure.

Table 4.4: Dam Locations in Lake County

Owner Type	Location	Water Body
Private	SE¼ SE¼ Sec 29-T105N-R53W Lat 43.8817 Long 97.2117	East Fork Vermillion River tributary
Local District	NW¼ SE¼ Sec 16-T106N-R53W Lat 43.9833 Long 97.1950	Lake Herman tributary
Local District	NE¼ SE¼ Sec 21-T106N-R53W Lat 43.9700 Long 97.1917	Lake Herman tributary
Local District	SW¼ SW¼ Sec 23-T106N-R53W Lat 43.9650 Long 97.1667	Lake Herman tributary
Private	SW¼ NE¼ Sec 29-T107N-R54W Lat 44.0467 Long 97.3367	East Fork Vermillion River tributary
Private	SE¼ SW¼ Sec 20-T106N-R52W Lat 43.9653 Long 97.1021	Lake Madison tributary

DROUGHT AND WILDFIRE

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.

Table 4.5: Lake County Ten Year Drought History

Location	Date Start	Date End	Type
Lake County	03/04/2008	03/25/2008	Abnormally Dry
Lake County	08/07/2008	08/26/2008	Abnormally Dry
Lake County	09/02/2008	09/30/2008	Moderate Drought
Lake County	02/06/2009	07/07/2009	Abnormally Dry
Lake County	09/22/2009	09/29/2009	Abnormally Dry
Lake County	09/13/2011	01/03/2012	Abnormally Dry
Lake County	01/10/2012	05/01/2012	Moderate Drought
Lake County	07/10/2012	07/17/2012	Moderate Drought
Lake County	07/24/2012	08/28/2012	Severe Drought
Lake County	09/04/2012	11/06/2012	Severe to Extreme Drought
Lake County	11/13/2012	04/09/2013	Severe Drought
Lake County	04/16/2013	05/07/2013	Moderate Drought
Lake County	05/14/2013	05/21/2013	Ab. Dry to Moderate Drought
Lake County	05/28/2013	06/04/2013	Abnormally Dry
Lake County	09/03/2013	09/17/2013	Abnormally Dry
Lake County	09/24/2013	10/08/2013	Moderate Drought
Lake County	10/15/2013	10/29/2013	Abnormally Dry
Lake County	04/22/2014	04/29/2014	Abnormally Dry

Location	Date Start	Date End	Type
Lake County	05/06/2014	05/27/2014	Moderate Drought
Lake County	07/29/2014	08/19/2014	Abnormally Dry
Lake County	11/18/2014	03/24/2015	Abnormally Dry
Lake County	03/31/2015	04/21/15	Moderate Drought
Lake County	04/28/2015	05/26/2015	Moderate to Severe Drought
Lake County	06/02/2015	06/16/2015	Ab. Dry to Moderate Drought
Lake County	06/23/2015	06/30/2015	Abnormally Dry
Lake County	06/27/2017	07/11/2017	Abnormally Dry
Lake County	07/18/2017	08/15/2017	Moderate Drought
Lake County	08/22/2017	09/19/2017	Abnormally Dry
Lake County	12/05/2017	01/16/18	Abnormally Dry

SOURCE: http://droughtmonitor.unl.edu/archive.html&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, Lake 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.

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 zero occurrences listed for wildfires in the County, but the State Fire Marshal's Office (SFMO) was contacted to verify that information. The SFMO information provided 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 the SFMO identifies 95 structure fire responses, 56

vehicle fire responses, and 143 outside fire responses reported from 2008 to 2017. 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, The SFMO provided information about the number of injuries and fatalities reported as a result of these fires. According to the information provided, zero civilian and zero firefighter injuries were reported from 2008 to 2017. During the same time period, zero civilian fatalities and zero firefighter fatalities were also reported.

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 143 outside (wildfire) fires as some fires required multiple departments to respond. The 2013 PDM plan did not list or identify the history of wildfire occurrences.

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

Year	Structural Fires	Vehicle Fires	Outside Fires
2008	13	6	11
2009	14	8	18
2010	6	12	13
2011	13	4	13
2012	9	4	17
2013	6	1	8
2014	5	7	15
2015	1	6	11
2016	12	4	14
2017	16	4	23
Total	**95**	**56**	**143**

SOURCE: South Dakota State Fire Marshall Office

EARTHQUAKES

An earthquake is the result of a sudden release of energy due to an adjustment in the earth's crust. This adjustment causes the ground to tremble and produces vibrations that radiate out from the focus of the quake. In South Dakota, the most likely causes for earthquakes would be from plate movements along faults and isocratic (glacial) rebound. Severe enough earthquakes can cause property damages and injuries or loss of lives. In 1982, a 3.6 magnitude earthquake was registered in neighboring Moody County. In 2005, a 3.1 magnitude earthquake was

registered in neighboring Miner County. No earthquake activity has been recorded in Lake County.

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 ten-year flood history in the County from 2008 to 2017.

Table 4.7: Lake County 10-year Flood History

Location or County	Type	Date	Time	Property Damage
Chester	Flood	06/05/2008	6:30 p.m.	0
Madison	Flash Flood	06/11/2010	2:20 a.m.	0
Orland	Flash Flood	09/22/2010	7:55 p.m.	200K
Orland	Flood	09/23/2010	12:39 a.m.	0
Ramona	Flood	03/16/2011	6:00 a.m.	0
Ramona	Flood	04/01/2011	12:00 a.m.	100K
Madison	Flash Flood	07/01/2011	2:00 p.m.	0
Madison	Flash Flood	07/10/2011	2:55 a.m.	0
Franklin	Flash Flood	05/05/2012	9:30 a.m.	0
Orland	Flash Flood	05/05/2012	10:45 p.m.	2000K
Ramona	Flood	06/16/2014	6:25 p.m.	50K
Madison	Flash Flood	06/17/2016	6:35 p.m.	0

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

Major Flood Occurrences:

- **April 2001 -** This presidentially declared disaster was precipitated by an onset of flooding that began during a spring thaw in early March 2001. On April 6, a series of rainstorms that dropped from two to six inches of rain resulted in flooding of the James, Vermillion, and Big Sioux rivers. The major impact was to public infrastructure. Due to ice and wind damage to utility poles and lines, electrical services to some areas were interrupted. Numerous bridges and roads were impacted as well. There was damage to county and township roads in the eastern and northeastern portion of the state that had previously not been affected by floodwater. Some of the damaged roads included school

bus, mail, and farm-to-market routes. Travel on these roadways involved significant risk. Several roads were temporarily impassable, requiring residents to travel greater distances because of detours. Many farmers were unable to access their fields to begin spring planting.

- **April and May 1997 –** Due to very heavy snows to nearly 100 inches during the 96-97 winter and a late April storm, heavy flooding once again occurred throughout the county generally affecting most townships, county roads and city streets. Many roads were inundated, many of these access roads are still under water.

- **July 1993 –** Flash flooding resulted from very heavy thunderstorms which moved from Aurora County east/northeast to Moody County in southeast South Dakota. Three to six inches of rain occurred in a two to four-hour period over already saturated ground. Cities, roads, farms, and lake front areas received water damage from the flooding. Many roads, culverts and bridges in the affected counties were undermined. In Lake County, major flash flooding hit the City of Madison where over five inches of rain caused Lake Herman, Memorial Creek and Silver Creek to overflow. Two thousand residents were evacuated. Over 500 homes in Madison were damaged. This event caused millions of dollars of damages to homes, businesses and infrastructure in Lake County.

HAIL

Table 4.8 indicates hail occurrences by location throughout the county. However, the information provided by the NOAA and SHELDUS websites was incomplete due to inconsistent reporting after such hazards occur. 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.

Table 4.8: Lake County 10-year Hail History

Location or County	Date	Time	Type	Magnitude
Smith's Park	05/01/2008	7:05 p.m.	Hail	1.00 In.
Ramona	06/05/2008	6:45 p.m.	Hail	0.88 In.
Ramona	07/07/2009	4:19 p.m.	Hail	1.00 In.
Ramona	07/07/2009	4:30 p.m.	Hail	1.00 In.
Madison	07/07/2009	4:36 p.m.	Hail	0.75 In.
Madison	07/07/2009	4:36 p.m.	Hail	1.00 In.
Madison Municipal Airport	07/07/2009	4:36 p.m.	Hail	0.88 In.

Location or County	Date	Time	Type	Magnitude
Madison	07/07/2009	4:45 p.m.	Hail	1.25 In.
Madison	09/30/2009	11:45 p.m.	Hail	0.88 In.
Nunda	07/17/2010	7:00 p.m.	Hail	0.75 in.
Madison	07/01/2011	1:45 p.m.	Hail	1.00 in.
Madison	07/01/2011	1:55 p.m.	Hail	1.00 in.
Nunda	07/07/2011	2:12 p.m.	Hail	1.75 In.
Winfred	08/22/2011	9:52 p.m.	Hail	1.00 In.
Winfred	08/22/2011	9:55 p.m.	Hail	1.75 In.
Franklin	08/22/2011	10:24 p.m.	Hail	1.00 In.
Chester	05/05/2012	9:07 a.m.	Hail	1.00 In.
Winfred	05/05/2012	7:24 p.m.	Hail	0.88 In.
Junius	05/05/2012	7:42 p.m.	Hail	1.00 In.
Madison	05/05/2012	7:45 p.m.	Hail	1.75 In.
Madison Municipal Airport	05/05/2012	8:12 p.m.	Hail	1.00 In.
Junius	05/05/2012	8:13 p.m.	Hail	1.00 In.
Chester	06/29/2102	3:55 p.m.	Hail	1.75 In.
Madison	06/19/2013	8:57 p.m.	Hail	0.88 In.
Madison	06/19/2013	9:09 p.m.	Hail	1.00 In.
Ramona	06/21/2013	3:04 p.m.	Hail	1.00 In.
Madison	06/21/2013	9:53 p.m.	Hail	1.00 In.
Madison	06/22/2013	10:49 p.m.	Hail	1.25 In.
Ramona	07/19/2014	6:04 a.m.	Hail	1.00 In.
Winfred	07/23/2015	10:30 p.m.	Hail	1.75 In.
Nunda	06/03/2016	4:14 p.m.	Hail	1.00 In.
Madison	06/17/2016	6:18 p.m.	Hail	1.00 In.
Madison	06/17/2016	6:21 p.m.	Hail	1.75 In.
Madison	06/17/2016	6:40 p.m.	Hail	1.00 In.
Orland	06/17/2016	6:40 p.m.	Hail	1.00 In.
Orland	08/18/2016	7:31 p.m.	Hail	1.00 in.
Winfred	09/15/2017	6:05 p.m.	Hail	1.00 in.
Madison Municipal Airport	09/23/2017	11:49 a.m.	Hail	1.00 In.

Location or County	Date	Time	Type	Magnitude
Junius	09/23/2017	12:23 p.m.	Hail	1.00 In.
Rutland	09/23/2017	12:48 p.m.	Hail	1.75 In.

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 the NCDC database, there have been no reported lightning events in Lake County for the past ten years. However, the possibility exists that the information is incomplete. It is also important to note that while no damage was reported, lightning strikes are very common in all South Dakota counties.

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. Between the years of 1950 and 2017, the County confirmed nineteen tornadoes/funnels. However, tornadoes may occur with little or no warning. Table 4.9 includes the tornado history in the County over the course of the past ten years.

Table 4.9: Lake County 10-year Tornado History

Location	Date	Time	Type	Magnitude	Injuries	Property Damage
Nunda	06/18/2009	8:11 p.m.	Tornado	EF 0	0	0
Junius	05/30/2011	7:12 p.m.	Tornado	EF 0	0	0
Ramona	05/30/2011	7:22 p.m.	Tornado	EF 0	0	0
Orland	08/22/2011	10:26 p.m.	Funnel		0	0
Nunda	05/10/2015	3:08 p.m.	Funnel		0	0
Winfred	09/15/2017	6:04 p.m.	Tornado	EF 0	0	0

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

Tornado Occurrences:

Lake County's considered to be in an F3 area, as is the rest of South Dakota. Wind speeds can get up to 206 mph at times during an F3 tornado. Tornadoes in South Dakota can reach F5, with wind speeds gusting up to 318 mph. Despite these facts, tornadoes are much less likely to occur in this area than other types of severe summer weather.

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 4.10 identifies dates and times of the temperature extremes.

The location in table 4.10 is not specifically identified in the table by jurisdiction due to the vast area across the State of South Dakota affected by extreme temperatures. Very cold temperatures and moderate northwest winds combined to lower wind chill readings to 35 to 45 below zero at times from the morning of January 14th to early morning on January 15th. The strongest winds were at the start of the event. While winds decreased slowly on the night of January 14th, actual temperatures also dropped, reaching 20 to 30 below zero near daybreak on January 15th, about which time winds became light and no longer a major factor. 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 15 and July 20, 2011 when high heat and humidity affected southeast South Dakota. Heat indices frequently rose above 115 degrees during the day. There were some cases of heat related illnesses in people, and several reports of livestock deaths.

Table 4.10: Lake County 10-year History of Extreme Temperatures

Location	Date	Time	Type
Lake County	02/19/2008	9:00 p.m.	Cold/Wind Chill
Lake County	01/14/2009	6:00 p.m.	Extreme Cold/Wind Chill
Lake County	01/07/2010	12:00 p.m.	Extreme Cold/Wind Chill
Lake County	02/01/2011	12:00 a.m.	Extreme Cold/Wind Chill

Location	Date	Time	Type
Lake County	07/15/2011	12:00 p.m.	Excessive Heat
Lake County	07/02/2012	11:00 a.m.	Excessive Heat
Lake County	07/16/2012	11:00 a.m.	Excessive Heat
Lake County	07/19/2012	11:00 a.m.	Excessive Heat
Lake County	01/20/2013	6:00 p.m.	Cold/Wind Chill
Lake County	12/23/2013	1:00 a.m.	Extreme Cold/Wind Chill
Lake County	01/23/2014	5:00 a.m.	Extreme Cold/Wind Chill
Lake County	03/02/2014	2:00 a.m.	Extreme Cold/Wind Chill
Lake County	01/16/2016	9:00 p.m.	Extreme Cold/Wind Chill
Lake County	06/10/2016	11:00 a.m.	Excessive Heat
Lake County	07/20/2016	12:00 p.m.	Excessive Heat
Lake County	12/17/2016	3:00 p.m.	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 ninety-three wind events from 1950-2017. Table 4.11 denotes the extent and severity of such hazards occurring in the last ten years. The County continues to educate residents of the dangers of such storms through public service announcements and other printed media.

Table 4.11: Lake County 10-year History for Thunderstorms

Location	Date	Time	Type	Mag
Madison	06/19/2008	8:40 p.m.	Thunderstorm Wind	52 kts
Madison	06/19/2008	8:45 p.m.	Thunderstorm Wind	52 kts.
Lake County	10/26/2008	10:00 a.m.	High Wind	39 kts.
Lake County	06/10/2010	9:05 a.m.	High Wind	50 kts.
Franklin	06/11/2010	1:24 a.m.	Thunderstorm Wind	61 kts.
Madison Municipal Airport	06/11/2010	1:35 a.m.	Thunderstorm Wind	56 kts.
Madison Municipal Airport	06/11/2010	1:40 a.m.	Thunderstorm Wind	61 kts.
Chester	06/11/2010	1:50 a.m.	Thunderstorm Wind	52 kts.
Nunda	07/07/2010	12:20 a.m.	Thunderstorm Wind	52 kts.
Orland	07/10/2010	7:45 p.m.	Thunderstorm Wind	56 kts.

Location	Date	Time	Type	Mag
Ramona	07/23/2010	8:27 p.m.	Thunderstorm Wind	52 kts.
Junius	07/23/2010	8:33 p.m.	Thunderstorm Wind	52 kts.
Wentworth	07/23/2010	8:46 p.m.	Thunderstorm Wind	56 kts.
Ramona	08/19/2010	8:42 p.m.	Thunderstorm Wind	56 kts.
Lake County	10/26/2010	5:11 a.m.	High Wind	51 kts.
Madison	05/30/2011	7:40 p.m.	Thunderstorm Wind	56 kts.
Madison Municipal Airport	07/01/2011	2:00 p.m.	Thunderstorm Wind	50 kts.
Wentworth	07/01/2011	2:07 p.m.	Thunderstorm Wind	61 kts.
Nunda	07/01/2011	2:15 p.m.	Thunderstorm Wind	52 kts.
Smith's Park	07/09/2011	11:40 p.m.	Thunderstorm Wind	56 kts.
Chester	07/09/2011	11:45 p.m.	Thunderstorm Wind	56 kts.
Orland	05/05/2012	7:41 p.m.	Thunderstorm Wind	70 kts.
Madison	05/05/2012	7:49 p.m.	Thunderstorm Wind	65 kts.
Madison Municipal Airport	05/05/2012	8:12 p.m.	Thunderstorm Wind	52 kts.
Madison	05/05/2012	8:30 p.m.	Thunderstorm Wind	61 kts.
Wentworth	05/05/2012	10:30 p.m.	Thunderstorm Wind	52 kts.
Madison	05/26/2012	5:44 a.m.	Thunderstorm Wind	61 kts.
Madison	08/03/2012	7:00 p.m.	Thunderstorm Wind	51 kts.
Ramona	08/03/2012	7:06 p.m.	Thunderstorm Wind	52 kts.
Madison Municipal Airport	08/03/2012	7:11 p.m.	Thunderstorm Wind	68 kts.
Madison Municipal Airport	09/04/2012	7:25 p.m.	Thunderstorm Wind	58 kts.
Madison Municipal Airport	09/04/2012	7:55 p.m.	Thunderstorm Wind	56 kts.
Lake County	01/16/2014	9:00 a.m.	High Wind	52 kts
Lake County	01/26/2014	12:00 p.m.	High Wind	50 kts
Lake County	09/09/2014	4:10 a.m.	High Wind	51 kts
Madison Municipal Airport	06/19/2015	4:47 p.m.	Thunderstorm Wind	56 kts
Madison	06/20/2015	2:00 a.m.	Thunderstorm Wind	56 kts
Madison	07/16/2015	6:36 p.m.	Thunderstorm Wind	56 kts
Winfred	07/25/2015	8:30 p.m.	Thunderstorm Wind	52 kts
Madison	07/25/2015	8:50 p.m.	Thunderstorm Wind	56 kts
Smith's Park	08/09/2015	6:00 p.m.	Thunderstorm Wind	61 kts
Lake County	02/19/2016	4:30 a.m.	High Wind	55 kts
Wentworth	06/17/2016	6:35 p.m.	Thunderstorm Wind	61 kts

Location	Date	Time	Type	Mag
Lake County	12/25/2016	11:00 p.m.	High Wind	53 kts
Winfred	08/25/2017	6:30 p.m.	Thunderstorm Wind	52 kts
Madison	08/25/2017	6:50 p.m.	Thunderstorm Wind	52 kts
Madison	08/25/2017	6:50 p.m.	Thunderstorm Wind	56 kts
Smith's Park	09/19/2017	10:09 p.m.	Thunderstorm Wind	65 kts.
Wentworth	09/19/2017	10:16 p.m.	Thunderstorm Wind	61 kts.

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

Major Wind Occurrences:

- **June 9, 2001 -** Many trees were downed in and around Madison by 80 mph winds. At a farm just to the northeast of Madison, a 220-foot milking barn was destroyed, half of another barn was destroyed, and several pieces of machinery were damaged. Also, a silo toppled over and killed two horses. At another farm northeast of Madison, part of a machine shed roof was torn off, an irrigation unit was tipped over and severely damaged, and trees were uprooted. Just to the northwest of Madison, high winds and hail broke windows out of a home and severely damaged the siding. In Madison, several buildings and some semi-trailers were damaged at a business by the high winds.

- **July 1, 2011 -** Thunderstorm winds caused widespread tree damage, including several trees uprooted or flattened, and others snapped a few feet above the ground. The winds also destroyed a 60 foot by 90 foot shed. Several homes and vehicles were damaged, including a car crushed by a tree and a garage heavily damaged by a falling tree. The winds caused damage to power lines and poles, both directly and from windblown debris, with a resulting power outage in most of Wentworth.

WINTER STORMS

Table 4.12 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 of the storms identified in Table 4.12 were considered to have occurred countywide. Due to the multiple occurrences of winter storms each year, an exhaustive compilation is not possible.

Table 4.12 Lake County 10-year History of Snow and Ice Storms

Location	Date	Time	Type
Lake County	04/10/2008	1:00 p.m.	Blizzard
Lake County	04/25/2008	5:00 a.m.	Heavy Snow
Lake County	12/14/2008	7:00 a.m.	Blizzard
Lake County	12/20/2008	10:00 a.m.	Blizzard
Lake County	01/12/2009	12:00 p.m.	Blizzard
Lake County	03/31/2009	7:00 a.m.	Blizzard
Lake County	12/23/2009	3:00 p.m.	Blizzard
Lake County	01/06/2010	10:00 a.m.	Winter Storm
Lake County	12/10/2010	11:00 p.m.	Blizzard
Lake County	12/20/2010	6:00 a.m.	Heavy Snow
Lake County	12/31/2010	6:00 a.m.	Winter Storm
Lake County	01/01/2011	12:00 a.m.	Winter Storm
Lake County	01/31/2011	10:00 a.m.	Winter Storm
Lake County	02/20/2011	3:00 a.m.	Heavy Snow
Lake County	02/13/2012	7:00 a.m.	Heavy Snow
Lake County	12/09/2012	10:00 a.m.	Blizzard
Lake County	02/10/2013	3:00 p.m.	Blizzard
Lake County	04/09/2013	3:00 a.m.	Winter Storm
Lake County	12/03/2013	5:00 p.m.	Winter Storm
Lake County	01/16/2014	10:00 a.m.	Blizzard
Lake County	03/18/2014	9:00 a.m.	Heavy Snow
Lake County	12/15/2014	7:00 a.m.	Winter Storm
Lake County	01/05/2015	11:00 a.m.	Winter Storm
Lake County	01/08/2015	2:00 p.m.	Blizzard
Lake County	11/30/2015	2:00 a.m.	Winter Storm
Lake County	12/01/2015	12:00 a.m.	Winter Storm
Lake County	12/15/2015	10:00 p.m.	Heavy Snow
Lake County	12/25/2015	8:00 p.m.	Winter Storm
Lake County	11/18/2016	4:00 a.m.	Winter Storm
Lake County	12/16/2016	11:00 a.m.	Winter Storm
Lake County	01/24/2017	3:00 p.m.	Winter Storm

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

Major Winter Storm Occurrences:

- **February 2001 –** Freezing rain was followed by snow and blowing snow. Heavy snow fell over much of the area. New snow accumulations were 8 inches or more from Brookings west to Huron...and southwest to Mitchell, Chamberlain, Burke, and Pickstown. The greatest reported accumulation was 15 inches at Burke. Along and southeast of a Sioux Falls to Yankton line, new snow accumulations were in the 2 to 6-inch range, but significant icing occurred in this area. There were scattered reports of tree and power line damage, and of minor structural damage due to the weight of the snow, but no damage estimates were available. Winds gusting to 40 to 50 mph during and after the snowfall caused near blizzard conditions and considerable drifting, blocking roads and stranding numerous vehicles. Travel was impossible in many areas and many businesses, colleges, and technical schools were closed. Interstate highway 90 and parts of Interstate highway 29 were closed for more than 18 hours due to the drifting snow and poor visibilities. County and State snowplows were pulled off the roads until conditions improved.

- **December 2009 –**Prolonged snowfall produced heavy accumulations over southeast South Dakota, ranging up to over 20 inches in several areas. The snowfall took place from two days before to the day after Christmas. The snowfall was accompanied by increasing north to northwest winds which caused widespread blizzard conditions on Christmas day and the start of the next day. The blizzard added to the very heavy snowfall made almost all travel impossible and shut down commerce.

- **April 2013 -**Heavy precipitation with rapid cooling produced a combination of freezing rain, sleet, and snow over all of southeast South Dakota from the early morning hours of April 9th, to the morning of April 11th. Moderate to heavy ice accumulations were reported near Interstate 90. These were followed by moderate to heavy snow and sleet accumulations, mainly near and north of Interstate 90. The ice accumulations, greater than a half inch in some areas, caused major tree and power line damage in the ice storm area. Fallen branches and limbs were numerous, trees were destroyed, roads were blocked, and some vehicles and homes suffered damages from the falling trees, limbs, and branches. There were also major power outages because of the power line and power pole damage. Strong winds with and following the storm, not strong enough to cause significant damage under dry conditions, contributed greatly to the tree and power line damage. The snow and sleet accumulations made travel difficult, especially in areas where downed trees and power lines were already causing road blockages.

- **November 2015 -**Snowfall of 5 to 11 inches followed a period of freezing drizzle over southeast South Dakota. The freezing drizzle fell after midnight on November 30th, then the accumulating snow developed from east to west that morning and continued into the start of the afternoon of December 1st.

Climate Change

Climate change is a global phenomenon. Human related activities are releasing increasing quantities of carbon dioxide and other heat trapping gases into the Earth's atmosphere causing increases in temperatures worldwide. Dennis Todey, Extension State Climatologist, predicts increased precipitation in the northern Great Plains with more heavy precipitation events and

flooding. Warmer temperatures will lengthen the growing season and increase the number of frost free days. Total snow fall accumulations will decrease. Overall, climate change will increase the number and intensity of weather hazards in the region.

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 4.13 below is an overall summary of vulnerability by jurisdiction produced from the FEMA worksheets completed by each participating jurisdiction and PDM Planning Team.

Table 4.13: Overall Summary of Vulnerability by Jurisdiction

Type of Disaster	Lake County	Brant Lake	Madison	Nunda	Ramona	Wentworth	PDM Team
Drought	M	L	M	L	M	L	H
Earthquake	L	N/A	N/A	N/A	N/A	N/A	N/A
Extreme Cold	H	H	L	M	M	M	L
Extreme Heat	H	H	L	L	M	L	L
Flood	H	L	H	N/A	M	L	H
Freezing Rain/Sleet/Ice	H	L	H	M	M	L	H
Hail	L	H	L	L	L	L	H
Heavy Rain	M	H	L	M	M	L	L
Heavy Snow	M	H	M	L	M	L	M
Ice Jam	M	N/A	L	N/A	N/A	N/A	N/A
Landslide	N/A	H	N/A	N/A	N/A	N/A	N/A
Lightning	L	L	L	L	L	L	L
Rapid Snow Melt	M	L	L	L	L	L	L
Strong Winds	M	H	M	M	M	M	M

Type of Disaster	Lake County	Brant Lake	Madison	Nunda	Ramona	Wentworth	PDM Team
Thunderstorm	L	H	L	L	M	L	L
Tornado	M	H	H	H	M	H	M
Urban Fire	L	L	L	L	L	M	L
Utility Interruption	H	M	L	M	L	L	L
Wild Fire	L	H	H	L	N/A	L	L

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 is 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 has experienced severe damages to roads and culverts periodically from 1993 through 2007. 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 the Appendix.

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 back-up 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. Due to the topography of the County, there are very few rivers or creeks with flowing water. Therefore, vulnerability to ice jams is considered very low.

Landslides have a low chance of occurring in the County due to the relatively flat topography.

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 seventeen 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 lightening 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 “Lightening” 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 Lake County, wildfires can be easily spotted and are capable of being maintained. The County does not have any areas that are considered wild land-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.

Climate Change is a global issue. Climate change exacerbates many of the identified weather hazards such as drought, extreme temperatures, severe storms, flooding, tornadoes and wildfires. Current climate conditions in the northern Great Plains already put a strain on communities and cause millions of dollars in damages. Climate change will only add to these problems.

ASSESSING VULNERABILITY: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

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

Lake County participates in the National Flood Insurance Program (NFIP). The City of Madison has been mapped and participates in the NFIP. Nunda, Ramona and Wentworth were all mapped in 2009 during a county-wide remapping project. Brant Lake was recently incorporated in March of 2016. Chester is an unincorporated village. Both were mapped as a part of the rural areas in Lake County in 2009. None of these communities participate in the NFIP. Table 4.14 shows County entities that participate in the NFIP.

While Zone A Flood Hazard Areas have been established for Lake County and the City of Madison. Lake County and the City of Madison will continue to participate and ensure

compliance of floodplain regulations. Brant Lake, Nunda, Ramona, Wentworth and Chester village have been designated Zone C and X, minimal flood hazard areas.

Table 4.14: Communities Participating in the National Flood Program, Lake County, SD

Community Name	Community ID	Current Map Effective Date
Lake County	460276	09/02/09
Brant Lake	***Not Participating***	
Madison	460044	09/02/09
Nunda	***Not Participating***	
Ramona	***Not Participating***	
Wentworth	***Not Participating***	
Chester Village	***Not Participating***	

Lake County and the City of Madison have designated floodplain administrators that require elevation certificates and issues floodplain development permits for structures constructed within Zone A of the identified flood hazard areas. None of the other Lake County communities have designated floodplain administrators.

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. Only the municipality of Madison has identified Flood Hazard Areas. Naturally, residential development is located adjacent to numerous lakes and depressions in Lake County, however only two policies are held in all of Lake County. See Table 4.15 for County NFIP statistics.

Table 4.15: Lake 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 Madison	99	91	$759,387	64	0
Unincorporated areas of Lake County	57	61	$660,220	7	0
Totals	**156**	**152**	**$1,419,607**	**71**	**0**

SOURCE: South Dakota State NFIP Coordinator (2013)

An issue of concern for the PDM Planning Team is the number of times specific properties and structures on those properties flood. As of 2010, Lake County had experienced 6 repetitive loss claims over three properties. Those properties have been paid a total of $81.511. 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. Since Lake County does not have any properties classified “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 or winter storms, a terrorist attack, or a 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 Madison has many structures that are vital to emergency operations. Each jurisdiction was responsible for listing critical infrastructure within their communities. Table 4.16 is a list of critical facilities that would cause the greatest distress in the county if destruction occurred. The information provided in Table 4.16 was compiled via survey of the participating communities.

Table 4.16: Critical Structures in Lake County

Jurisdiction/ Entity	Location	Address	Sector	Sub Sector	Name	Owner Type
Lake County	Lake County	Various Locations	Non-Emergency Response Facility	Electrical Supply	Electric Power Distribution Equipment	Private
Lake County	Lake County	Various Locations	Non-Emergency Response Facility	Electrical Supply	Substations	Private
Lake County	Lake County	Various Locations	Communications	Telephone, Cable, Internet	Telecommunications Systems	Private
Lake County	Lake County	Various Locations	Non-Emergency Response Facility	Energy	Northwestern Energy Pipeline	Private
Lake County	Lake County	Various Locations	Non-Emergency Response Facility	Energy	Dakota Access Pipeline	Private
Lake County	Lake County	46269 SD Hwy 34	Non-Emergency Response Facility	Energy	Dakota Ethanol	Private
Lake County	Lake County	Various Locations	Non-Emergency Response Facility	Water Supply	BSCWS and KRWS Water Well Sites	Private
Lake County	Lake County	23473 457th Avenue	Non-Emergency Response Facility	Sanitary Sewer	LMSD Sewer Lagoons	Private
Lake County	Lake County	23493 457th Avenue	Non-Emergency Response Facility	Sanitary Sewer	LMSD Office and Sewer Lagoons	Private
Lake County	Lake County	Various Locations	Non-Emergency Response Facility	Water Supply	BSCWS and KRWS Pump Houses and Water Storage Tanks	Private
Lake County	Lake County	45305 SD Hwy 34	Population to Protect	Museum	Prairie Village	Private
Lake County	Lake Herman	23409 State Park Drive	Population to Protect	Park	Lake Herman State Park	Public
Lake County	Lake Madison	6431 Walkers Point Drive	Population to Protect	Recreation Area	Walkers Point Recreation Area	Public
Lake County	Lake County	45545 242 Street	Population to Protect	Private Institution	Rustic Areas Colony School	Private
Lake County	Rutland	102 School Street	Population to Protect	Public Institution	Rutland School	Public
Lake County	Lake County	22244 465 Avenue	Population to Protect	Private Institution	Cambridge Colony School	Private

Jurisdiction/ Entity	Location	Address	Sector	Sub Sector	Name	Owner Type
Lake County	Lake County	23843 446A Avenue	Population to Protect	Private Institution	Gracevale Colony School	Private
Lake County	Lake County	Various Locations	Non-Emergency Response Facility	Sanitary Sewer	CSD Sewer System	Public
Lake County	Lake County	Various Locations	Non-Emergency Response Facility	Sanitary Sewer	BLSD Sewer System	Public
Chester	Chester	102 2nd Avenue	Population to Protect	Public Institution	Chester High School	Public
Chester	Chester	4th Street and 3rd Avenue	Emergency Service	Building	Chester Fire Hall/ Community Center	Public
Chester	Chester	West 1st Street	Non-Emergency Response Facility	Water Supply	Water Tower	Public
Chester	Chester	4th Avenue and 5th Street	Population to Protect	Recreation	Chester Ballfield	Public
Brant Lake	Brant Lake	South Arbor Lane	Emergency Services	Warning Siren	Brant Lake Home Owners Assn. Siren	Private
Brant Lake	Brant Lake	3720 Coves North Drive	Population to Protect	Building	Day Care Facility	Private
Madison	Madison	1600 Airport Drive	Government Facility	Transportation	Madison Airport	Public
Madison	Madison	45369 234 Street	Population to Protect	Public Institution	Madison Christian School	Private
Madison	Madison	401 N. Van Eps Avenue	Population to Protect	Public Institution	St. Thomas School	Private
Madison	Madison	800 NE 9th Street	Population to Protect	Public Institution	Madison High School	Public
Madison	Madison	700 NW 9th Street	Population to Protect	Public Institution	Madison Elementary School	Public
Madison	Madison	820 N Washington Avenue	Population to Protect	Public Institution	Dakota State University	Public
Madison	Madison	500 Block NE 11th Street	Population to Protect	Public Institution	Dakota State University Sports Complex	Public
Madison	Madison	323 SW 10th Street	Public Health	Building	Madison Regional Health System	Private
Madison	Madison	211 NW 1st Street	Population to Protect	Building	Heritage Assisted Living Center	Private
Madison	Madison	706 SW 7th Street	Population to Protect	Building	Valiant Assisted Living Center	Private
Madison	Madison	718 NE 8th Street	Population to Protect	Building	Madison Care and Rehabilitation Center	Private

Jurisdiction/ Entity	Location	Address	Sector	Sub Sector	Name	Owner Type
Madison	Madison	1001 S Egan Avenue	Population to Protect	Building	Bethel Lutheran Home	Private
Lake County	Madison	200 E Center Street	Government Facility	Building	Lake County Courthouse/SO	Public
Madison	Madison	823 SE 4th Street	Government Facility	Water System	Madison Water Treatment Plant	Public
Madison	Madison	116 W Center Street	Government Facility	Building	Madison City Hall/Police Department	Public
Madison	Madison	200 SE 3rd Street	Government Facility	Building	Madison Fire Department	Public
Madison	Madison	323 SW 10th Street	Emergency Services	Building	Madison Ambulance	Private
Lake County	Madison	1001 SW 4th Street	Government Facility	Building	Lake County Highway Department	Public
Madison	Madison	401 S Highland	Government Facility	Building	Madison Street Department	Public
Madison	Madison	111 Van Eps Avenue	Population to Protect	Building	Madison Auditorium	Public
Madison	Madison	412 S Union Avenue	Non-Emergency Response Facility	Energy	Madison Electric Department	Public
Madison	Madison	1001 NW 1st Street	Population to Protect	Recreation	Madison Aquatic Center/Park	Public
Madison	Madison	800 S Egan Avenue	Population to Protect	Recreation	Thue Ballfields/ Flynn Field	Public
Madison	Madison	1010 NE 1st Street	Population to Protect	Recreation	Baughman/Belatti Park	Public
Madison	Madison	SD Hwy 34 and 456 Avenue	Non-Emergency Response Facility	Sanitary Sewer	Wastewater Treatment Facility	Public
Madison	Madison	209 E Center Street	Population to Protect	Building	Madison Library	Public
Madison	Madison	NW 4th Street and North Union Avenue	Non-Emergency Response Facility	Water Supply	Water Tower	Public
Madison	Madison	NE 9st Street and North Heatherwood Avenue	Non-Emergency Response Facility	Water Supply	Water Tower	Public
Madison	Madison	NW 4th Street and North Blanche Avenue	Population to Protect	Recreation	Memorial Park	Public

Jurisdiction/ Entity	Location	Address	Sector	Sub Sector	Name	Owner Type
Madison	Madison	SE 1st Street and South Harth Avenue	Population to Protect	Recreation	Library Park	Public
Madison	Madison	119 E Center St.	Government Facility	Building	US Post Office	Public
Madison	Madison	NE 7th Street and Roosevelt Avenue	Population to Protect	Recreation	Totland Park	Public
Madison	Madison	NW 9th Street and Highland Avenue	Population to Protect	Recreation	Northwest Park	Public
Nunda	Nunda	410 Main St.	Emergency Services	Building	Fire Hall	Public
Nunda	Nunda	203 Church Dr.	Non-Emergency Response Facility	Emergency Shelter	Grace Lutheran Church	Private
Nunda	Nunda	410 Main St.	Non-Emergency Response Facility	Water Supply	Well/Pump House	Public
Nunda	Nunda	307 Mustang Dr.	Communication	Building	ITC Building	Private
Nunda	Nunda	504 Main St.	Government Facility	Building	US Post Office	Public
Nunda	Nunda	307 Elm St.	Non-Emergency Response Facility	Energy	F&M Bulk Propane Tanks	Private
Nunda	Nunda	104 Cottonwood Dr.	Government Facility	Building	Town Shed	Public
Ramona	Ramona	210 E. 3rd St.	Population to Protect	Building	Ramona Assisted Living Center	Private
Ramona	Ramona	220 W. 2nd St.	Public Institution	Building	Oldham/Ramona School	Public
Ramona	Ramona	120 S. Railway Ave.	Non-Emergency Response Facility	Emergency Fuel Facility	Elevator	Private
Ramona	Ramona	141 S. Railway Ave.	Non-Emergency Response Facility	Emergency Fuel Facility	Gas Station	Private
Lake County	Ramona	100 W. Main St.	Government Facility	Building	County Highway Shop	Public
Ramona	Ramona	150 E. 4th St.	Population to Protect	Housing	Apartment Building	Private
Ramona	Ramona	151 W. Main St.	Population to Protect	Housing	Apartment Building	Private
Ramona	Ramona	130 W. Pleasant Ave.	Non-Emergency Response Facility	Sanitary Sewer	Lift Station	Public
Ramona	Ramona	131 N. Pearce Ave.	Government Facility	Building	Town Equipment Shop	Public

Jurisdiction/ Entity	Location	Address	Sector	Sub Sector	Name	Owner Type
Ramona	Ramona	130 E. 2nd St.	Non-Emergency Response Facility	Water Supply	Water Tower/Well	Public
Ramona	Ramona	110 E. 2nd St.	Communications	Building	Alliance Communications Building	Private
Ramona	Ramona	217 E. Main St.	Government Facility	Building	US Post Office	Public
Ramona	Ramona	230 E. Main St.	Emergency Services	Building	Fire Hall	Public
Ramona	Ramona	44974 225th St.	Non-Emergency Response Facility	Sanitary Sewer	Sewer Lagoons	Public
Wentworth	Wentworth	425 S. Main	Emergency Services	Building	Fire Hall	Public
Wentworth	Wentworth	46208 233rd	Non-Emergency Response Facility	Sanitary Sewer	Sewer Lagoons	Public
Wentworth	Wentworth	103 S. Main	Communication	Building	ITC Building	Private
Wentworth	Wentworth	104 SW 1st	Population to Protect	Building	Apartments	Private
Wentworth	Wentworth	216 S. Main	Government Facility	Building	City Building	Public
Wentworth	Wentworth	316 S. Main	Non-Emergency Response Facility	Emergency Shelter	St. Peters Church	Private
Wentworth	Wentworth	201 S. Centennial	Government Facility	Emergency Shelter	Community Barn	Public
Wentworth	Wentworth	107 S Main Ave.	Government Facility	Building	US Post Office	Public

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 4.17 identifies whether each community has the specified administrative and technical capabilities, and who serves in such capacity. Table 4.18

encapsulates the efficacy of the specified planning mechanisms with regard to disaster mitigation and to identify potential deficiencies in the specified plans.

Table 4.17: Administrative and Technical Capabilities

Administrative/ Staff Composition	Local Jurisdiction					
	Brant Lake	***Madison***	***Nunda***	***Ramona***	***Wentworth***	***Lake County***
Board of Adjustment	Elected Officials	Appointed	NA	NA	Elected Officials	Elected Officials
Building Official	NA	Appointed	NA	NA	NA	Appointed
Community Planner	NA	City Engineer	NA	NA	NA	Zoning Officer
Elected Officials	Trustee	Commission	Trustee	Trustee	Trustee	Commission
Emergency Manager	NA	NA	NA	NA	NA	Appointed
Engineer/Highway Superintendent	NA	Appointed	NA	NA	NA	Appointed
Floodplain Administrator	NA	City Engineer	NA	NA	Finance Officer	Zoning Officer
GIS Coordinator	NA	NA	NA	NA	NA	NA
Planning Commission	Elected Officials	Appointed	NA	Elected Officials	Elected Officials	Appointed
Zoning Officer	Finance Officer	City Engineer	NA	NA	Finance Officer	Appointed
Grant Writing Capability (Yes/No)	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*
Non-profit organizations focused on environmental protection.	No	No	No	No	No	No
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***

Table 4.18: Capabilities of Growth Guidance Instruments

Capabilities of Community Planning Mechanisms	Brant Lake	Madison	Nunda	Ramona	Wentworth	Lake County
Does the Future Land-Use Map identify natural hazard areas?	Y	Y	NA	NA	Y	Y
Do the land-use policies discourage development or redevelopment within natural hazard areas?	Y	Y	NA	NA	Y	Y
Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?	Y	Y	NA	NA	Y	Y
Does the transportation plan limit access to hazard areas?	Y	Y	NA	NA	Y	Y
Is transportation policy used to guide growth in safe locations?	Y	Y	NA	NA	Y	Y
Are movement systems designed to function under disaster conditions (e.g. evacuation)?	Y	Y	NA	NA	Y	Y
Are environmental systems that protect development from hazards identified and mapped?	N	N	NA	NA	N	N
Do environmental policies provide incentives to development that is located outside protective ecosystems?	N	N	NA	NA	N	N
Do environmental policies maintain and restore protective ecosystems?	N	N	NA	NA	N	N
Are the goals and policies of the comprehensive plan related to those of the FEMA Local Hazard Mitigation Plan?	N	N	NA	NA	N	N
Is safety explicitly included in the plan's growth and development policies?	Y	Y	NA	NA	Y	Y
Does the Zoning Ordinance conform to the comprehensive plan in terms of discouraging development or redevelopment within natural hazard areas?	Y	Y	NA	NA	Y	Y
Does the zoning ordinance contain natural hazard overlay zones that set conditions for land use within such zones?	Y	Y	NA	NA	Y	Y

Capabilities of Community Planning Mechanisms	Brant Lake	Madison	Nunda	Ramona	Wentworth	Lake County
Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use?	Y	Y	NA	NA	Y	Y
Does the zoning ordinance restrict development within, or filling of, wetlands, floodways, and floodplains?	Y	Y	NA	NA	Y	Y
Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?	NA	N	NA	NA	NA	N
Do the subdivision regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?	NA	N	NA	NA	NA	N
Do the subdivision regulations allow density transfers where Hazard areas exist?	NA	N	NA	NA	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 2013 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 establishment of baseline statistics for future development and disaster mitigation plans. The information provided in the following tables was collected from the Lake County Director of Equalization. Inconsistencies and missing information result from lack of existing mechanisms, plans, and technical documents available.

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 each structure on a 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 updated flood hazard area (Zone “A”) boundaries and other discovery documents provided by FEMA in 2017. If it was determined any structures on the applicable lot were located within the flood hazard area, the total assessed value for structures on said lot was included in the value of structures in the hazard area. The information does not account for letters of map amendment or letters of map revision which may have been approved.

Lake County, as the name suggests, is home to numerous resorts. On these resorts numerous manufactured homes, campers, and cabins primarily used for seasonal dwelling are located adjacent to the shores of numerous lakes. At least three such resorts were identified during the review of vulnerable structures. No estimates for values of the seasonal dwellings were available with the assessment information. Over sixty (60) structures, presumably for seasonal occupation, were identified as located in the floodplain but are not accounted for in the valuation or population estimates provided in Tables 4.19 – 4.25.

All properties with structures, whether owner occupied or not were included in the valuations provided in Tables 4.19 through 4.28. 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. It should be noted that the number of structures references the number of parcels with structures of a certain land use category. In cases where a residential use and commercial use occupy the same parcel, they are counted under each category. Some parcels with “Residential” structures only include garages/storage buildings or other accessory structures but no residence. However, when reviewing the number of people and estimated value of structures in the flood plain in Lake County and Madison, specific information assessment data regarding each parcel was utilized to determine which structure(s) were in the floodplain and their value. To determine the number of people in the hazard area, the number of housing units located in the hazard area was multiplied by the average number of residences per household in Lake County and Madison. The following tables also do not address information regarding religious, governmental, or utility structures. Although not included in Tables 4.19 through 4.28, the State of South Dakota Hazard Mitigation Plan incorporated HAZUS analysis accounting for potential losses to those structures within Lake County.

Table 4.19: Lake 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	2,824	223	7.9	$299,349,147	$12,602,118	4.2	4,121	513	12.4
Commercial/Industrial	182	6	3.3	$25,079,224	$788,600	3.1			
Agricultural	986	21	2.1	$14,195,163	$297,300	2.1			
Mobile Homes	265	21	7.9	$25,079,224	$440,233	1.8		48	1.2
Total	**4,257**	**271**	**6.4**	**$344,202,027**	**$14,128,251**	**4.1**	**4,121**	**561**	**13.6**

Table 4.20: Brant Lake 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	57	0	0	$8,259,661	0	0	51	0	0
Commercial/Industrial	0	0	0	$73,009	0	0			
Agricultural	0	0	0	$0	0	0			
Manufactured Home	0	0	0	$525	0	0			
Total	**57**	**0**	**0**	**$8,259,661**	**0**	**0**	**51**	**0**	**0**

Table 4.21: Madison 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	2,113	213	10.1	$173,349,765	$12,108,800	7.0	6,474	469	7.2
Commercial/Industrial	367	30	8.2	$74,789,800	$9,938,600	13.3			
Agricultural	5	0	0.0	$46,800	$0	0.0			
Manufactured Home	107	2	1.9	$1,192,915	$33,766	2.8		6	0.1
Total	**2,592**	**245**	**9.5**	**$249,379,280**	**$22,081,166**	**8.9**	**6,474**	**475**	**7.3**

Table 4.22: Nunda 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	$505,000	0	0	43	0	0
Commercial/Industrial	7	0	0	$112,400	0	0			
Agricultural	4	0	0	$165,500	0	0			
Manufactured Home	7	0	0	$79,162	0	0		0	0
Total	**41**	**0**	**0**	**$862,062**	**0**	**0**	**43**	**0**	**0**

Table 4.23: Ramona 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	85	5	5.9	$2,971,200	$194,300	6.5	174	11	6.3
Commercial/Industrial	20	0	0	$1,371,600	0	0			
Agricultural	4	0	0	$18,000	0	0			
Manufactured Home	6	0	0	$102,936	0	0			
Total	**115**	**5**	**4.3**	**$4,463,736**	**$194,300**	**4.4**	**174**	**11**	**6.3**

Table 4.24: Wentworth 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	87	15	17.2	$2,863,600	$381,100	13.3	337	33	9.8
Commercial/Industrial	16	6	37.5	$511,400	$61,200	12.0			
Agricultural	0	0	0	$0	$0	0			
Manufactured Home	7	7	100.0	$118,057	$118,057	100.0		16	4.8
Total	**114**	**28**	**24.6**	**$3,493,057**	**$567,991**	**16.3**	**337**	**49**	**14.6**

Table 4.25: Lake 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	5,189	456	8.8	$485,298,373	$25,286,318	5.2	11,200	1,026	9.2
Commercial/Industrial	592	42	7.1	$101,864,424	$10,788,400	10.6			
Agricultural	999	25	2.5	$14,425,463	$297,300	2.1			
Manufactured Home	398	30	7.5	$7,071,563	$599,690	8.5		70	0.6
Total	**7,718**	**555**	**7.2**	**$610,659,823**	**$36,703,708**	**6.0**	**11,200**	**1,096**	**9.8**

Table 4.26 is an overall summary of vulnerability by utility provider produced from information gathered from the providers.

Table 4.26: Utilities Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Utility Provider	Total Number of Structures	Total Value of Structures	HAZARDS			
				Flood	Strong Winds	Tornado	Winter Storms
Poles	Electric	11,469	$21,719,500	Yes	Yes	Yes	Yes
Overhead Transformers	Electric	758	$1,300,000	Yes	Yes	Yes	Yes
Underground Transformers	Electric	2,058	$7,020,000	Yes	No	No	No
Underground Cabinets	Electric	668	$8,311,000	Yes	No	No	No
Underground Pedestals	Electric	1,311	$1,322,000	Yes	No	No	No
Miles of Underground Line	Electric	381	$29,877,000	Yes	No	No	No
Miles of Overhead Line	Electric	527	$28,723,360	Yes	Yes	Yes	Yes
Substations	Electric	3	4,500,000	Yes	Yes	Yes	Yes

Type of Structure	Utility Provider	Total Number of Structures	Total Value of Structures	HAZARDS			
				Flood	Strong Winds	Tornado	Winter Storms
Pad Mount Switches	Electric	72	$1,296,000	Yes	No	Yes	No
Generation Plant	Electric	1	$4,500,000	No	No	Yes	No
Treatment Plants	Water	1	$1,600,000	No	Yes	Yes	No
Storage Reservoirs	Water	2	$2,000,000	No	Yes	Yes	No
Wells	Water	9	$450,000	No	No	No	No
Pump Stations	Water	2	$550,000	No	Yes	Yes	No
Miles of Underground Pipeline	Water	325	N/A	No	No	No	No

SOURCE: Sioux Valley Energy, Madison Utility and BSCWS

Notes:

 # in HA: Number of structures in hazard area utilized county assessment data to identify the number of properties of a given use type, with structures located within the floodplain. Aerial photography, Comprehensive Land Use Plans, and DFIRM boundaries, Discovery Map data (updated Zone A boundaries and flood depth information for "ANI" identified property in Wentworth and Nunda) provided by FEMA were used for identification. Some structures included may have received LOMA's, removing them from the flood plain, since the effective date of the current DFIRM.

$ in HA: Value of structures in hazard area was estimated by extrapolating assessed valuations of structures on parcels which had a primary structure within the hazard area. This data was provided by the Lake County Department of Equalization and is classified by land use.

 # in [Jurisdiction]: The number of people was based on the 2010 Census. [Special Note: The Comprehensive Land Use Plan for Brant Lake indicates a population of approximately 100 individuals in 2016. Since all other population estimates are based upon the 2010 Census, the estimate provided by the 2017 Census estimator for 2010 was used in the above tables.]

 # 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).

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

Most of Lake County is in the Big Sioux River Watershed, therefore Lake 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 4.29

FEMA updated the HAZUS modeling based on 2010 Census information as part of a nationwide study. Data from Lake County was extracted to produce a specified report for the purposes of this plan. It should be noted that the data represented in Figure 4.1 is intended to identify those areas most prone to flooding in Lake County, rather than to provide a precise prediction of losses in a base flood (1 percent chance). Since no flood elevations have been established for most portions of Lake County, the HAZUS data, though not precise is the best available data for projecting flood losses in Lake County at the present time.

Figure 4.1: Lake County Flood Hazard Vulnerability Map

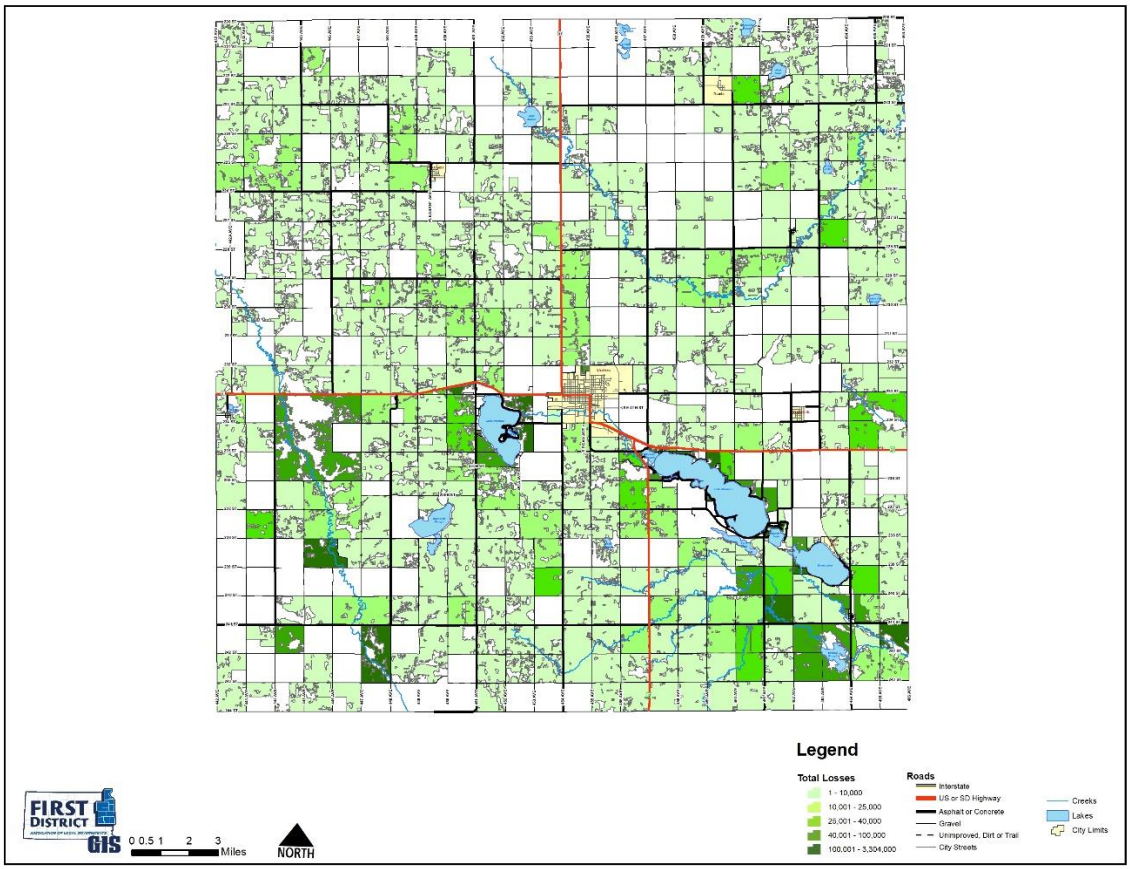


Table 4.27: HAZUS-MH Base Flood (1 Percent Chance) Loss Estimation Results (2011)

Building Damage	Loss Ratio*	Contents Damage and Inventory Loss	Total Economic Building Loss	Number of Displaced People	People Needing Shelter
8,740,000	1.1%	11,306,000	20,841,000	1,128	664

SOURCE: *State of South Dakota Hazard Mitigation Plan. p 3-147; Table 3-41.South Dakota Office of Emergency Management. 2011.*

*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 from1950 – 2010 was calculated, inflated to current (2009) dollars. A loss ratio was then calculated by dividing the total damage by the total building exposure. Table 4.30 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 were also analyzed on a statewide scale. According to the National Climatic Data Center Storm Events database, there were 1,592 tornadoes in South Dakota between January 1950 and April 2010. Of those, 61 were rated as an F3 event, 6 as an F4, and 1 as an F5. Total property damage for these events is estimated at $643 million. This suggests that South Dakota experiences 10 tornadoes and $10.5 million in losses each year. There were 17 deaths and 441 injuries in this time period, which averages out to approximately eight injuries each year. Of these storms, five resulted in major disaster declarations, with a total relief cost estimated at $148,686,613 in 2008 dollars. This averages out to $29.737 million (also in 2008 dollars) per major disaster. Based on the frequency of events, South Dakota averages one major disaster level tornado every 318 events or approximately every 12 years. The total historic losses and annualized losses by county are presented.

Table 4.28: Lake County Annualized Losses from Tornadoes

Total Events 1950-2010	Total Property Damage (inflated) 1950-2010	Annualized Losses	Total Building Exposure	Loss Ratio
20	5,627,940	93,799	799,974,000	0.00012

SOURCE: *State of South Dakota Hazard Mitigation Plan. P.3-174; Table 3-67. South Dakota Office of Emergency Management 2011.*

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. Multiple communities within Lake County are experiencing growth and have comprehensive land use plans which identified future areas for development. In addition to Lake County, the cities of Madison and Wentworth have adopted Comprehensive Land Use Plans with Future Land Use Maps. The municipality of Brant Lake is nearing completion of its first Comprehensive Land Use Plan during the preparation of this plan. 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. Madison, the only community for which a National Flood Insurance Program Flood Hazard Map has been prepared, approved recommended ordinances for the proper regulation of property within the floodplain. Tables 4.29 – 4.32 identify the projected vulnerability for communities which have adopted land use plans. Future Land Use Maps for each jurisdiction which have adopted Comprehensive Land Use Plans are included in Appendix G.

Table 4.29: Lake County (Unincorporated Area)
Potential Floodplain Development – By Land Use Type

	Community Totals		**Flood Hazard Area**			
Land Use Category	Projected Development Density (Acres/Unit)	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
Ag – Residential	40	N/A	80	N/A	2	1
Lake – Residential	2	N/A	N/A	N/A	44	44
Commercial	.25	N/A	N/A	N/A	0	0
Industrial	.5	N/A	N/A	N/A	0	0

N/A: Most of the rural area is planned to remain agricultural in use with varying degree of land use restrictions.

Table 4.30: Town of Brant Lake
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	4.3	0.0	0	0	0
Commercial	1	0	0.0	0	0	0
Industrial	0.25	0	0.0	0	0	0

Table 4.31: City of Madison
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	227	29	12.8	510	87
Commercial	1	120	1	0.8	120	1
Industrial	0.25	25	0	0.0	6	3

***Areas for future development type within city limits**

Table 4.32: Town of Wentworth
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	18	6	33.3	15	6
Commercial	1	0	0	0.0	0	0
Industrial	0.25	12	4	33.3	1	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.

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 Lake County PDM.

On the following pages, a hazard vulnerability map is shown for each of the jurisdictions participating in this PDM process. The maps identify critical infrastructure. 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. 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 4.1 through 4.7).

Figure 4.2: Lake County Hazard Vulnerability Map

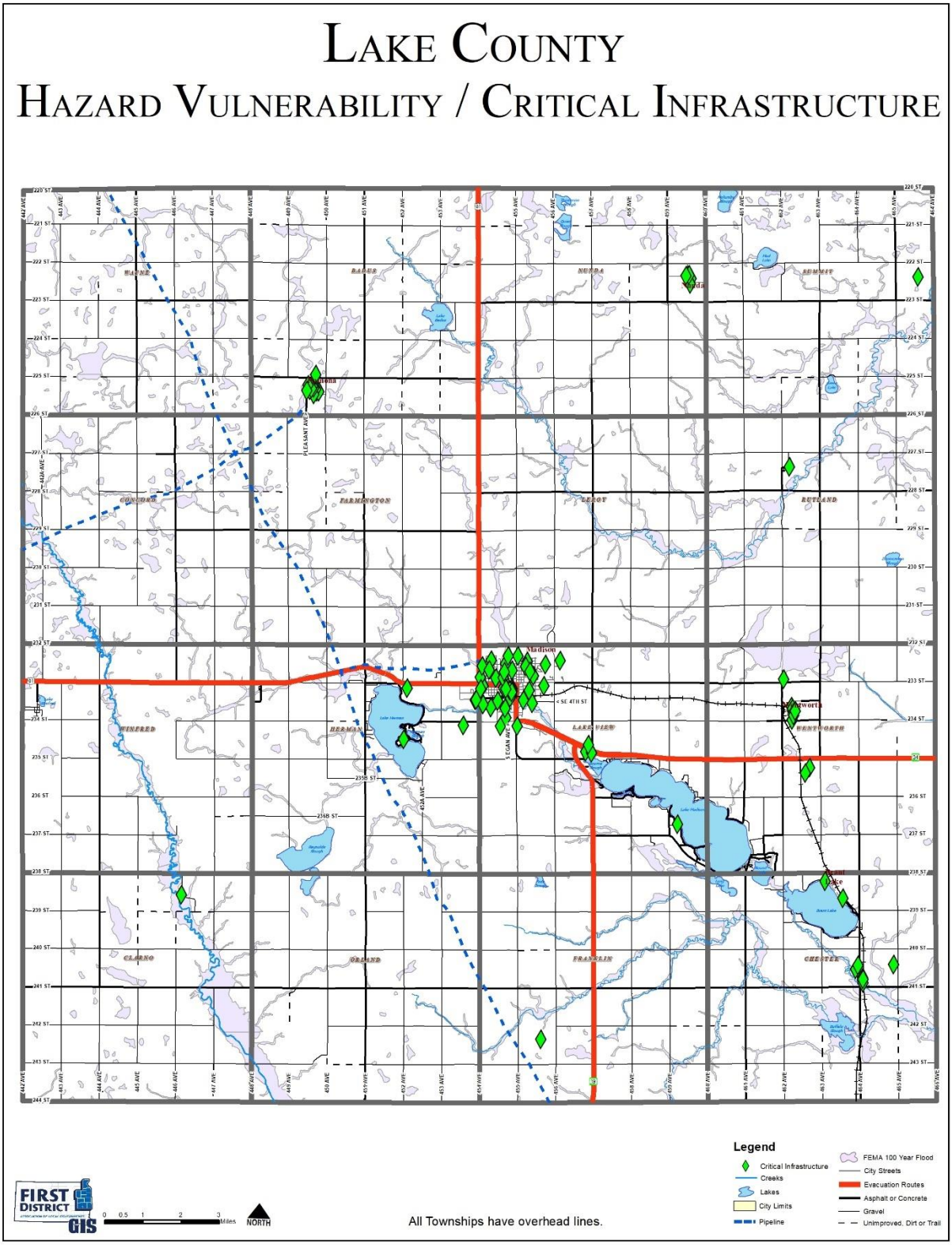


Figure 4.3: City of Brant Lake Hazard Vulnerability Map

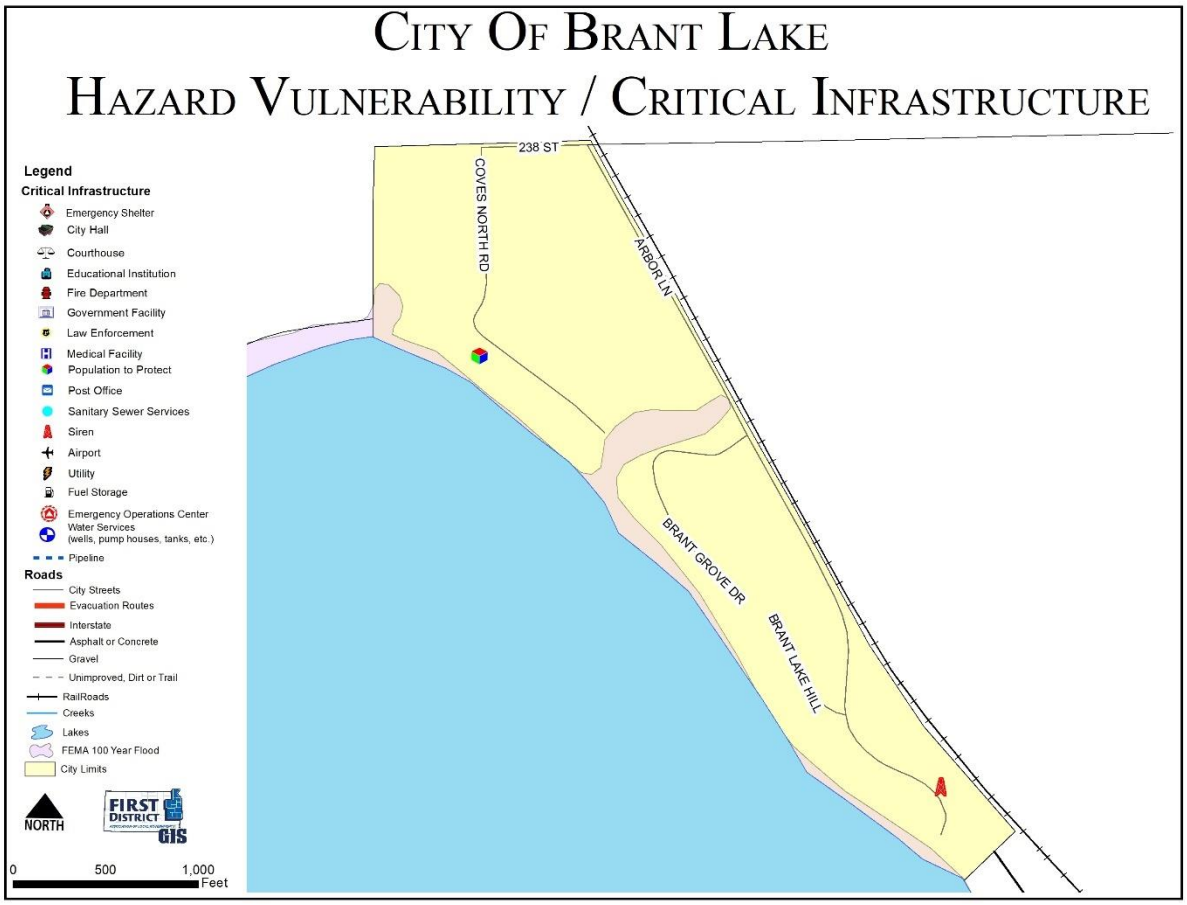


Figure 4.4: City of Madison Hazard Vulnerability Map

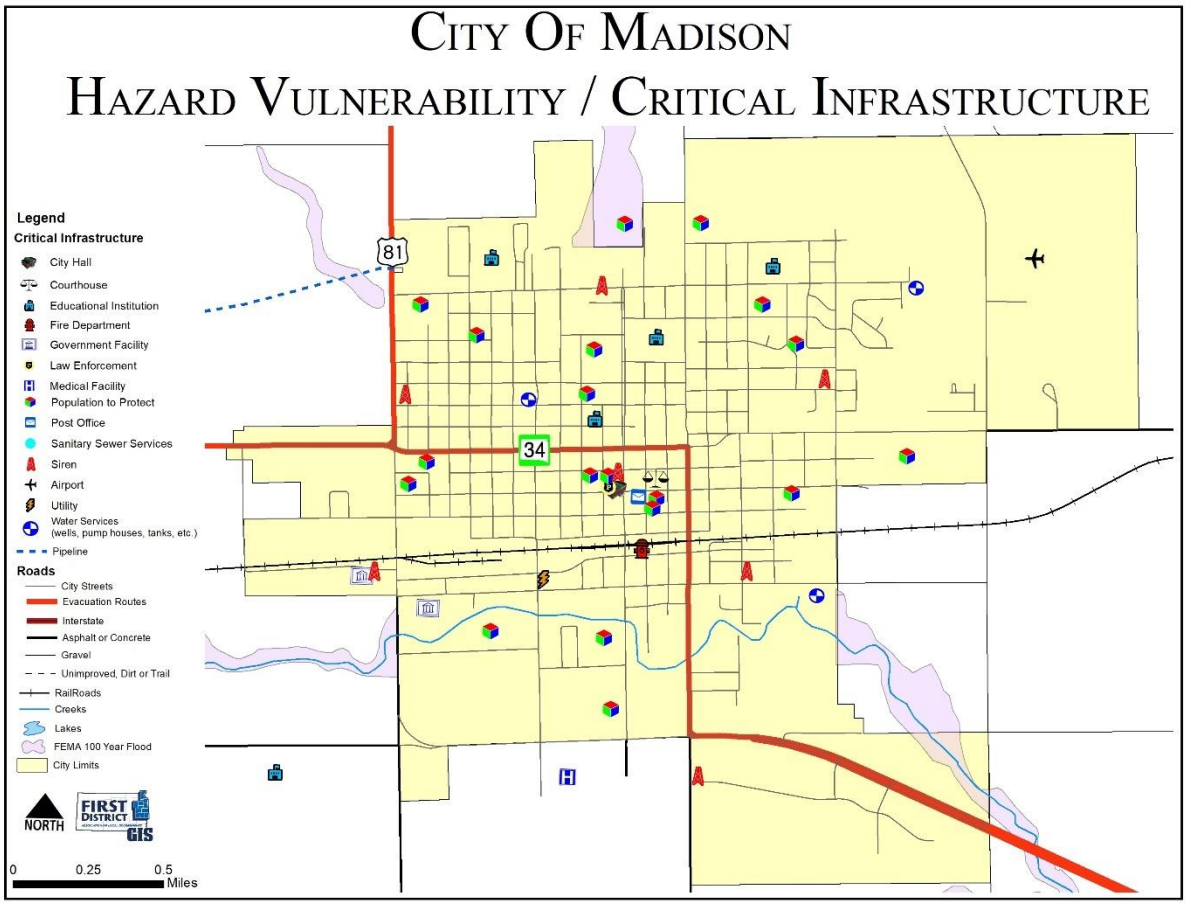


Figure 4.5: Town of Nunda Hazard Vulnerability Map

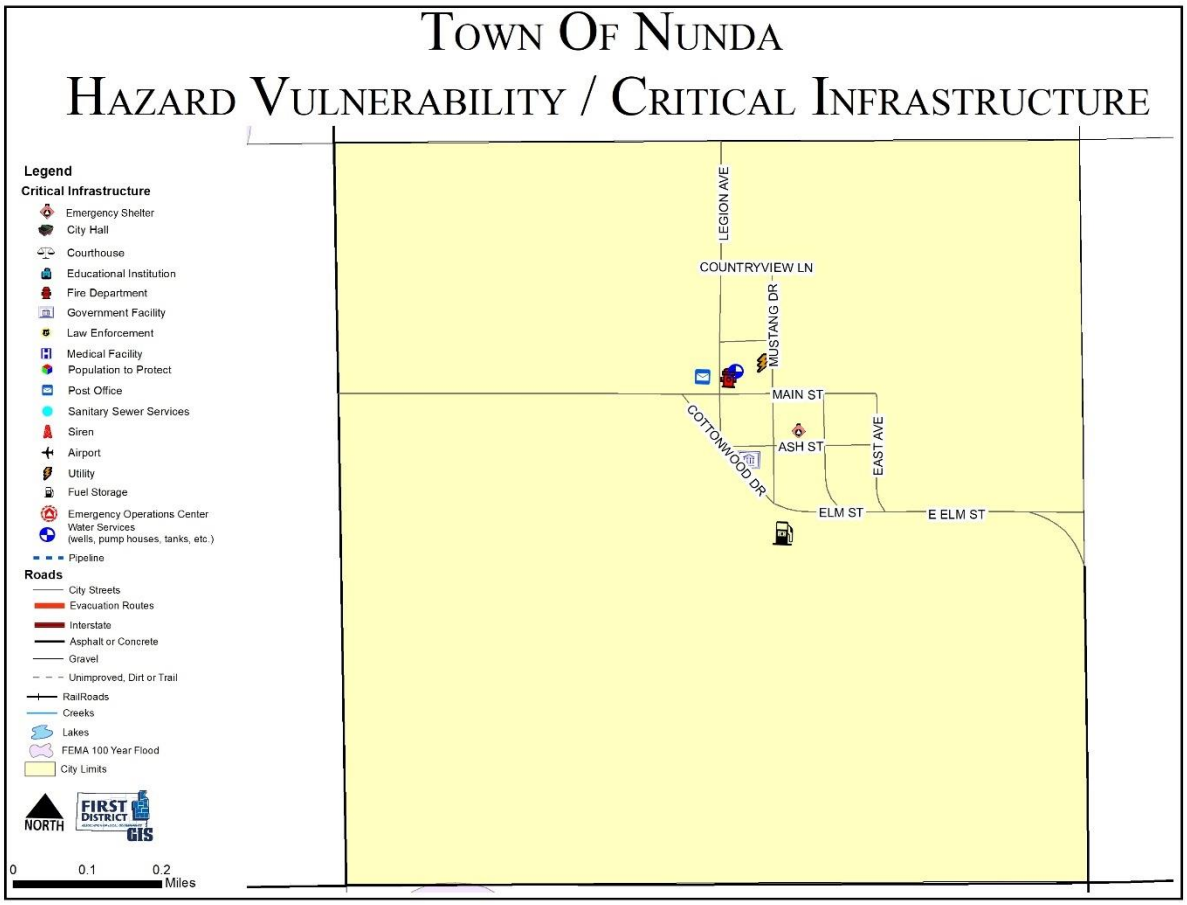


Figure 4.6: Town of Ramona Hazard Vulnerability Map

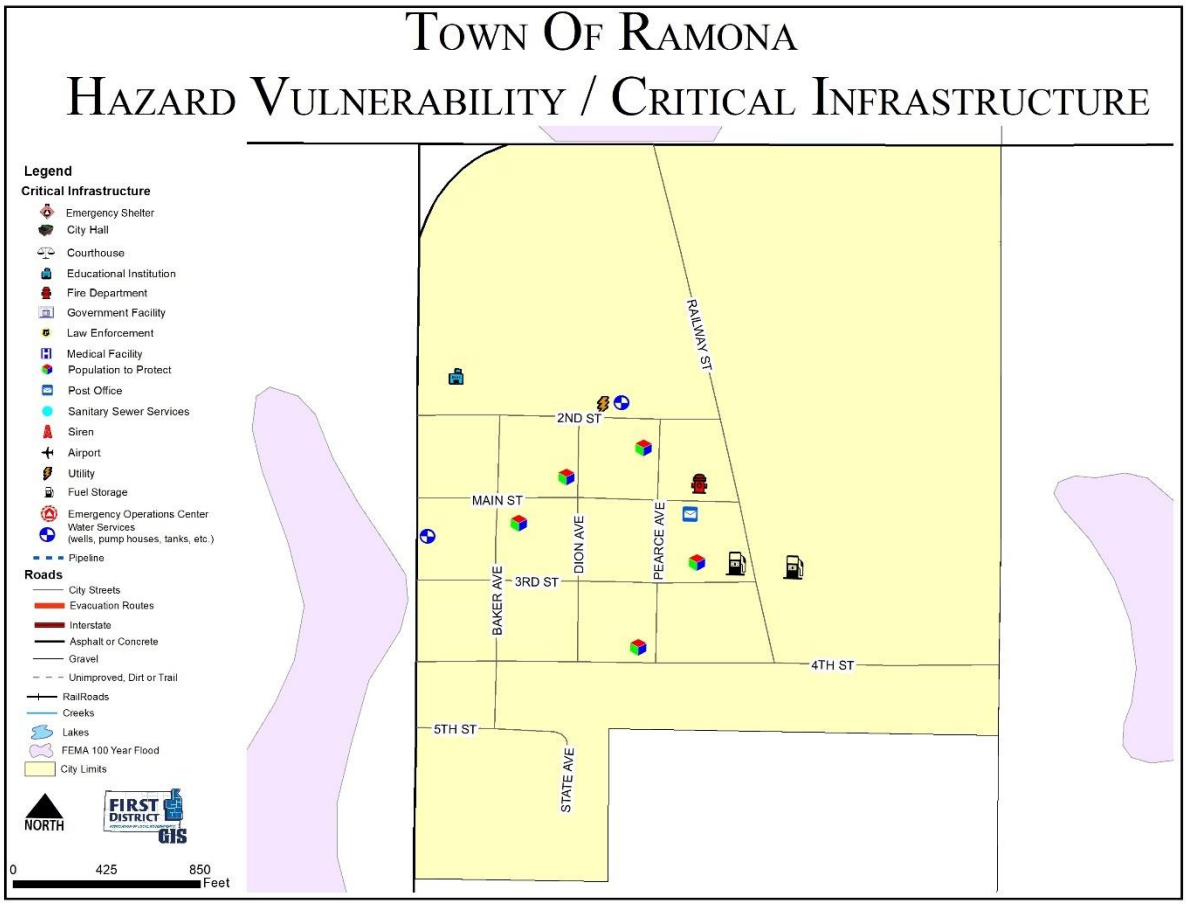


Figure 4.7: Town of Wentworth Hazard Vulnerability Map

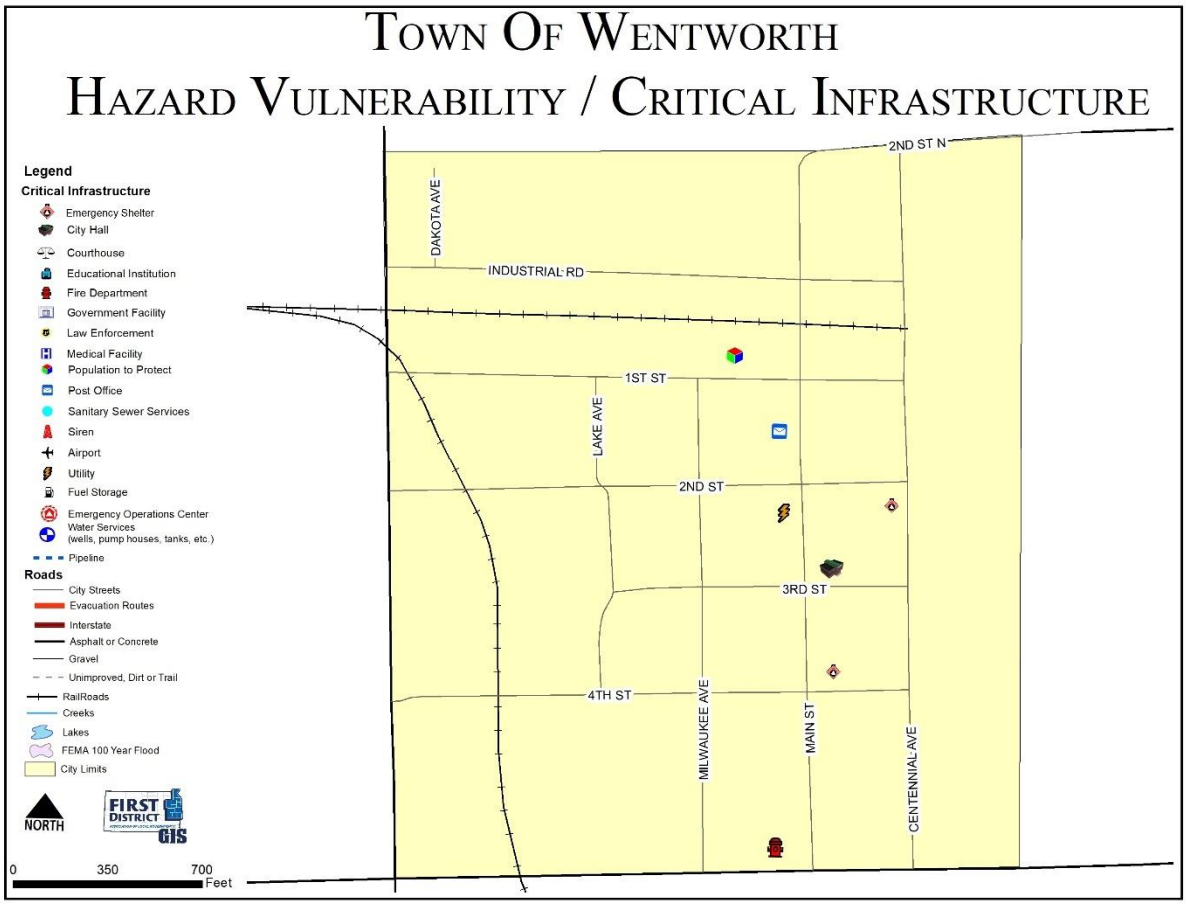
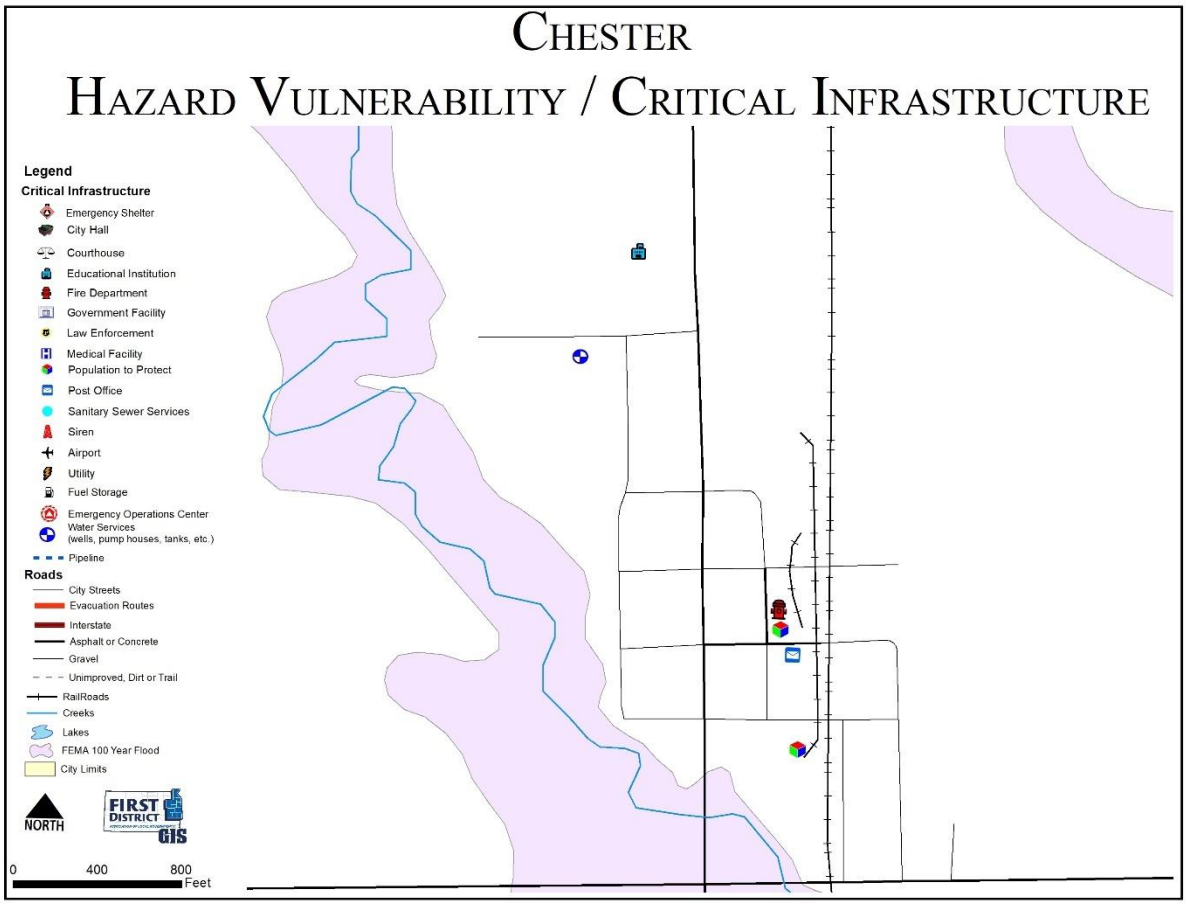


Figure 4.8: Chester Village Hazard Vulnerability Map



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 previous 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 5.8.

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 Lake County from flooding.
Goal #2: Educate and inform Lake 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 severe weather hazards (See Table 5.6)**

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

Problem Statements	Actions	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake 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.	✓	✓	✓	✓	✓	✓

Problem Statements	Actions	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake County*
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.			✓	✓		
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	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake County*
Portions of storm sewer system is not designed to 100-year flood event	Installing or upgrading storm sewer piping.		✓				
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 storm sewer system.	✓	✓		✓	✓	
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	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake County*
Many roads and bridges were built prior to identification of flood hazard areas	Replace and raise bridges		✓				✓
	Elevating roads 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	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake 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	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake 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	✓	✓	✓	✓	✓	✓
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	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake 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 Lake County.
Goal #3: Reduce the negative effects wildfires have on Lake County.

- **Actions/Projects to reduce fire and drought risks through policy implementation (See Table 5.7)**

- **Actions/Projects to change the characteristics or impacts of fire and drought hazards (See Table 5.8)**

- **Actions to reduce loss potential of infrastructure to 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	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake 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	Educate residents on the benefits of conserving water at all times, not just during a drought.	✓	✓	✓	✓	✓	✓

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

Problem Statements	Actions	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake 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	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake County*
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	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake 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.	✓	✓	✓	✓	✓	✓

Table 5.11: Planning Activities

Problem Statements	Actions	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake 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	*Brant Lake*	*Madison*	*Nunda*	*Ramona*	*Wentworth*	*Lake 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 2013 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 do 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 and 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 most 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 electric utility providers was the burying of overhead lines in rural areas of the county.

In addition, a meeting at which all township supervisors were invited was held on March 12, 2018. At that meeting 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. Not all townships submitted the maps with potential activities; however the appendix includes maps of vulnerable sites and potential mitigation actions proposed by the townships in the County.

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

LAKE COUNTY PROBLEM STATEMENTS	LAKE COUNTY ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Enhance public education on a regional scale, aimed at mitigating natural hazards and reducing the risk to citizens, public agencies, private property, businesses, and schools.	Educate and develop outreach programs and materials. Develop curriculum for schools. Familiarize public officials of requirements regarding public assistance for disaster response. Encourage individual and family preparedness. Make the PDM Plan available online.	Medium	Ongoing	Emergency Management Director and Commission Administrative Officer	Unknown	County, Municipal, Private	All	Improve public safety during hazardous conditions
Integrate goals and action items from PDM Plan into existing regulatory documents, where appropriate.	Integrate into comprehensive land use plan and zoning ordinances. Ensure current building plans do not encroach on known hazard areas.	Medium	Ongoing	Zoning and Drainage Officer	Unknown	County	Flooding and Fire	Protect specific areas of Lake County from floods

LAKE COUNTY PROBLEM STATEMENTS	LAKE COUNTY ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Identify and pursue funding opportunities to develop and implement local and county mitigation activities.	Identify funding programs that may support mitigation activities. Allocate county resources to those projects.	Medium	Ongoing	County Emergency Management Director and Highway Superintendent	Unknown	County	All	Improve public safety during hazardous conditions
Identify areas of high risk and develop strategies to mitigate those risks.	Develop inventories of at-risk buildings and infrastructure and prioritize mitigation projects.	Medium	Ongoing	County Emergency Management Director	Unknown	County	All	Improve public safety during hazardous conditions
Upgrade communications and maintain existing communications equipment.	Upgrade emergency communications to full P25 compliance. Invest in necessary upgrades.	High	Medium	County 911 Communications Director; County Sheriff; Local Emergency Responders; County Emergency Management Director	Unknown	County, Municipal, Private, PDM, HMCP, DHS	All	Improve public safety during hazardous conditions

LAKE COUNTY PROBLEM STATEMENTS	LAKE COUNTY ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Maintain existing warning siren systems and upgrade, as needed.	Develop a protocol for testing warning sirens. Invest in necessary upgrades. Enhance communication capabilities between weather spotters and emergency services.	High	Short	County Emergency Management Director	Unknown	County, Municipal, Private, PDM, HMCP, DHS	Severe Storms and Tornado	Improve public safety during hazardous conditions
Analyze each repetitive flood property. Identify appropriate and feasible mitigation activities for identified repetitive flood properties.	Contact repetitive loss property owners to discuss mitigation activities. Explore options for incentives. Use mapping data.	Medium	Medium	County Emergency Management Director and Zoning and Drainage Officer	Unknown	County	Flooding	Improve public safety during a flooding event
Recommend revisions to requirements for development within the floodplain, where appropriate.	Evaluate elevation requirements. Explore raising the base elevation. Identify alternatives to reduce development in the floodplain.	Low	Medium	Zoning and Drainage Officer	Unknown	County	Flooding	Improve public safety during a flooding event

LAKE COUNTY PROBLEM STATEMENTS	LAKE COUNTY ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Enhance data and mapping for floodplain information within the county, identify and map flood-prone areas outside of designated floodplains.	Use mapping data to update flood-loss estimates. Map culverts in unincorporated areas of the county.	Low	Medium	Zoning and Drainage Officer	Unknown	County	Flooding	Improve public safety during a flooding event
Encourage development and dissemination of maps relating to fire hazard and help educate and assist builders and homeowners in being engaged in fire mitigation activities and to help guide emergency services during response.	Conduct risk analysis using GIS technology. Update maps.	Low	Medium	Zoning and Drainage Officer	Unknown	County and Municipal	Fire	Protect citizens & reduce damages to residences & businesses during fire events

LAKE COUNTY PROBLEM STATEMENTS	LAKE COUNTY ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Enhance strategies for debris management for severe winter storm events and windstorm events.	Develop coordinated management strategies for deicing roads, plowing snow, clearing roads of fallen trees, debris from public and private property.	Medium	Short	County Highway Superintendent and Municipal Public Works Directors	Unknown	County and Municipal	Winter and Severe Storms and Tornado	Improve public safety during hazardous conditions
Increase public awareness of severe winter storm mitigation activities.	Collect information on public educational materials for protecting life, property, and the environment from severe winter storm events. Distribute educational materials regarding evaluation routes during road closure.	Medium	Short	County Emergency Management Director	Unknown	County	Severe Winter Storms	Improve public safety during hazardous conditions
County mobile homes at risk during severe storm events	Check all mobile homes are properly secured and anchored to ground	Medium	Ongoing	Zoning and Drainage Officer	Unknown	County	Severe Storms and Tornado	Improve public safety during hazardous conditions

LAKE COUNTY PROBLEM STATEMENTS	LAKE COUNTY ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Traveling public at risk on county roads during high water events	Raise county road grades as needed to maintain safety and access of traveling public.	Medium	Long	County Highway Superintendent	Unknown	County and HMGP/OEM	Flooding	Improve public safety during hazardous conditions
Promote NOAA weather radio usage	Periodic newspaper articles promoting the purchase and usage of weather radios by County residents	Medium	Ongoing	Lake County Emergency Manager	$100	County	All	Improve public safety during hazardous conditions
Educate County residents regarding risks, vulnerability and mitigation activities for hazardous events	Periodic newspaper articles Severe Weather Awareness, Winter Weather Awareness and Fire Prevention Weeks	Medium	Ongoing	Lake County Emergency Manager	$100	County	All	Improve public safety during hazardous conditions

BRANT LAKE PROBLEM STATEMENTS	BRANT LAKE ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Potential loss of power for sewer system grinder pumps during an emergency event	Purchase of portable generators	Medium	Medium	Brant Lake City Council	$100,000	HMGP/OEM, City, USDA	Severe Weather Hazards	Reduce the extent to which utility interruptions affect areas during severe weather situations
Improve safety and firefighting capability of local fire department	Purchase required firefighting equipment for fire department	Medium	Medium	Brant Lake City Council and Fire Department	N/A	HMGP/OEM, City, FD, AFG, USDA	Fire	Increase firefighting capabilities
Improve safety and firefighting capability of local fire department	Construct a new fire station	Medium	Medium	Brant Lake City Council and Fire Department	N/A	City, USDA, CDBG, FD	Fire	Increase firefighting capabilities
Existing warning siren is not sufficiently serving the need of City residents	Purchase and install a new storm warning siren.	High	Medium	Brant Lake City Council	$40,000	HMGP/OEM, City, USDA	Severe Weather Hazards	Improve public safety during severe weather
City does not have a Tornado Safe Room	Construction of Tornado Safe Room in city	Low	Long	Brant Lake City Council	$300,000.00	HMGP/OEM, City, USDA	Severe Storms and Tornado	Improve public safety during severe weather
Only one street access to community	Construct a second street access into community	High	Short	Brant Lake City Council	N/A	City, USDA	All	Improve public safety during an emergency

BRANT LAKE PROBLEM STATEMENTS	BRANT LAKE ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Shoreline erosion along lake	Construct shoreline stabilization project	Medium	Medium	Brant Lake City Council	N/A	City, Private	Flooding	Protect city property during high water events
Drainage issues within the community	Conduct a drainage study within the community	Medium	Medium	Brant Lake City Council	$25,000	City	Flooding	Improve public safety during severe weather and flooding

MADISON PROBLEM STATEMENTS	MADISON ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Improve storm water flows within city	Replace/upgrade culvert on north Blanche Avenue	Medium	Medium	Madison Engineering Department	$180,000	HMGP/OEM, City, USDA	Flooding	Protect specific areas of Madison from flooding
Improve storm water flows within city	Replace/upgrade culvert on east Center Street	High	Short	Madison Engineering Department	$180,000	HMGP/OEM, City, USDA, SD DOT	Flooding	Protect specific areas of Madison from flooding
City residences/businesses at risk of power failure during severe storms event	Bury electrical power lines in the central loop	High	Short	Madison Public Utilities Manager	$2,500,000	HMGP/OEM, City Electric Revenues	All	Reduce the extent to which electric utility interruptions affect city residents during disaster events
Improve storm water flows within city	Construct retention dam on north city limits	High	Medium	Madison Engineering Department	$10,000,000	USCOE, HMGP/PDM, City, USDA	Flooding	Protect specific areas of Madison from flooding
Improve storm water flows within city	Install curb/gutter along undeveloped streets	Low	Long	Madison Engineering Department	$50/running foot	Private, City, SD DOT	Flooding	Protect specific areas of Madison from flooding
Improve storm water flows within city	Develop plan of priorities to widen stream areas	Low	Long	Madison Engineering Department	Unknown	Private, City, SD DOT	Flooding	Protect specific areas of Madison from flooding

MADISON PROBLEM STATEMENTS	MADISON ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Improve storm water flows within city	Construct berm along Memorial Creek south of 2nd Street NE	Low	Long	Madison Engineering Department	$200,000	HMGP/PDM, City, USDA	Flooding	Protect specific areas of Madison from flooding
Improve storm water flows within city	Construct berm north of Bethel Home south on Egan Street	Low	Long	Madison Engineering Department	$200,000	HMGP/PDM, City, USDA	Flooding	Protect specific areas of Madison from flooding
Improve storm water flows within city	Construct grade raise on south Highland Avenue	Low	Long	Madison Public Works Department	$500,000	City, USDA, SD DOT	Flooding	Protect specific areas of Madison from flooding
Improve storm water flows within city	Construct berm north of Gehl/Manitou	Low	Long	Madison Engineering Department	$200,000	USCOE, City, HMGP/PDM, Private, USDA	Flooding	Protect specific areas of Madison from flooding
Improve storm water flows within city	Bridge replacement south Garfield Avenue	High	Short	Madison Engineering Department	$180,000	City, SD DOT	Flooding	Protect specific areas of Madison from flooding
Improve storm water flows within city	Replace RR trestle across Memorial Creek	Medium	Medium	Madison Public Works Department	Unknown	Railroad, City, HMGP/PDM	Flooding	Protect specific areas of Madison from flooding
Improve storm water flows within city	Bank stabilization along Memorial Creek	Low	Long	Madison Public Works Department	$150,000	City, HMGP/PDM	Flooding	Protect specific areas of Madison from flooding

MADISON PROBLEM STATEMENTS	MADISON ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Improve storm water flows within city	Maintain and improve drainage/basin areas including ROWs during dry season	Low	Long	Madison Public Works Department	N/A	HMGP/PDM, City	Flooding	Protect specific areas of Madison from flooding
Improve storm water flows within city	Bank stabilization along Silver Creek	Low	Long	Madison Public Works Department	$150,000	HMGP/PDM, City	Flooding	Protect specific areas of Madison from flooding
City residences & businesses at risk of sewer backup damages during severe storm events	Install sewer check valves in residential & business buildings	Medium	Long	Madison Public Works Department	Unknown	Private	Flooding	Reduce the extent to which sewer utility interruptions affect city residents during disaster events
City residences & businesses at risk of sewer backup damages during severe storm events	Remove sump pumps that are discharging into sewer system in residential & business buildings	Medium	Long	Madison Public Works Department	Unknown	City, Private	Flooding	Reduce the extent to which sewer utility interruptions affect city residents during disaster events
Improve storm water flows within city	Retention of water north of Madison through improvements to township roads	Medium	Long	Madison Public Works Department	Unknown	USCOE, City, HMGP/PDM	Flooding	Protect specific areas of Madison from flooding

MADISON PROBLEM STATEMENTS	MADISON ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Fire Department Building is at risk of power failure during severe storms event	Purchase of back-up generator for fire department building	High	Short	Madison Fire Chief	$50,000	OEM/HMGP, City, USDA, DHS	Severe Weather Hazards	Improve public safety during severe weather
Existing warning sirens are not sufficiently serving the need of City residents	Install a new storm warning siren at 931 NE 6th Street (High Priority)	High	Short	Madison City Finance Officer/Utility Director	$50,000	City, USDA, DHS	Severe Weather Hazards	Improve public safety during severe weather
City does not have a Tornado Safe Room at Bachman/Belatti Park	Construction of Tornado Safe Room in park	High	Short	Madison City Finance Officer	$250,000.00	HMGP/OEM, City, USDA	Tornado	Improve public safety during severe weather
Residents in mobile home courts are at risk during tornado/severe storms	Construct Tornado Safe Room to serve each mobile home court	High	Short	Madison City Finance Officer	Unknown	HMGP/OEM, City, USDA	Tornado	Improve public safety during severe weather
City does not have a Tornado Safe Room at Thue Ballfields	Construction of Tornado Safe Room at Thue Ballfields	High	Short	Madison City Finance Officer	$600,000	HMGP/OEM, City, USDA	Tornado	Improve public safety during severe weather
Debris management after disaster events	Develop and maintain coordinated strategies for debris management for severe storms	Medium	Medium	Madison Public Works & Emergency Services	Unknown	City	Severe Storms & Flooding	Improve public safety during severe weather & flooding

MADISON PROBLEM STATEMENTS	MADISON ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
City residences & businesses at risk of damages during fire events	Replace water tower	Medium	Medium	Madison Finance Officer	Unknown	City, HMGP, PDM	Fire	Protect citizens & reduce damages to residences & businesses during fire events
City residences & businesses at risk of damages during flood and fire events	Review and update city building codes as needed.	Medium	Long	Madison Engineering Department	Unknown	City	Flooding & Fire	Protect citizens & reduce damages to residences & businesses during fire events
City residences & businesses at risk of damages during fire events	Replace/upgrade water main in the city	Medium	Short	Madison Finance Officer	Unknown	City, HMGP, PDM	Fire	Protect citizens & reduce damages to residences & businesses during fire events

NUNDA PROBLEM STATEMENTS	NUNDA ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Maintain local firefighting capabilities	Ensure all fire fighters have proper equipment and training	High	On going	Fire Chief	Dependent on type of equipment and training	FEMA, Fire Department, Town, Townships	Fire	Increase safety and firefighting capabilities

RAMONA PROBLEM STATEMENTS	RAMONA ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Sanitary sewer system is at risk of failure in the event high storm water run-off/flooding	Construct improvements to the wastewater collection & lagoon systems	Medium	Long	Town Board	Unknown	OEM/HMGP, Town, USDA, SD DENR, CDBG	Flooding	Reduce the extent to which utility interruptions affect areas during flooding event
Water system is at risk of failure in the event of severe storms and storm water run-off/flooding	Construct improvements to the water system	Medium	Long	Town Board	Unknown	OEM/HMGP, Town, USDA, SD DENR, CDBG	Severe Storm and Flooding	Reduce the extent to which utility interruptions affect areas during severe storms/flooding events
Policies need to comply with this and other plans.	Update Comprehensive Land Use Plan and Zoning Regulations	Medium	Short	Town Board	$5,000	Town	Flooding	Protect Specific Areas of Ramona from floods

WENTWORTH PROBLEM STATEMENTS	WENTWORTH ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Sanitary sewer system is at risk of failure in the event high storm water run-off/flooding	Construct improvements and riprap the wastewater treatment lagoon system	Medium	Medium	Town Board	$49,900	Town	Flooding	Reduce the extent to which utility interruptions affect areas during flooding event
Drainage problems occur in portions of Wentworth	Clean drainage ditches in town	Medium	Short	Town Board	$10,000.00	HMGP/OEM, Town, USDA	Flooding	Protect specific areas of Wentworth from flooding

TOWNSHIPS PROBLEM STATEMENTS	TOWNSHIPS ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Drainage issues in portions of townships affects roads	Replace gravel washed off roads due to high water/flooding	High	Short	Township Boards	N/A	Townships	Flooding/Heavy Precipitation	Protect specific areas of Lake County from high water/floods
Drainage issues in portions of townships affects roads	Bridge replacement or rehabilitation	Medium	Medium	Lake County Highway Department and Township Boards	N/A	Lake County, Townships, BIG (SD DOT)	Flooding/Heavy Precipitation	Protect specific areas of Lake County from high water/floods
Drainage issues in portions of townships affects roads	Replace culverts	Medium	Medium	Township Boards	N/A	Townships	Flooding/Heavy Precipitation	Protect specific areas of Lake County from high water/floods
Drainage issues in portions of townships affects roads	Raise road grade	Low	Long	Township Boards	N/A	Townships	Flooding/Heavy Precipitation	Protect specific areas of Lake County from high water/floods

UTILITIES PROBLEM STATEMENTS	UTILITIES ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Overhead lines are vulnerable to freezing rain/sleet/ice	Bury power lines in areas where feasible	Medium	Medium	Sioux Valley Energy & Madison Utilities	Dependent on type of line and construction method	FEMA-HMGP, RUS, Utility Funds	Severe Winter Weather Hazards	Reduce the extent to which utility interruptions affect areas during severe weather situations
Overhead lines are vulnerable to freezing rain/sleet/ice	Rebuild critical overhead power lines to make them more resistant to damage from ice	High	Medium	Sioux Valley Energy & Madison Utilities	Dependent on type of line and construction method	FEMA-HMGP, RUS, 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 ice and high wind events	Bury power lines in areas of high traffic volume where feasible	Medium	Medium	Sioux Valley Energy & Madison Utilities	Dependent on type of line and construction method	FEMA-HMGP, RUS, 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 wind events	Bury power lines in heavily treed areas or rebuild overhead lines away from heavily treed areas	Medium	Medium	Sioux Valley Energy & Madison Utilities	Dependent on type of line and construction method	FEMA-HMGP, RUS, Utility Funds	Severe Weather Hazards (summer and winter)	Reduce the extent to which utility interruptions affect areas during severe weather situations
Overhead lines and support structures are vulnerable to flooding	Bury or rebuild overhead power lines away from flood-prone areas	Medium	Medium	Sioux Valley Energy & Madison Utilities	Dependent on type of line and construction method	FEMA-HMGP, RUS, Utility Funds	Flooding	Reduce the extent to which utility interruptions affect areas during severe weather situations

UTILITIES PROBLEM STATEMENTS	UTILITIES ACTIONS	RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Water main freezing due to colder temperatures	Bury identified water mains deeper in the ground	Medium	Medium	Big Sioux Community Water System	N/A	FEMA-HMGP, RUS, Utility Funds	Winter Weather	Reduce the extent to which utility interruptions affect areas during winter weather situations
Wave action eroding sewer lagoon berms	Rip rap sewer lagoon berms	Medium	Long	Lake Madison Sanitary District Board	Unknown	FEMA-HMGP, SD DENR, Rural Development, Utility Funds	Flooding, Severe Weather Hazards	Reduce the extent to which utility interruptions affect areas during severe weather situations
Loss of system function can cause sewer backup damages during power outages	Purchase backup power generators for system lift stations	High	Long	Lake Madison Sanitary District Board	$30,000/unit	FEMA-HMGP, SD DENR, Rural Development, Utility Funds	Power Outage, Severe Weather Hazards (summer)	Reduce the extent to which utility interruptions affect areas during severe weather situations
Lift stations are vulnerable to overland flooding	Purchase sand bags to reinforce lift stations	Low	Short	Lake Madison Sanitary District Board	Unknown	FEMA-HMGP, Utility Funds	Flooding	Reduce the extent to which utility interruptions affect areas during severe weather situations
Lift Station control panel failure during an emergency	Purchase and install new lift station control panels	High	Long	Lake Madison Sanitary District Board	Unknown	FEMA-HMGP, Utility Funds	All Hazards	Reduce the extent to which utility interruptions affect areas during severe weather situations

Figure 5.1: Lake County Potential Mitigation

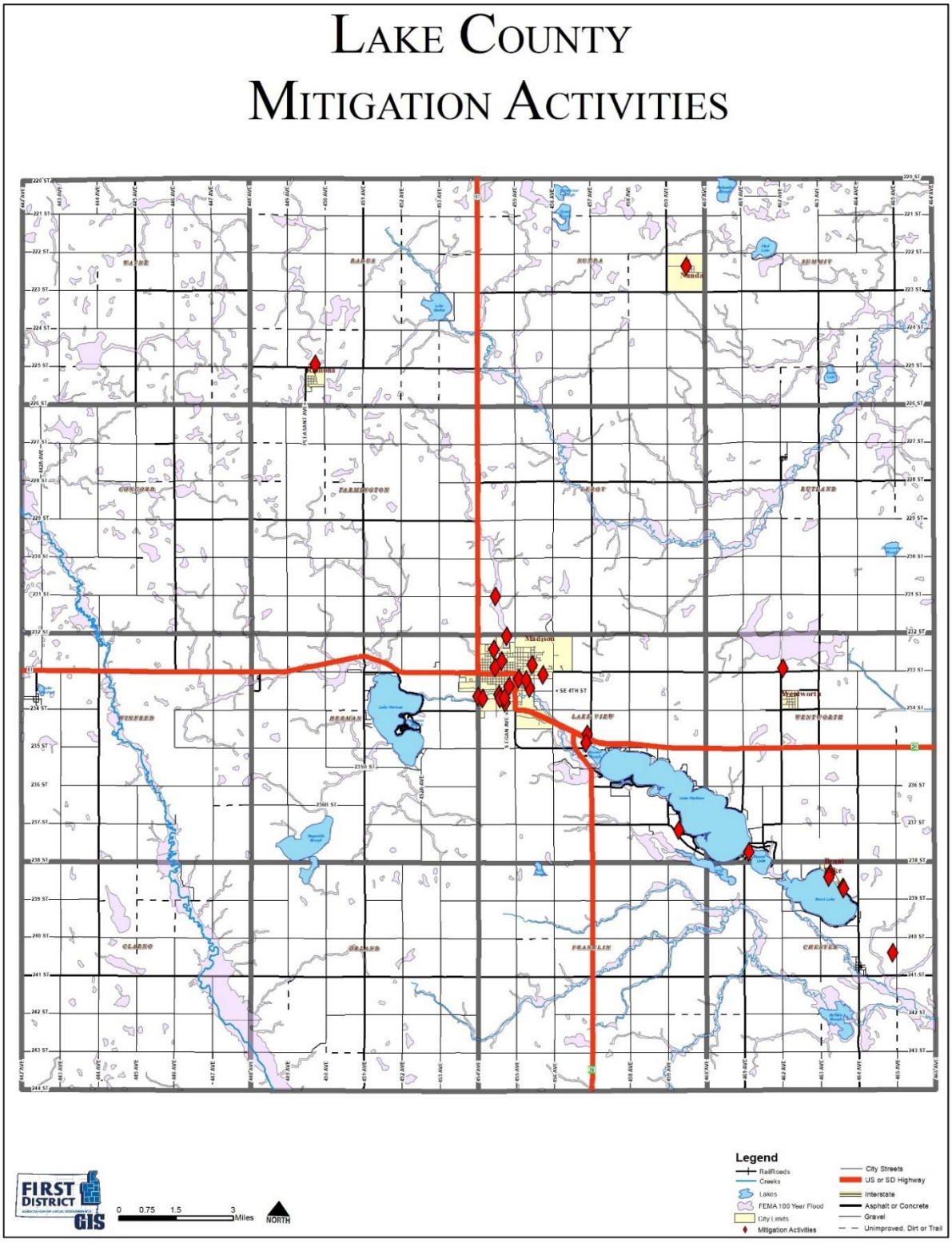


Figure 5.2: City of Brant Lake Potential Mitigation

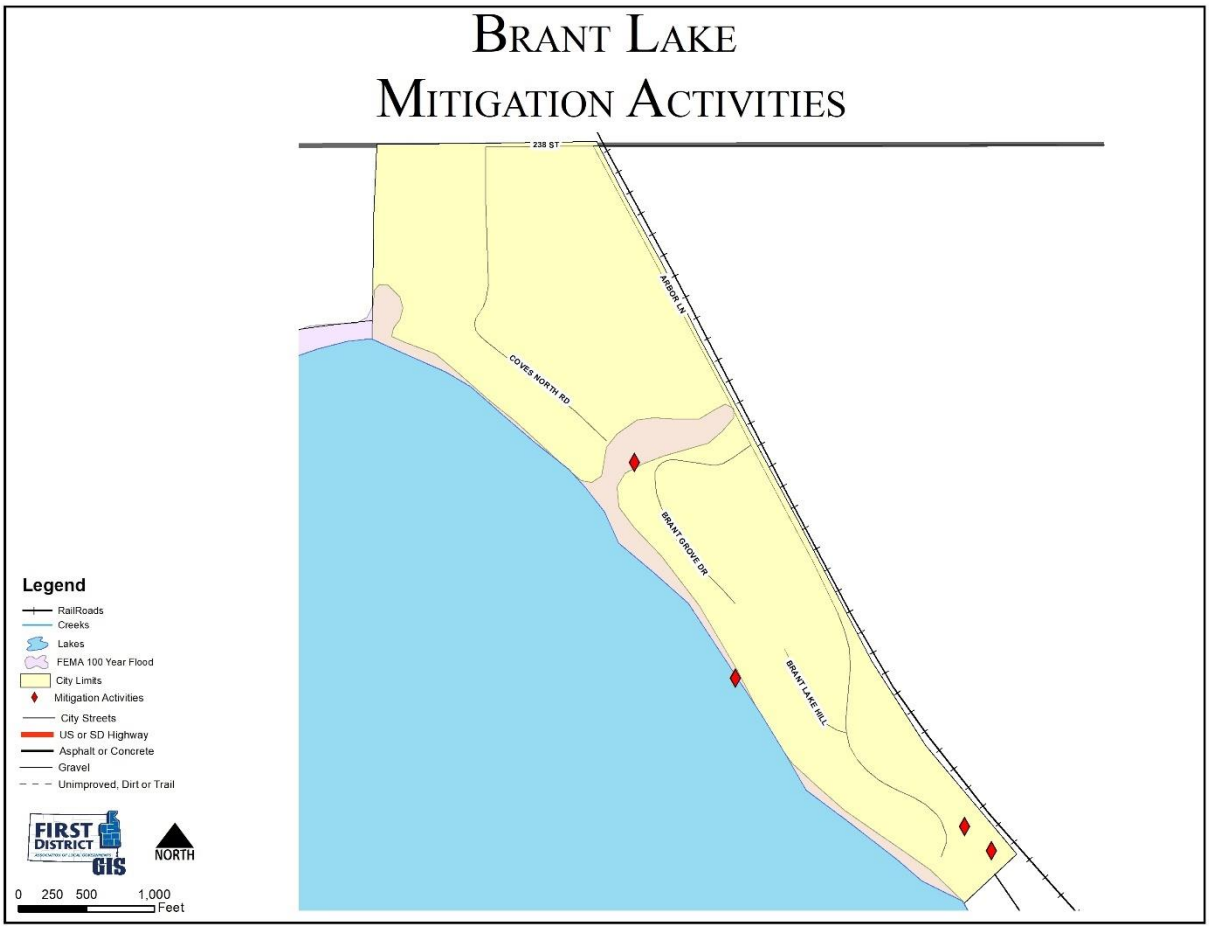


Figure 5.3: City of Madison Potential Mitigation Project Map

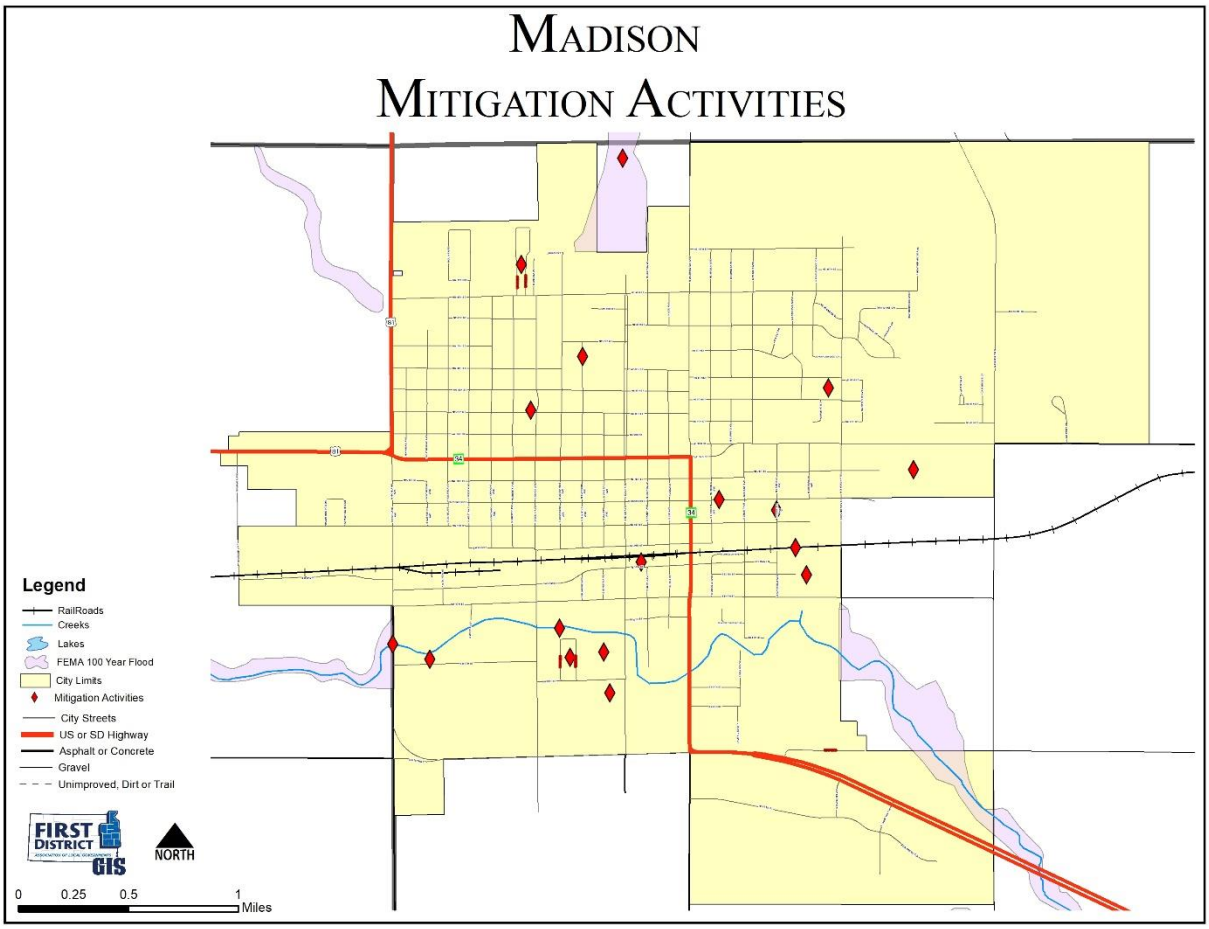


Figure 5.4: Town of Nunda Potential Mitigation Project Map

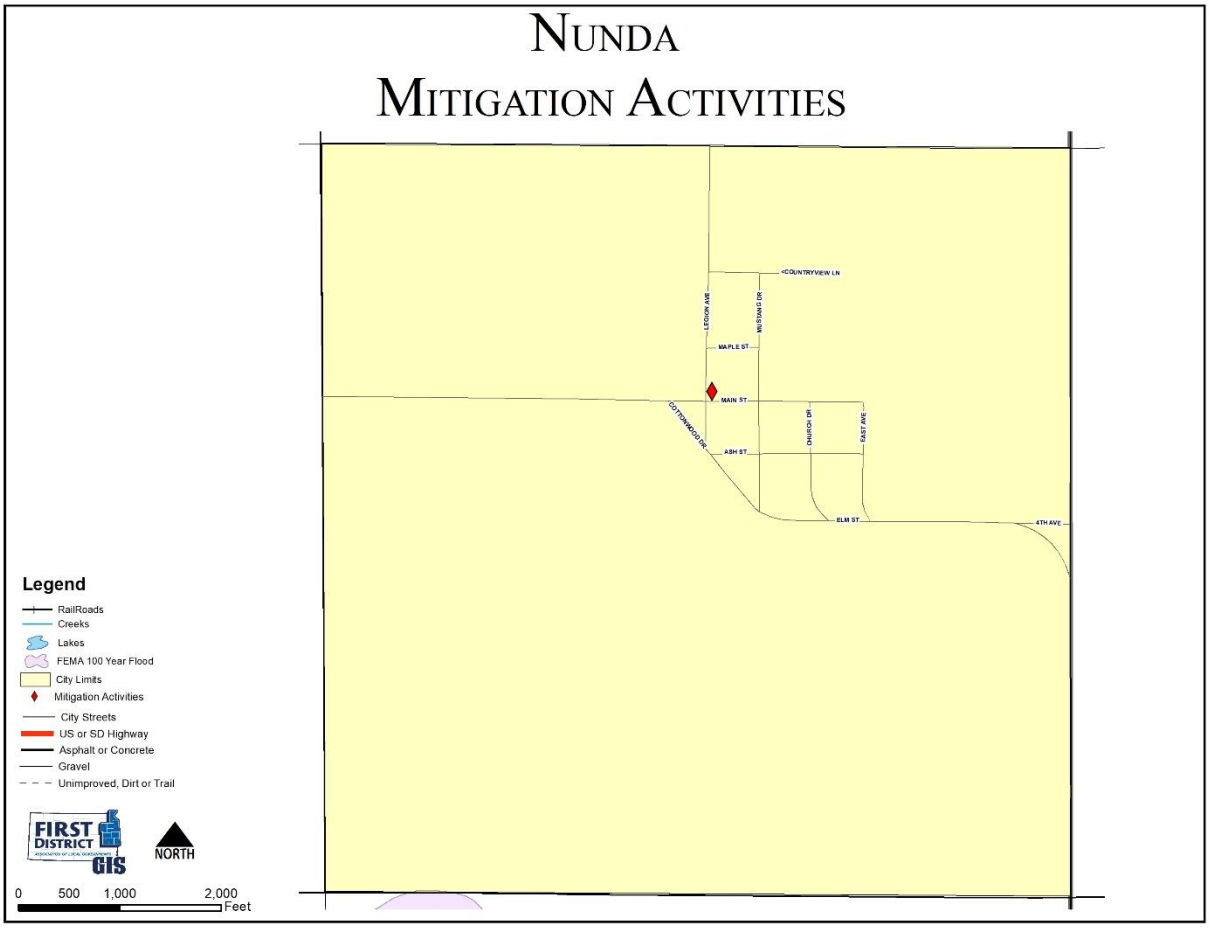


Figure 5.5: Town of Ramona Potential Mitigation Project Map

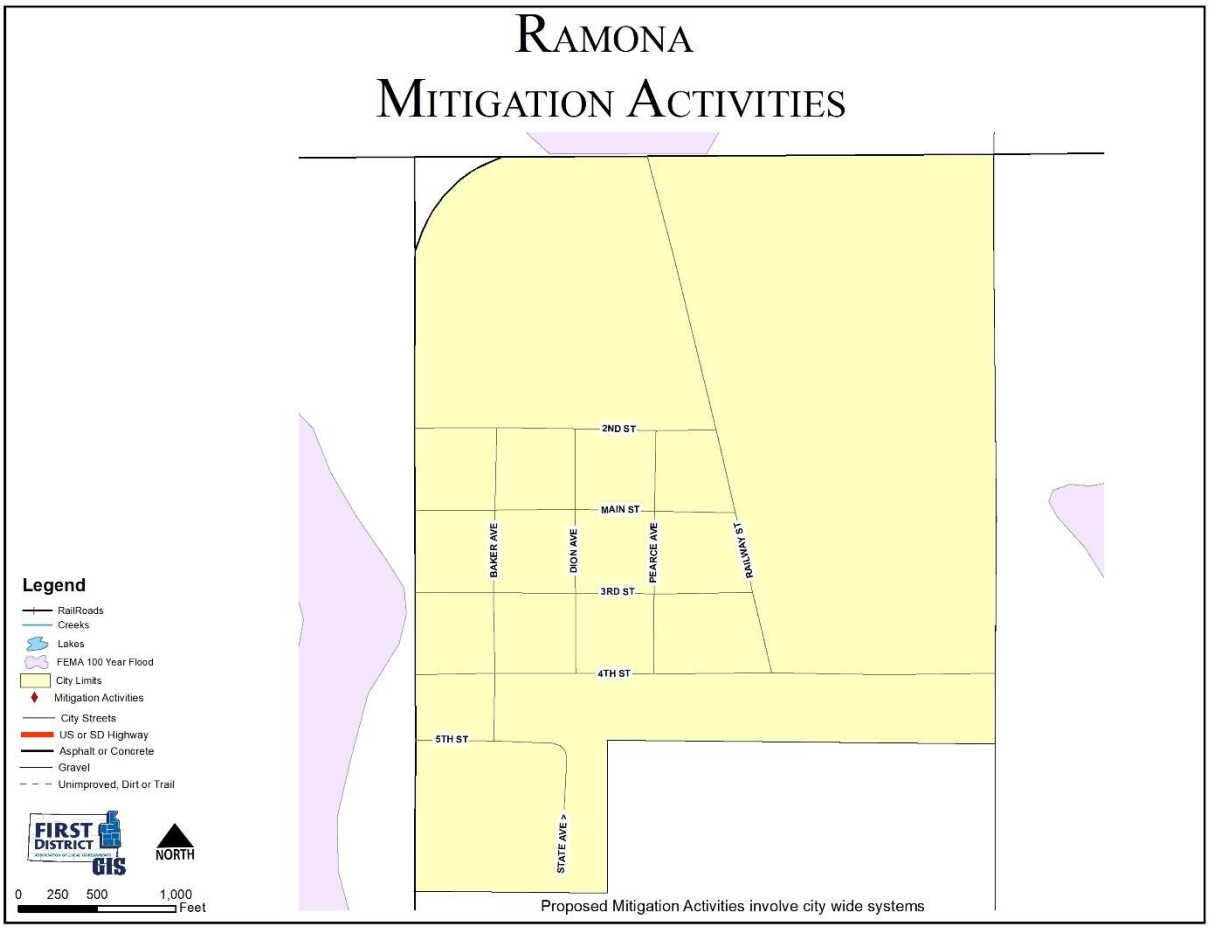
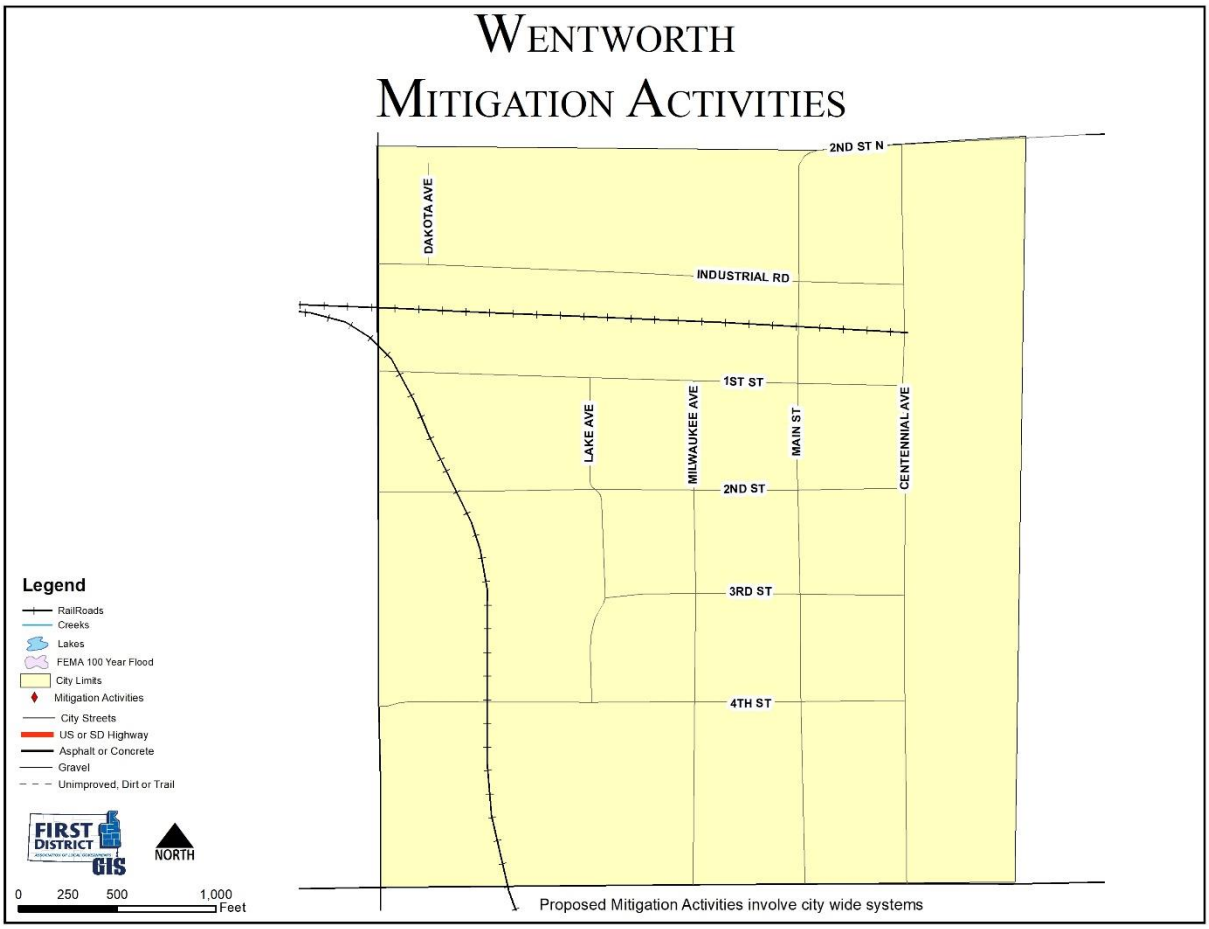


Figure 5.6: Town of Wentworth Potential Mitigation Project Map



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 Lake 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 benefit cost analysis will be conducted on an individual basis after the decision is made to move forward with a project.

The 2004 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. Lake County updated the original PDM plan in 2009. This plan met the requirements for the 2008 Local Mitigation Plan Review Crosswalk. The County updated their PDM plan in September of 2013. The 2013 PDM update consisted of an All Hazards Mitigation Plan covering natural and manmade hazards. This plan met the requirements of the 2011 Local Mitigation Plan Review Tool. The plan was approved by FEMA. Information from the 2013 PDM plan was incorporated during the drafting of the 2018 PDM plan update. The FEMA approved methodology and format utilized for the 2018 Lake County PDM update is similar to counties neighboring Lake County.

CHAPTER 6
PLAN MAINTENANCE

MONITORING, EVALUATING, AND UPDATING THE PLAN

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

The County and all of 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 Lake 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 Lake County Emergency Management Office located in the Lake County Courthouse and the First District Association of Local Governments office. The PDM will also be available for review on the Lake County website and on 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 Lake 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 Lake 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 towns 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 and Sign-in Sheets

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 2013 PDM Mitigation Project Implementation

Appendix H - References

Appendix A

Resolution of Adoption by Jurisdiction

Lake County Resolution

Brant Lake Resolution

Madison Resolution

Nunda Resolution

Ramona Resolution

Wentworth Resolution

Appendix B

PDM Planning Team Agendas, Sign-in Sheets and Minutes

AFFIDAVIT OF PUBLICATION

AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA }
} ss.
County of Lake }

Aubrey Larsen of the City of Madison, County of Lake, State of South Dakota, being first duly sworn on oath, deposes and says:

The Madison Daily Leader is a daily legal newspaper of general circulation, printed and published in the City of Madison, in said County of Lake, by Hunter Publishing, Inc., Jon M. Hunter, publisher, and has been such legal newspaper during the times hereinafter mentioned; that the said Madison Daily Leader has been in existence as such legal newspaper for more than one year prior to the publication of the notice hereunto attached, and has during all of said time had, and how has, more than 200 bona fide subscribers; that the undersigned, the affiant, is the Secretary of the said newspaper, in charge of the advertising department thereof and has personal knowledge of all the facts stated in this affidavit and the advertisement headed

Lake County Emergency Management

Lake County Pre-Disaster Mitigation Plan

printed copy of which hereunto attached, was printed and published in the said newspaper for One successive weeks, once each week and on the same day of the week, on the following dates, to-wit:

On Wednesday, the 1st day of November, 20 17;
On ....., the ..... day of ....., 20.....;
On ....., the ..... day of ....., 20.....;
On ....., the ..... day of ....., 20.....;
On ....., the ..... day of ....., 20.....;
On ....., the ..... day of ....., 20.....;
On ....., the ..... day of ....., 20.....;
On ....., the ..... day of ....., 20.....;

That $ 7.97 being the full amount of the fees for publication of the attached notice inures solely for the benefit of the publisher of the said newspaper; that no arrangement or understanding for a division thereof has been made with any other person and that no part thereof has been agreed to be paid to any other person whomsoever.

Aubrey Larsen

Subscribed and sworn to before me this 2nd day of November, 20 17

ANN L. KOCH
NOTARY PUBLIC
SOUTH DAKOTA

Ann L. Koch
Notary Public, Lake County, South Dakota

NOTICE

Lake County will begin the process of updating the Lake 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 Lake County mitigation planning team will meet at 7 p.m. on Monday November 13, 2017 at the Lake County Extension Building - 1060 S. Egan Avenue, Madison, SD. The public is welcome to attend. Questions or comments may be directed to Lake County Emergency Management Director, Doug Huntrods at 605-256-7611.

Published once at the total approximate cost of $7.97

Doug S Huntrods
06 Nov 2017
EMA - 0423

RECEIVED
NOV - 6 2017
Lake County Auditor

Publication Fees ——— $.....
Notary Fees ——— $.....
Total ——— $.....

Received Payment,

.....

Lake County

Pre-Disaster Mitigation Plan Kickoff Meeting

7:00 p.m. Monday, November 13, 2017

Lake County Extension Building

Agenda

- Introduction of team members
- What is mitigation planning
- Why is Lake County updating the Pre-Disaster Mitigation Plan
- Review plan components
- Review timeline/scope

LAKE COUNTY PRE-DISASTER MITIGATION PLANNING MEETING

LAKE COUNTY STAKEHOLDERS MEETING

November 13, 2017

Name	Organization	Email*
Greg Maag	1st District	greg@1stdistrict.org
Shelli Gust	Lake County	shelligust@lake.sd.gov
MYRON NAGEL	RAMONA FIRE	MYRON@NAGELTECHNOLOGIES.COM
Doug Huntrods	Lake EM	lakecema@lake.sd.gov
Justin Meyer	Madison Police	justin.meyer@cityofmadisonsd.com
Brad Lawrence	City of Madison	bradlawrence@cityofmadisonsd.com
MARY ASKREN	Daily Leader	mary@madisondailyleader.com
NATE OINES	East River Elec.	noines@eastriver coop
Brennen Ahlers	Wentworth Township	brennenahlers@yahoo.com
Kathy Hansen	MRHS	Kathy.hansen@madisonhospital
Barry Donyo	City of Madison	streets@cityofMadisonSD.com
Roy Lindsay	City of Madison	mayor.lindsay@cityofmadisonsd.com
Ryan Hegg	City of Madison	ryan.hegg@cityofmadisonsd.com

**** It is intended to send "draft" documents via email if possible.***

Minutes
Lake County Pre-Disaster Mitigation Plan Team Kick-Off Meeting
November 13, 2017
Lake County Extension Building

20 individuals were in attendance:

- Doug Huntrods, Lake County Emergency Manager
- Shelly Gust, Lake County
- Myron Nagel, Ramona Fire Department
- Justin Meyer, Madison Police Department
- Brad Lawrence, City of Madison
- Mary Askren, Madison Daily Leader
- Nate Oines, East River Electric
- Brennen Ahlers, Wentworth Township
- Kathy Hansen, Madison Regional Hospital System
- Gary Gonyo, City of Madison
- Roy Lindsey, Mayor, City of Madison
- Ryan Hegg, City of Madison
- Greg Maag, First District Association of Local Governments

Lake County Emergency Management Director Doug Huntrods welcomed those in attendance and had team members introduce themselves and what entity they represented. Huntrods then introduced Planner Greg Maag of the First District Association of Local Governments.

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

Maag led the Planning Team members through the risk assessment worksheets process to identify hazards and rate the County's vulnerability to these hazards. Planning Team representatives provided information regarding mitigation activities within their own respective entities. A general review of the existing Pre-Disaster Mitigation Plan was started by defining work responsibilities for all parties involved in the process. The First District will doing background and research, and the PDM Team provides oversight and guidelines throughout the process. The timeline and scope of project were reviewed.

Meeting adjourned at 9:00 p.m. Date and time for the next meeting to be scheduled later in the year.

Minutes recorded by Greg Maag.

AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA }
} ss.
County of Lake }

Aubrey Larsen of the City of Madison, County of Lake, State of South Dakota, being first duly sworn on oath, deposes and says:

The Madison Daily Leader is a daily legal newspaper of general circulation, printed and published in the City of Madison, in said County of Lake, by Hunter Publishing, Inc., Jon M. Hunter, publisher, and has been such legal newspaper during the times hereinafter mentioned; that the said Madison Daily Leader has been in existence as such legal newspaper for more than one year prior to the publication of the notice hereunto attached, and has during all of said time had, and how has, more than 200 bona fide subscribers; that the undersigned, the affiant, is the Secretary of the said newspaper, in charge of the advertising department thereof and has personal knowledge of all the facts stated in this affidavit and the advertisement headed

Lake County Emergency Management

Lake County Pre-Disaster Mitigation Plan

printed copy of which hereunto attached, was printed and published in the said newspaper for One successive weeks, once each week and on the same day of the week, on the following dates, to-wit:

On Thursday, the 24th day of May, 20 18;
On ....., the ..... day of ....., 20.....;
On ....., the ..... day of ....., 20.....;
On ....., the ..... day of ....., 20.....;
On ....., the ..... day of ....., 20.....;
On ....., the ..... day of ....., 20.....;
On ....., the ..... day of ....., 20.....;
On ....., the ..... day of ....., 20.....;

That $ 4.98 being the full amount of the fees for publication of the attached notice inures solely for the benefit of the publisher of the said newspaper; that no arrangement or understanding for a division thereof has been made with any other person and that no part thereof has been agreed to be paid to any other person whomsoever.

Aubrey Larsen

Subscribed and sworn to before me this 25th day of May, 20 18

ANN L. KOCH
SEAL NOTARY PUBLIC SOUTH DAKOTA SEAL

Ann L Koch
Notary Public, Lake County, South Dakota

Thursday May 24

PUBLIC NOTICE FROM THE OFFICE OF LAKE COUNTY EMERGENCY MANAGEMENT

The Lake County Pre-Disaster Mitigation Team will hold a public meeting for the natural hazards discussed in the Lake County Pre-Disaster Mitigation Plan. The meeting will be held at 7:00 p.m., Tuesday, June 12th, at the Lake County Extension Building. All interested members of the public are invited to attend.

Published once at the total approximate cost of $4.98

RECEIVED
MAY 29 2018
Lake County Auditor

Publication Fees ——— $.....
Notary Fees ——— $.....
Total ——— $.....

Received Payment,

.....

Lake County Pre-Disaster Mitigation Plan

Mitigation Planning Team Meeting

7:00 p.m. Tuesday, June 12, 2018

Lake County Extension Building

Agenda

- Introduction
- Review of Previous Meetings and Plan Development History
- Review of PDM Preliminary Draft
    - Plan Authority and Purpose
    - Community Profile
    - Plan Process
    - Risk Assessment/Critical Infrastructure
    - Review of Goals and Objectives
    - Project Identification
    - Plan Maintenance
- Questions
- Set Date of Final Review

Sign in list

Minutes

3rd meeting affidavit

3rd meeting agenda

3rd meeting sign up list

3rd meeting minutes

Appendix C

Community Meeting Agendas, Sign-in Sheets and Minutes

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

Town	Date
Brant Lake	April 9, 2018
Madison	May 7, 2018
Nunda	February 12, 2018
Ramona	February 13, 2018
Wentworth	February 14, 2018

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. Following the hazard identification and vulnerability exercises the governing body was asked to rate the level to which they agree with the goals of the Pre-Disaster Mitigation Plan. Finally, the Town Board was asked to identify critical infrastructure within the community. All master sheets and infrastructure lists compiled at those meetings can be found in Appendix E. A master infrastructure list was compiled for each town Table 4.16.

The annual Town, Townships and Lake Associations Meeting with the Lake County Commissioners held on March 12, 2018 was attended by Greg Maag, Planner, with First District Association of Local Governments. At that meeting Mr. Maag met with representatives from Townships that had not submitted vulnerable infrastructure location maps and potential mitigation projects information that had been previously requested. The members present were asked to identify areas most vulnerable to natural hazards on a map and any potential mitigation projects. Those maps and potential mitigation projects are included in Appendix E.

City of Brant Lake

City of Brant Lake Trustee Meeting
3867 Brant Grove Dr.
April 9, 2018 at 7:30pm

Brant Lake
PO Box 4
Brant Lake, SD 57016

Agenda:

1. Call to Order
2. Approval of agenda
3. Treasurer report
4. Approval of bills
5. Approval of minutes
    a. March 13, 2018 meeting
6. Old Business
    a. Road Surface Investigation
7. New Business
    a. Parameters regarding road maintenance
    b. Building permit review
    c. Todd Kays – Lake County Pre-disaster Mitigation Plan
8. Executive session for personnel SDCL 1-25-2(1)
9. Next regular meeting: Tuesday, May 8th @ 7:00 pm

LAKE COUNTY PRE-DISASTER MITIGATION PLANNING MEETING

City ~~Town~~ of Brant Lake Meeting

Date 4-9-18

Name	Organization	Email*
Todd Kreis	1st D.A.R.	
Pam Lidel	Repsenting self	pamL@itctel.com
Karen Reiff	City Trustee	jkreiff@live.com
Dave Philips	City Trustee	dphilips@ITCTEL.com
Doug Bowen	City Trustee	d.bowen09@gmail.com
Tom REIFF	City Trustee	tom.a.reiff@gmail.com
Jason Moen	resident	jason.moen@spartanmotors.com
Susan Moen	Resident	Susan.Farnmoen@ITCTEL.com

** It is intended to send "draft" documents via email if possible.*

CITY OF BRANT LAKE SOUTH DAKOTA

Trustee Meeting Minutes – April 9, 2018

Opening
President D. Philips called the meeting of the City of Brant Lake Board of Trustees to order at 8:13 pm on Monday, April 9, 2018 at 3867 Brant Grove Drive.

Present
Dave Philips; Doug Bowen; Karen Reiff; Tom Reiff; and Melissa Wagner. Paula Wagner was absent.

Approval of Agenda
A motion was presented to amend the agenda to add Todd Kays – Lake County Pre-disaster Mitigation Plan. The agenda was approved as amended.

Treasurer Report
Reviewed financials, as of March 31st the cash balance on the books was $10,918.29. Reviewed 2018 activity through March compared to budget. Melissa sent the 2017 Annual Report to the State as well as published in the Madison Daily Leader. Treasurer report was motioned and approved.

Approval of Bills
The following bills were approved for payment: Madison Daily Leader - $42.17 (Publications); Wilbur-Ellis - $175.00 (Snow Removal); Melissa Wagner - $191.61 (Salary).

Approval of Minutes
Minutes from the meeting on 3/13/18 were approved.

Old Business
Road Surface Investigation : An engineer would like to present some surfacing options, as soon as the roads dry up some information will be presented to the Board.

New Business
Parameters regarding road maintenance : Discussion took place regarding what the City will plan to do to the roads this 2018 summer season. Tom and Doug to find vendors and get some price quotes for gravel and dust control. A motion was presented to spend up to $16,000 for gravel and dust control. Motion approved as presented.

Building permit review : A discussion took place regarding a resident who is wishing to present a zoning permit application and the process required around this request. The Board of Adjustment will review the variance request prior to the May 7th Trustee meeting.

Pre-disaster Mitigation Plan : Todd presented to the board a series of questions that needed to be answered regarding disaster preparedness. Both the trustees and the attending public answered the questions.

Executive Session
Passed on executive session.

Adjournment
Meeting was adjourned at 9:12 pm. The next regular meeting is scheduled for 7:30 pm on May 7, 2018, at 3867 Brant Grove Drive, Brant Lake, SD.

Minutes submitted by: Melissa J. Wagner, Finance Officer

Dave Philips, President

Published once at an approximate cost of $

THE CITY OF MADISON

BOARD OF COMMISSIONERS
AGENDA
MAY 7, 2018
5:30PM – COMMISSION ROOM – 116 W CENTER ST

CALL TO ORDER

ROLL CALL

OATH OF OFFICE – ROBERT THILL, MIKE WALDNER

ADOPT AGENDA

APPEARANCES / ACKNOWLEDGEMENTS
1) Acknowledge Drinking Water Certificate of Achievement Award
2) Luke Muller, Planner – First District Association of Local Governments – Lake County Pre-Disaster Mitigation Plan Update

CONSENT CALENDAR
1) Minutes – April 30, 2018
2) Building Permit Report – April

OLD BUSINESS

NEW BUSINESS
1) Resolution No. 2018-07 – Adopt the Powers and Duties of the Mayor and Commissioners
2) Resolution No. 2018-08 – Provide Extensions to Certain Provisions of Previous Agreements with Madison Housing & Redevelopment Commission
3) Resolution No. 2018-09 – Establish a Special Maintenance Fee
4) Authorize Mayor to Sign Letter of Contract
   Banner Associates, Inc. – GIS Technical Assistance/Maintenance
5) Bid No. 874 – Review and Award Bid – Construction of Underground Electric Primary, Secondary, Service and Street Light Circuitry
6) Bid No. 875 – Review and Award Bid – Egan Avenue Parking Lot Project 2018-4
7) Declare as Surplus Property and Authorize for Proper Disposal – High Pressure Sodium Lighting and Associated Hardware

ANNOUNCEMENTS

EXECUTIVE SESSION

ADJOURN

Supplementary agenda information may be accessed at www.cityofmadisonsd.com
AGENDAS – CITY COMMISSION

If special accommodations are necessary to attend any Board of Commissioners meeting, please contact the Finance Office at (605) 256-7500 at least 24 hours before meeting time. All attempts shall be made to accommodate a request.

Staff meeting

LAKE COUNTY PRE-DISASTER MITIGATION PLANNING MEETING

City of Madison Meeting

May 7, 2018

Name	Organization	Email*
Randy Minnaert	Fire	randy.minnaert@cityofmadisonsd.com
Joyce Ebdrup	Public Works	cityshop@cityofmadisonsd.com
Justin Meyer	Police	justin.meyer@cityofmadisonsd.com
Mike McGillivray	Parks	parks@cityofmadisonsd.com
Ryan Hegg	Engineering	ryan.hegg@cityofmadisonsd.com
Jan Steiner	Water dist. Sewer Collection	jan.water@cityofmadisonsd.com
Rick Nighbert	Water / wastewater Treatment	rick.nighbert@cityofmadisonsd.com
Roy Lindsay Jr	City of Madeson Mayor	mayor.lindsay@cityofmadisonsd.com
Brad Lawrence	City of Madison Utilities	Brad.Lawrence@cityofmadisonsd.com

** It is intended to send "draft" documents via email if possible.*

City of Madison

~~LAKE COUNTY~~ PRE-DISASTER MITIGATION PLANNING MEETING

City of Madison Meeting

May 7, 2018

Name	Organization	Email*
Luke Muller	1st District	
JOHN BECK	BECK + HOFER CONSULT	
Jerry Lammers	MHRC city	
Brenda Strom	MHRC	
Marie Lohsandt	MHRC	
Sue Bergheim	KJAM	
Chuck Clement	Madison Daily Leader	chuck@madisondailyleader.com
Kaden Krusemark		
Stacy Krusemark		

** It is intended to send "draft" documents via email if possible.*

CITY OF MADISON
BOARD OF COMMISSIONERS PROCEEDINGS
MADISON, SD 57042

07 May 2018
Regular

The Board of Commissioners of the City of Madison met in regular session on the 7th day of May with the following members present on roll call: Mayor Roy J. Lindsay, Jr. and Commissioners Jeremiah Corbin, Kelly Johnson, Robert Thill and Mike Waldner.

Incumbents Commissioner Thill and Commissioner Waldner took their Oaths of Office.

Motion by Commissioner Johnson to approve the May 7th agenda, second by Commissioner Corbin. Motion carried unanimously.

The South Dakota Department of Environment and Natural Resources (DENR) awarded the City of Madison with a Drinking Water Certificate of Achievement Award. Motion by Commissioner Waldner to acknowledge the award and directed Utility Director Brad Lawrence to congratulate and thank the department operators. Motion seconded by Commissioner Thill. Motion carried unanimously.

Luke Muller, Planner with the First District Association of Local Governments, provided an update on the Lake County Pre-Disaster Mitigation Plan. Following a meeting earlier in the day with numerous City officials, he'll continue to develop the document as required by the Federal Emergency Management Agency (FEMA) to allow for grant eligibility and financial assistance for applicable projects and disaster recovery.

Motion by Commissioner Corbin, second by Commissioner Johnson, to approve the following items on the consent calendar: Minutes - April 30, 2018 and Building Permit Report - April. Motion carried unanimously.

Motion by Commissioner Corbin to adopt Resolution No. 2018-07 - Adopt the Powers and Duties of the Mayor and Commissioners, second by Commissioner Waldner. Motion carried unanimously.

Motion by Commissioner Corbin to adopt Resolution No. 2018-08 - Provide Extensions to Certain Provisions of Previous Agreements with Madison Housing & Redevelopment Commission, second by Commissioner Johnson. Motion carried unanimously.

Motion by Commissioner Corbin to adopt Resolution No. 2018-09 - Establish a Special Maintenance Fee, second by Commissioner Thill. Motion carried unanimously.

Motion by Commissioner Waldner, second by Commissioner Corbin, to authorize the Mayor to sign a Letter of Contract with Banner Associates, Inc. for GIS technical assistance and maintenance at a cost not to exceed $8,300.00 with funds to come from the water fund cash balance. Said contract defines a range of technical assistance to transition to the ArcGIS Desktop system and eventually manage the GIS data internally. Motion carried unanimously.

Commissioner Corbin left the meeting at 6:10pm.

Bid No. 874 for Construction of Underground Electric Primary, Secondary, Service and Street Light Circuitry was reviewed: Karian Peterson Power Line Contracting, LLC - $228,836.17, MP Nexlevel, LLC - $234,608.96, May Construction, Inc. - $234,726.17, AEI Construction, Inc. - $237,078.38, Geldner Underground, Inc. - $306,681.17, Cable Communications Services, Inc. - $369,115.12, Push, Inc. - $413,520.47. Motion by Commissioner Waldner to award Bid No. 874 to Karian Peterson Power Line Contracting, LLC for $228,836.17, second by Commissioner Thill. Motion carried unanimously.

Bid No. 875 for Egan Avenue Parking Lot Project 2018-4 was reviewed: Double H Paving - $61,950.70, Dawson Construction, Inc. - $62,252.00, Black-Top Paving - $88,684.50, Seal Pros, Inc - $76,578.00, ASCO - $69,011.60, Myrl & Roy's Paving - $86,711.60. Motion by Commissioner Waldner to award Bid No. 875 to Double H Paving for $61,950.70, second by Commissioner Johnson. Motion carried unanimously.

Motion by Commissioner Waldner, second by Commissioner Thill to declare High Pressure Sodium Lighting and Associated Hardware as surplus property, appoint Jeremiah Corbin, Brad Lawrence and Chad Comes as appraisers and authorize for proper disposal. Motion carried unanimously.

Motion by Commissioner Johnson to adjourn, second by Commissioner Thill. Motion carried unanimously.

The Board of Commissioners adjourned at 6:20pm.

/s/Jennifer Eimers
Finance Officer

Published once at the approximate cost of $____.

Town of Nunda

Town of Nunda
Agenda
February12, 2018 – Meeting

Meet with Greg Maag to discuss & review Pre Disaster Mitigation Program being reviewed by Lake County.
Present and approve all outstanding bills.
Review and approve Annual Financial Report as presented by Finance Officer.
Approve March meeting to be held on 3rd Monday (March 19th) of March
Any other discussions.

LAKE COUNTY PRE-DISASTER MITIGATION PLANNING MEETING

Town of Nunda Meeting

Date 2/12/18

Name	Organization	Email*
Greg Maag	1st District	
Joyce Dragseth	Town of Nunda	jjdrag@itctel.com
Cody Tureito	Town of Nunda	CodyTureito@yahoo.com
Dan Hanson	Town of Nunda	dshanson@itctel.com
Kurt Olsen	Town of Nunda	Kurtalanolson@gmail.com

*** _It is intended to send "draft" documents via email if possible._**

NUNDA TOWN BOARD MEETING

The regular meeting of the Nunda Town board was held on February 12, 2018 with all members present. Greg Maag of First District met with the board to review and discuss the pre-disaster mitigation plan update being done by Lake County. Minutes and financial reports were read and approved. Motion by Olson, second by Tveito to allow the following bills: Madison Daily Leader – 25.79- publications; Otter Tail Power – 382.77– lights; SD DOR – 29.00 – water tests; De Smet Ins. – 73.05 – Quonset insurance; Fisher Rounds & Assc – 1305.00 Town liability ins. & 2,337.00 – fire dept liability. March meeting will be held on March 19th to allow board to act as equalization board. 2017 Annual Financial Report was presented by finance officer. Motion by Tveito, second by Olson to approve the report. Discussion held on town tractor. Motion by Olson, second by Tveito to adjourn. Published once at the approximate cost of $_____.

Joyce Dragseth

Finance Officer

Town of Ramona

Meeting Agenda

Ramona Town Board

Tues

Feb 13th, 2018

7:00 pm

Meeting to Order

Minutes of Previous Meeting –

Old Business

New Business

Greg Magg- 1st District - lake county PDM plan

Bar Report –

Dakota Pump & Control - Quotes for repairs

Loss Control Survey

Lake Co Signing Meeting

Red Cross - smoke detectors

Executive Session- Personnel

Past due water bills-

Paying of the Bills –

Other business properly brought to the Board

LAKE COUNTY PRE-DISASTER MITIGATION PLANNING MEETING

Town of Ramona Meeting

Date 2/13/18

Name	Organization	Email*
Greg Maag	1st District	
Carlos Hendricks	Finance Officer	townoframona@allliancecom.net
Daren Spickle	Trustee Town of Ramona	dspickle@alliancecom.net
Tim Talley	" " " "	ta talley @ itotmail.com
Larry Malcomb	" " " "	Larrym@allliancecom.net

** It is intended to send "draft" documents via email if possible.*

Regular Meeting Minutes
Ramona Town Board

The Ramona Town Board met Tues. Feb 13, 2018 at 7:00 with members Tim Tolley, Daren Spilde and Larry Malcomb present. Also present Greg Maag, First District and Billie Byington, bar manager.

Meeting was called to order. Previous meeting minutes were read. Motion by Spilde, seconded by Tolley to approve as read.

Greg Maag, First District to update Lake County PDM plan. Updated plan and discussed need of future projects.

Billie Byington, bar report. Discussion of Mt Oyster Feed.

Review of Loss Control Survey.

Review of quotes from Dakota Pump & Control for sewer system repairs.

Saturday March 24th, 2018 the Red Cross and Ramona Volunteer Fire Department will installing free smoke alarms to those requesting them. Information will be sent in water bills.

Motion by Spilde, seconded by Malcomb to pay bar mgr over time hours retroactive to Dec 2017. Contract will be presented.

Review of reports and bills.

Motion by Malcomb, seconded by Tolley to pay the following bills:

General Account: Manitou Finance, loan pymt, 457.79; Carla Henrichs, wages, 331.39; Xcel Energy, elect, com bldg,137.37, ballpark, 23.56, sto bldg, 12.87, st lites, 685.66; Alliance, phone, internet, 107.89; Bud's Clean Up, garb serv, 548.34; Central Business Supply, office supplies, 12.25; First District, annual dues, 272.30; Kundert-Williams, insurance, 44.00; Madison Daily Leader, publishing, 59.25; Larry Malcomb, wages, 60.03; Mid Amer Energy, gas/heat, 282.21; P&M Service, fuel, 60.14; SD St Treasurer, sales tax, 39.36; Daren Spilde, wages, 60.03; Tim Tolley, wages, 69.26; EFTPS, payroll tax, 107.26.

Water Account: Carla Henrichs, wages, 331.39; Xcel Energy, elect, 558.24; Paul Fischer, wages, 356.66, postage, 6.65; Kingbrook, wtr, 788.00; Town-Gen, payroll tax, 150.14; Rural Dev, loan pymt, 246.00.

Sewer Account: Xcel Energy, elect, 68.92; Dakota Pump & Control, repairs, 788.78; Paul Fischer, wages, 257.65; Goth Elect, line repairs, 2430.28; Town-Gen, payroll tax, 42.70; Rural Dev, loan pymt, 307.00.

Bar Account: Ramona Bar, till, 379.69; Alli Abraham, wages, 362.47; Billie Byington, wages, 895.22; Josh Ok, wages, 429.43; Kristen Reese, wages, 87.73; Beal Dist, beer, 1805.55; Cash-Wa, tobacco, pizza, sandwiches, misc, 1631.82; Chesterman, pop, 325.00; Dakota Bev, beer, 435.65; Johnson Bros, liquor, 248.95; Pepsi, pop, 247.03; Republic Natl, liquor, 633.05; Alli Abraham, wages, 362.47; Billie Byington, wages, 949.70; Danelle Fink, wages, 75.42; Josh Ok, wages, 193.93; Xcel Energy, elect, 317.17; Alliance, phone, cable, int, 160.11; Beal Dist, beer, 988.95; Bud's Clean Up, garb serv, 35.52; Lewis, misc, 87.73; Mid Amer Energy, gas/heat, 183.55; Midwest Alarm, alarm monitor, 30.46; Ramona Bar, petty cash, 99.50; Republic Natl, liquor, 242.94; SD St Treasurer, sales tax, 829.82; Sunshine, pop, misc, 61.63; Town-Gen, payroll tax, 768.26; NCR Silver, serv fee, 79.00. Receipts, 13577.39.

No further buisness. Motion by Spilde, seconded by Tolley to adjourn. Published once at the total aprox cost of _____

Carla Henrichs
Finance Officer

TOWN OF WENTWORTH

Council Meeting – 6:00 PM

Wednesday, February 14, 2018

City Office

AGENDA

- Call Meeting to Order
- Roll Call & Recognition of Visitors
- Additions or Corrections to Agenda
- Motion to Approve January 17, 2018 Minutes As Written

OLD BUSINESS

- None

NEW BUSINESS

- Greg Maag – Lake County Disaster Planning
- 2017 Legislative Audit Report
- Review & approve January financial reports & pay February Claims
- Public Time – A time for residents to discuss or express concerns to the Council on any issue not on the agenda. Questions & concerns are limited to 5 minutes. Action will not be taken at the meeting on any issue not on the agenda.
- Next Meeting – March 14, 2018 – 6:00 p.m.
- Adjournment

LAKE COUNTY PRE-DISASTER MITIGATION PLANNING MEETING

Town of Wentworth Meeting

Date 2/14/18

Name	Organization	Email*
Greg Maug	1st District	
[illegible]	Town of Wentworth	
Jim Spielmann	Town of Wentworth	
Reg Vega	Town of Wentworth	
Clark M. Wolds	Town of Wentworth	

** It is intended to send "draft" documents via email if possible.*

WENTWORTH TOWN COUNCIL MINUTES

The Wentworth Town Council met in regular session on Wednesday, February 14, 2018 at 6:00 p.m. at the Finance Office. President Roger Vogt called the meeting to order with the following Council members present for roll call: Jim Spielmann, Roger Vogt and Charles Wold. Also present was Greg Maag & Trish Natwick, Finance Officer.

There were no additions or corrections to the Agenda.

Motion was made by Spielmann and seconded by Wold to approve the Minutes of the January 17, 2018 Council meeting as written.

OLD BUSINESS:

None

NEW BUSINESS:

Greg Maag, from 1st District Association, appeared before Council to discuss the Lake County Pre-Disaster Mitigation Plan. Maag discussed risk assessment, hazard identification, hazard vulnerability and mitigation projects over the short, medium & long term.

Wold motioned and Spielmann seconded to approve the 2017 Legislative Audit Annual Report as presented by Natwick.

Council reviewed January financials and February billing vouchers. Motion was made by Spielmann & seconded by Wold to approve & pay the monthly claims as follows: Big Sioux Water-$900.25 February Water Purchases; Big Sioux Water-$1,155.00 Sewer & Water Operator Contract; Bud's Clean-up-$816.93 Garbage Contract; Central Business Supply-$8.77 Office Supplies; Grapevines-$39.39 Misc. Expense; Grapevine Design-$100.00 Web-site Maintenance; IRS-$581.26 Payroll Taxes; ITC-$141.34 Phone, Fax and Internet; Madison Daily Leader-$70.95 Publications; Ottertail Power Company-$484.55 Electric & Street Lighting; Quill-$86.99 Office Supplies; T&H Welding-$382.06 Equip. Repairs; Roger Vogt-$161.61 January Payroll; Jim Spielmann-$129.29 January Payroll; Charles Wold-$129.29 January Payroll; Marge Krause-$92.34 January Payroll; Trish Natwick-$1,431.52 January Payroll; Terry Reck-$193.93 January Payroll; Duane Walburg-$263.25 Animal Control.

With no further business, the meeting adjourned. The next regular session meeting will be Wednesday, March 14, 2018 at 6:00 p.m. at the Finance Office.

Trish Natwick
Finance Officer

Published once at the total approximate cost of $ _____

27TH ANNUAL TOWN, TOWNSHIPS & LAKES ASSN

MEETING WITH THE COUNTY COMMISSIONERS

MONDAY-- MARCH 12, 2018

NICKY'S, 1407 NW 2ND ST., MADISON SD

6 p.m. Chair Kelli Wollmann--Welcome by Lake County Commission

Pledge of Allegiance

Free meal will be served

6:30 p.m. Terry Sletten, SDATAT Executive Director

Tammy Schwebach, Schwebach Insurance

Doug Huntrods, Emergency Manager

Greg Maag, First District RE: Pre-disaster Mitigation Plan

Representative from SD Local Transportation Assistance Program

Rick Becker, Director of Equalization
Local board of equalization March 19-23, 2018
Assessment books will be available.

Please rsvp to the Lake County Auditor at 605-256-7600 or lakeauditor@lake.sd.gov

DATE: 3-12-18 Annual Twp mtg

NAME:	REPRESENTING:
LORi Hansen	Lakeview
Hoy M' Gil	Herman
Scott Leighton	Herman
Dennis Rensch	Badus
Jeff Carruthers	Wentworth
Denese Johannsen	Clarno
Kelly Johannsen	Clarno
Beverly Nugent	Franklin
Ryan McIntire	winfred
Mick Clark	Wayne
Jay Keibel	SDAT AT
Jon Hansen	DOE
Sid Gulbranson	Lake View
Dee Balogh	Farmington
David Stoen	Chester
Paula Barnick	Auditor's Ofc
Bobbi Janke	"
Todd Klein	Clarno

(18)

DATE: 3-12-18 Annual Twp Mtg

NAME:	REPRESENTING:
BRENNEN AHLERS	WENTWORTH TOWNSHIP
Nick Opdahl	Franklin Township.
JIM HILDEBRANDT	Concord Township
DAN BRUNS	FARMington
Roger Hageman	Concord
Marty Thompson	Chester
Tami Schuebach	Schuebach Ins.
Doug Huntrods	Lake EM

March 12, 2018

Name	Twp/Town/Dept
Darwin Wollmann	LeRoy
Kelli Wollmann	Lake County Commission
Mike Birkett	Wayne
Rick Becker	Equalization office
Deb Blanchette	Equalization
Greg Maag	1st District
Deb Reinicke	Lake Co. Comm.
Rodney Asmussen	Badus
Lee Limmer	Wentworth Supervisor
Roger Abraham	Concord
David Hagemann	Concord
[illegible]	Farmington
Patty Vanhove	"
Marvin Brinkman	Concord
Kevin Minnaert	Franklin
Stephanie Terwilliger	Winfred
Walt Schaefer	Winfred
Don Hansen	Lakeview
Shelli Gust	State's Atty Office
Wendy Kloeppner	State's Atty Office
Jennie Larson	DOE
Dan Schutt	Chester
Dave Dahl	Chester
Kerm Huff	Farmington
JEFF Muller	FRANKLIN

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Appendix D - Hazard Identification/Vulnerability Worksheets

Appendix E includes master worksheets for Hazard Identification and Vulnerability for jurisdictions compiled as described in Appendix C. Lists were gathered at meetings as described below:

Entity	Date
Lake County PDM Team	November 13, 2017
Brandt Lake	April 9, 2018
Madison	March 7, 2018
Nunda	February 12, 2018
Ramona	February 13, 2018
Wentworth	February 14, 2018

Master worksheets for Hazard Identification and Vulnerability for jurisdictions and utilities (multiple were submitted for Lake County) below.

City of Brant Lake

Lake County PDM
Worksheet #1 (City of Brant Lake)
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)
Avalanche			X
Communication Disruption		X	
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
Landslide			X
Lightning	X		
Rapid Snow Melt		X	
Strong Winds		X	
Subsidence			X
Thunderstorm	X		
Tornado		X	
Transportation Disruption		X	
Urban Fire		X	
Utility Interruption	X		
Wild Fire			X

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Lake County PDM
Worksheet #2 (City of Brant Lake)
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
Avalanche				X
Communication Disruption	X			
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
Landslide	X			
Lightning		X		
Rapid Snow Melt			X	
Strong Winds	X			
Subsidence				X
Thunderstorm	X			
Tornado	X			
Transportation Disruption	X			
Urban Fire			X	
Utility Interruption		X		
Wild Fire	X			

City of Madison

Lake County PDM
Worksheet #1 (City of Madison)
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)
Avalanche			X
Communication Disruption	X		
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	
Landslide			X
Lightning	X		
Rapid Snow Melt		X	
Strong Winds	X		
Subsidence			X
Thunderstorm	X		
Tornado		X	
Transportation Disruption		X	
Urban Fire	X		
Utility Interruption	X		
Wild Fire	X		

1

Lake County PDM
Worksheet #2 (City of Madison)
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
Avalanche				X
Communication Disruption			X	
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	
Landslide				X
Lightning			X	
Rapid Snow Melt			X	
Strong Winds		X		
Subsidence				X
Thunderstorm			X	
Tornado	X			
Transportation Disruption			X	
Urban Fire			X	
Utility Interruption			X	
Wild Fire	X			

Town of Nunda

my copy

Lake County PDM
Worksheet #1 (Town of Nunda)
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)
Avalanche			X
Communication Disruption		X	
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
Landslide			X
Lightning	X		
Rapid Snow Melt		X	
Strong Winds	X		
Subsidence			X
Thunderstorm	X		
Tornado		X	
Transportation Disruption			X
Urban Fire		X	
Utility Interruption		X	
Wild Fire	X		

Lake County PDM
Worksheet #2 (Town of Nunda)
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
Avalanche				X
Communication Disruption			X	
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
Landslide				X
Lightning			X	
Rapid Snow Melt			X	
Strong Winds		X		
Subsidence				X
Thunderstorm			X	
Tornado	X			
Transportation Disruption				X
Urban Fire			X	
Utility Interruption		X		
Wild Fire			X	

Town of Ramona

Lake County PDM
Worksheet #1 (Town of Ramona)
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)
Avalanche			X
Communication Disruption		X	
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	
Landslide			X
Lightning		X	
Rapid Snow Melt		X	
Strong Winds	X		
Subsidence			X
Thunderstorm	X		
Tornado		X	
Transportation Disruption			X
Urban Fire		X	
Utility Interruption		X	
Wild Fire		X	

Lake County PDM
Worksheet #2 (Town of Ramona)
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
Avalanche				X
Communication Disruption			X	
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
Landslide				X
Lightning			X	
Rapid Snow Melt			X	
Strong Winds		X		
Subsidence				X
Thunderstorm		X		
Tornado		X		
Transportation Disruption				X
Urban Fire			X	
Utility Interruption			X	
Wild Fire				X

Town of Wentworth

Lake County PDM
Worksheet #1 (Town of Wentworth)
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)
Avalanche			X
Communication Disruption		X	
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
Landslide			X
Lightning	X		
Rapid Snow Melt		X	
Strong Winds	X		
Subsidence			X
Thunderstorm	X		
Tornado		X	
Transportation Disruption			X
Urban Fire		X	
Utility Interruption		X	
Wild Fire			X

Lake County PDM
Worksheet #2 (Town of Wentworth)
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
Avalanche				X
Communication Disruption			X	
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
Landslide				X
Lightning			X	
Rapid Snow Melt			X	
Strong Winds		X		
Subsidence				X
Thunderstorm			X	
Tornado	X			
Transportation Disruption				X
Urban Fire		X		
Utility Interruption			X	
Wild Fire			X	

Lake County PDM
Worksheet #1 (PDM Team)
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)
Avalanche			X
Communication Disruption	X		
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
Landslide			X
Lightning	X		
Rapid Snow Melt		X	
Strong Winds	X		
Subsidence			X
Thunderstorm	X		
Tornado	X		
Transportation Disruption		X	
Urban Fire	X		
Utility Interruption	X		
Wild Fire	X		

Lake County PDM
Worksheet #2 (PDM Team)
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
Avalanche				X
Communication Disruption			X	
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
Landslide				X
Lightning			X	
Rapid Snow Melt			X	
Strong Winds		X		
Subsidence				X
Thunderstorm			X	
Tornado		X		
Transportation Disruption			X	
Urban Fire			X	
Utility Interruption			X	
Wild Fire			X	

Lake County PDM
Worksheet #1 (Lake Co. Commission)
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)
Avalanche			X
Communication Disruption	X		
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	
Landslide			X
Lightning	X		
Rapid Snow Melt	X		
Strong Winds	X		
Subsidence			X
Thunderstorm	X		
Tornado	X		
Transportation Disruption	X		
Urban Fire	X		
Utility Interruption	X		
Wild Fire		X	

Lake County PDM
Worksheet #2 (Lake Co. Commission)
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
Avalanche				X
Communication Disruption	X			
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		
Landslide				X
Lightning			X	
Rapid Snow Melt		X		
Strong Winds		X		
Subsidence				X
Thunderstorm			X	
Tornado		X		
Transportation Disruption	X			
Urban Fire			X	
Utility Interruption	X			
Wild Fire			X	

Lake County Zoning

Lake County PDM
Worksheet #1 (Lake Co. Zoning)
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)
Avalanche			✓
Communication Disruption		✓	
Dam Failure			✓
Drought		✓	
Earthquake			✓
Extreme Cold	✓		
Extreme Heat		✓	
Flood		✓	
Freezing Rain/Sleet/Ice	✓		
Hail	✓		
Heavy Rain	✓		
Heavy Snow	✓		
Ice Jam			✓
Landslide			✓
Lightning		✓	
Rapid Snow Melt		✓	
Strong Winds	✓		
Subsidence			✓
Thunderstorm	✓		
Tornado		✓	
Transportation Disruption		✓	
Urban Fire		✓	
Utility Interruption	✓		
Wild Fire		✓	

Lake County PDM
Worksheet #2 (Lake Co. Zoning)
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
Avalanche				✓
Communication Disruption		✓		
Dam Failure			✓	
Drought		✓		
Earthquake				✓
Extreme Cold	✓			
Extreme Heat		✓		
Flood			✓	
Freezing Rain/Sleet/Ice	✓			
Hail			✓	
Heavy Rain		✓		
Heavy Snow		✓		
Ice Jam			✓	
Landslide				✓
Lightning			✓	
Rapid Snow Melt			✓	
Strong Winds		✓		
Subsidence				✓
Thunderstorm			✓	
Tornado			✓	
Transportation Disruption		✓		
Urban Fire			✓	
Utility Interruption	✓			
Wild Fire			✓	

Lake County PDM
Worksheet #1 (Sioux Valley)
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)
Avalanche			✓
Communication Disruption		✓	
Dam Failure			✓
Drought		✓	
Earthquake			✓
Extreme Cold	✓		
Extreme Heat	✓		
Flood		✓	
Freezing Rain/Sleet/Ice	✓		
Hail	✓		
Heavy Rain	✓		
Heavy Snow	✓		
Ice Jam		✓	
Landslide			✓
Lightning	✓		
Rapid Snow Melt		✓	
Strong Winds	✓		
Subsidence		✓	
Thunderstorm	✓		
Tornado		✓	
Urban Fire		✓	
Utility Interruption	✓		
Wild Fire		✓	

Lake County PDM
Worksheet #2 (Sioux Valley)
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
Avalanche				✓
Communication Disruption			✓	
Dam Failure				✓
Drought				✓
Earthquake				✓
Extreme Cold			✓	
Extreme Heat			✓	
Flood			✓	
Freezing Rain/Sleet/Ice	✓			
Hail			✓	
Heavy Rain			✓	
Heavy Snow		✓		
Ice Jam			✓	
Landslide				✓
Lightning			✓	
Rapid Snow Melt			✓	
Strong Winds	✓			
Subsidence			✓	
Thunderstorm		✓		
Tornado		✓		
Urban Fire				✓
Utility Interruption			✓	
Wild Fire			✓	

Lake County PDM
Worksheet #1 (Big Sioux RWS)
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)
Avalanche			X
Communication Disruption	X		
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
Landslide			X
Lightning	X		
Rapid Snow Melt	X		
Strong Winds	X		
Subsidence			X
Thunderstorm	X		
Tornado	X		
Urban Fire			X
Utility Interruption	X		
Wild Fire			X

Big Sioux CWS
23343 479th Ave
Egan SD 57024

Lake County PDM
Worksheet #2 (Big Sioux RWS)
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
Avalanche				X
Communication Disruption			X	
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
Landslide				X
Lightning	X			
Rapid Snow Melt		X		
Strong Winds	X			
Subsidence				X
Thunderstorm	X			
Tornado	X			
Urban Fire				X
Utility Interruption	X			
Wild Fire			X	

Big Sioux CWS
23343 479th Ave
Egan SD 57024

Appendix E

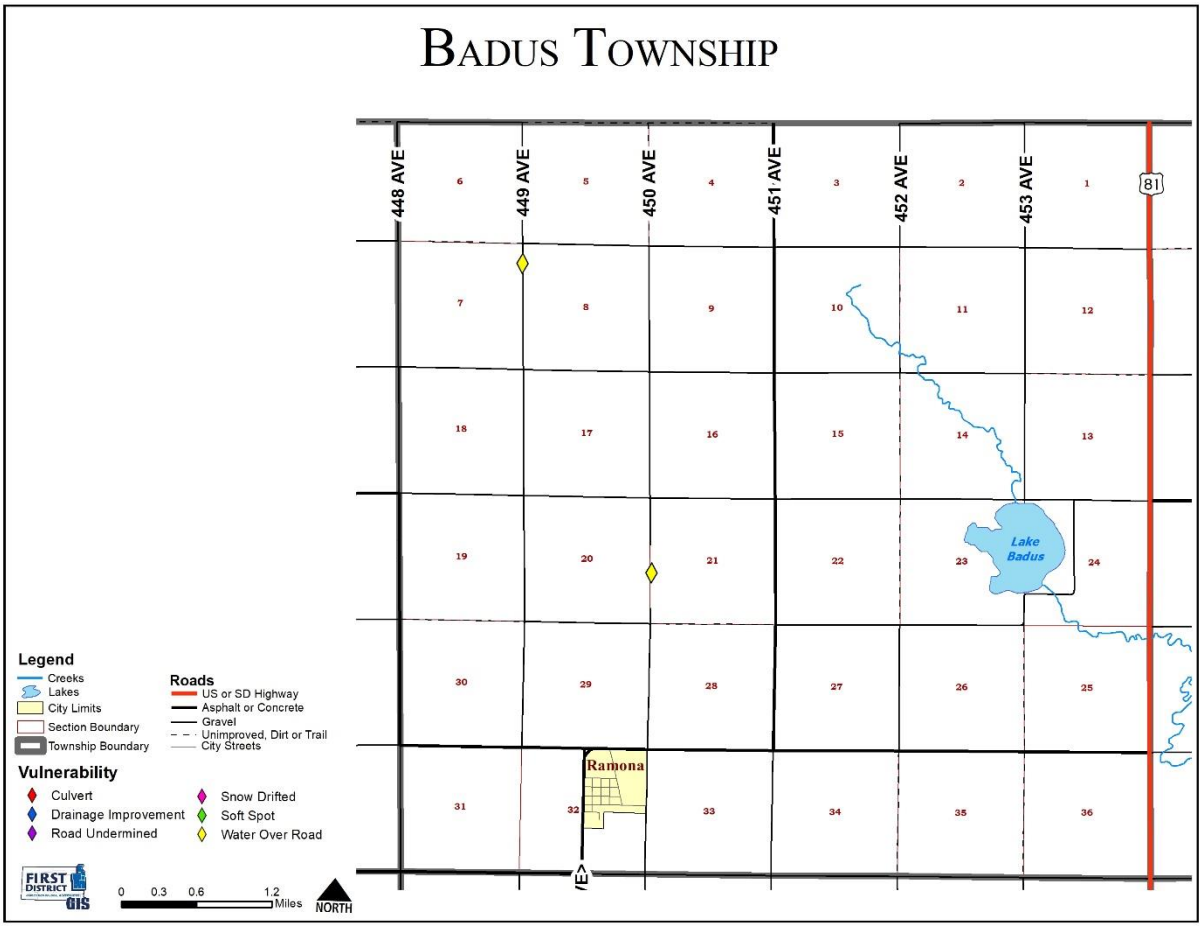
Township Vulnerable and Potential Mitigation Project Site Maps

In December of 2017 First District mailed a request to the Township Clerk or Road Supervisor of every township in Lake County. They were requested to list any critical infrastructure and identify (on a map) any areas which are most vulnerable to natural hazards, specifically flooding. First District Staff attended the annual meeting of the Towns, Townships and Lake Associations Meeting with the Lake County Commissioners on March 12, 2018. First District Staff met with those Townships and Lake Associations in attendance to complete the maps and information. It was assumed that any townships which did not respond to the information request had no critical infrastructure or vulnerable areas which may require mitigation activities. Of the 16 requests sent, 8 were returned with vulnerable areas identified (see table below).

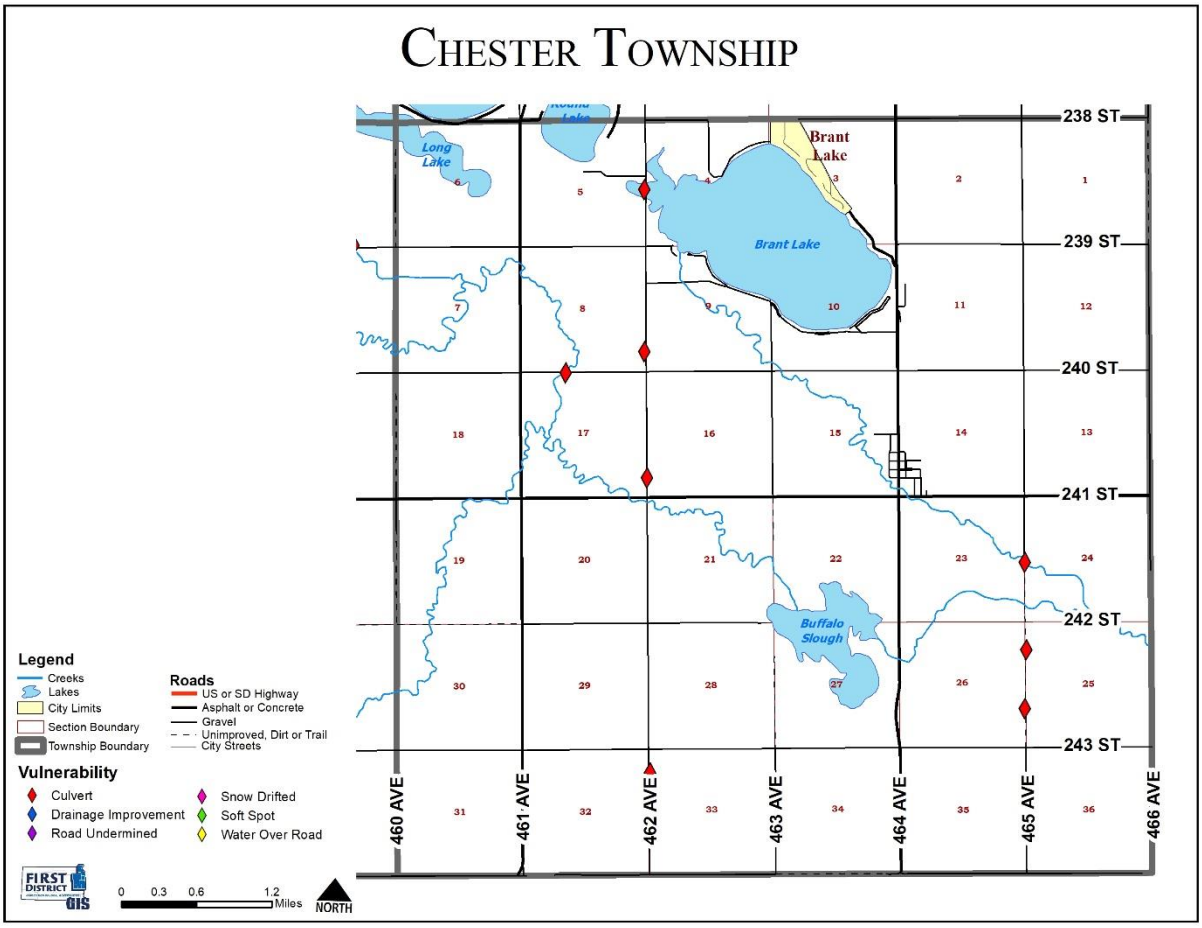
Township Name	Response
Badus Township	Identified vulnerabilities
Chester Township	Identified vulnerabilities
Clarno Township	Not returned/ No vulnerabilities
Concord Township	Not returned/ No vulnerabilities
Farmington Township	Identified vulnerabilities
Franklin Township	Identified vulnerabilities
Herman Township	Not returned/ No vulnerabilities
Lake View Township	Identified vulnerabilities
Le Roy Township	Identified vulnerabilities
Nunda Township	Not returned/ No vulnerabilities
Orland Township	Identified vulnerabilities
Rutland Township	Not returned/ No vulnerabilities
Summit Township	Not returned/ No vulnerabilities
Wayne Township	Not returned/ No vulnerabilities
Wentworth Township	Identified vulnerabilities
Winfred Township	Not returned/ No vulnerabilities

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

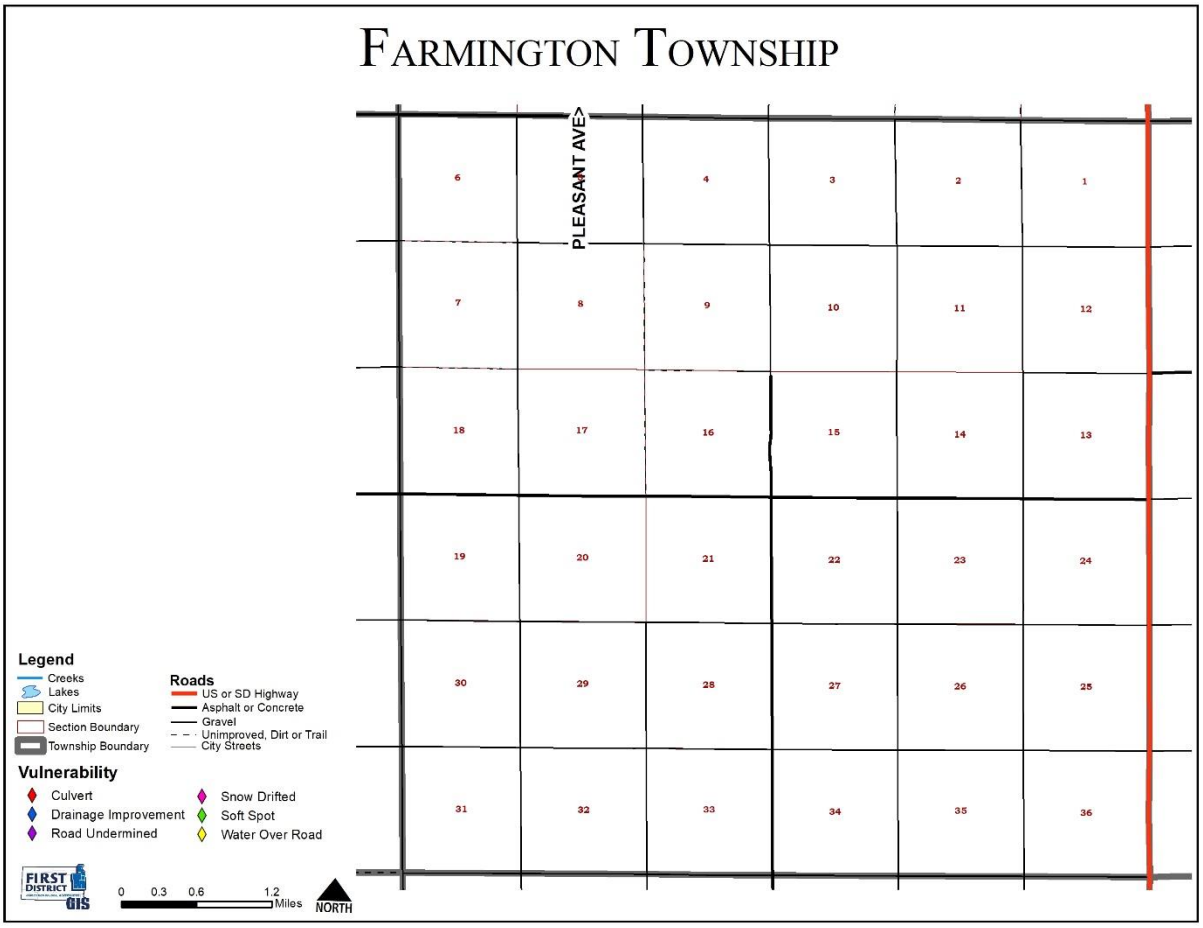
Badus Township



Cheater Township

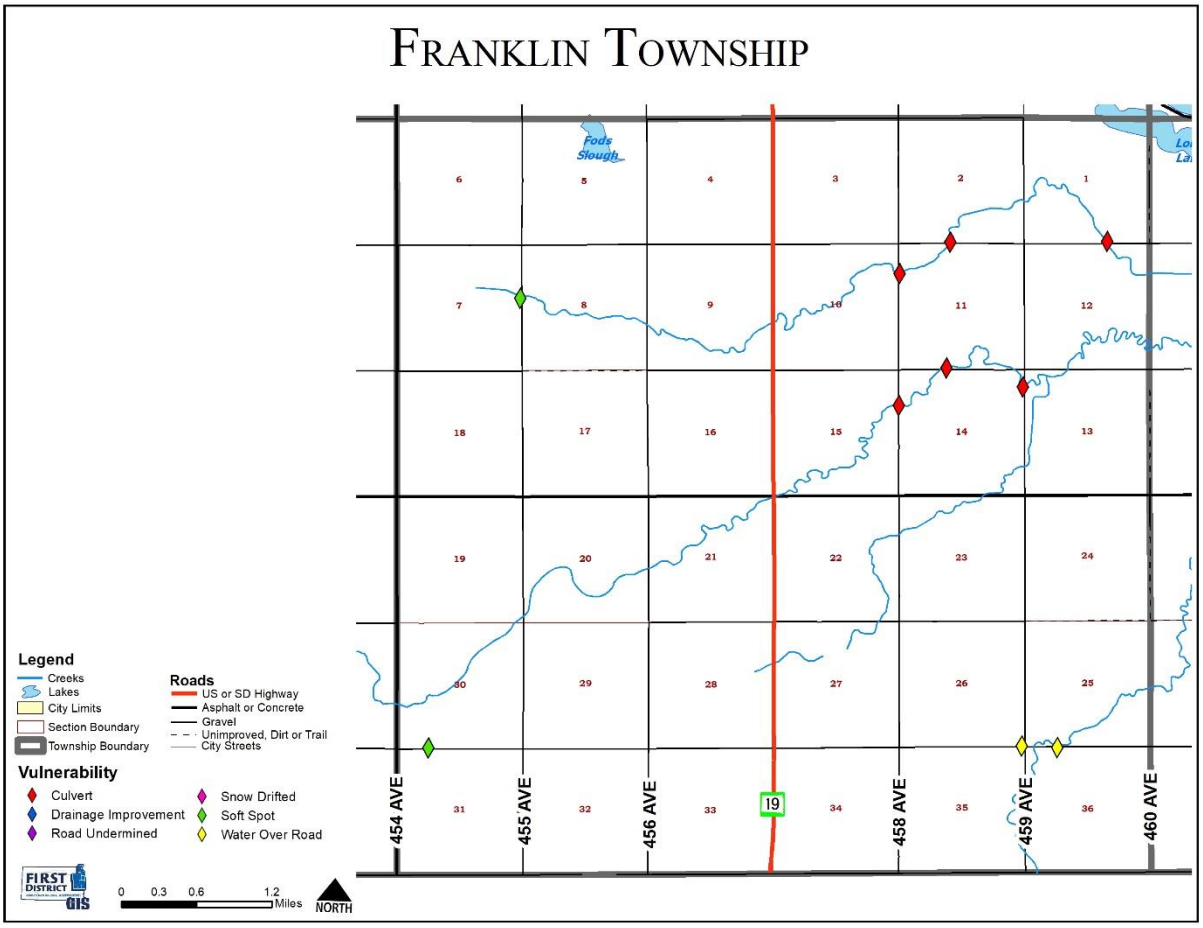


Farmington Township

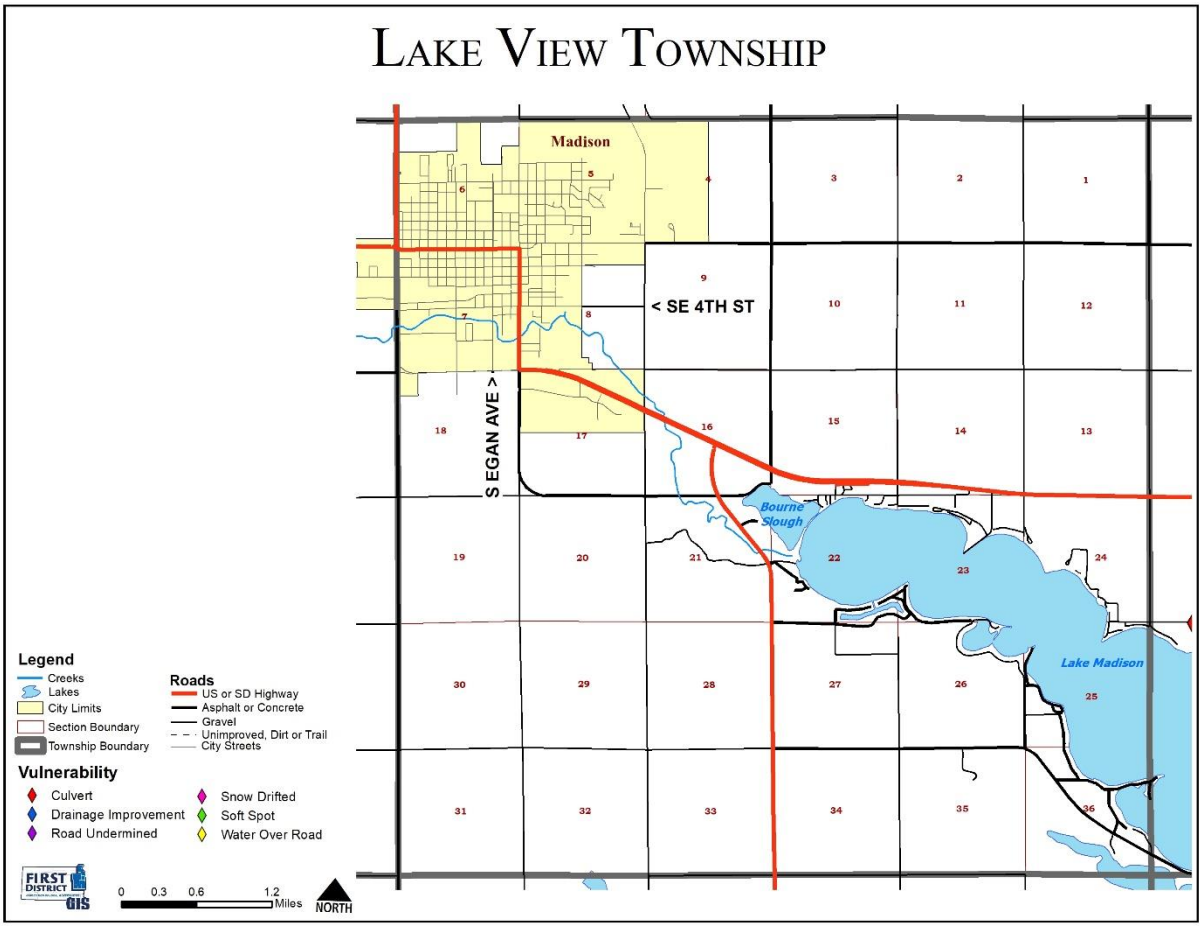


No areas of concern.

Franklin Township

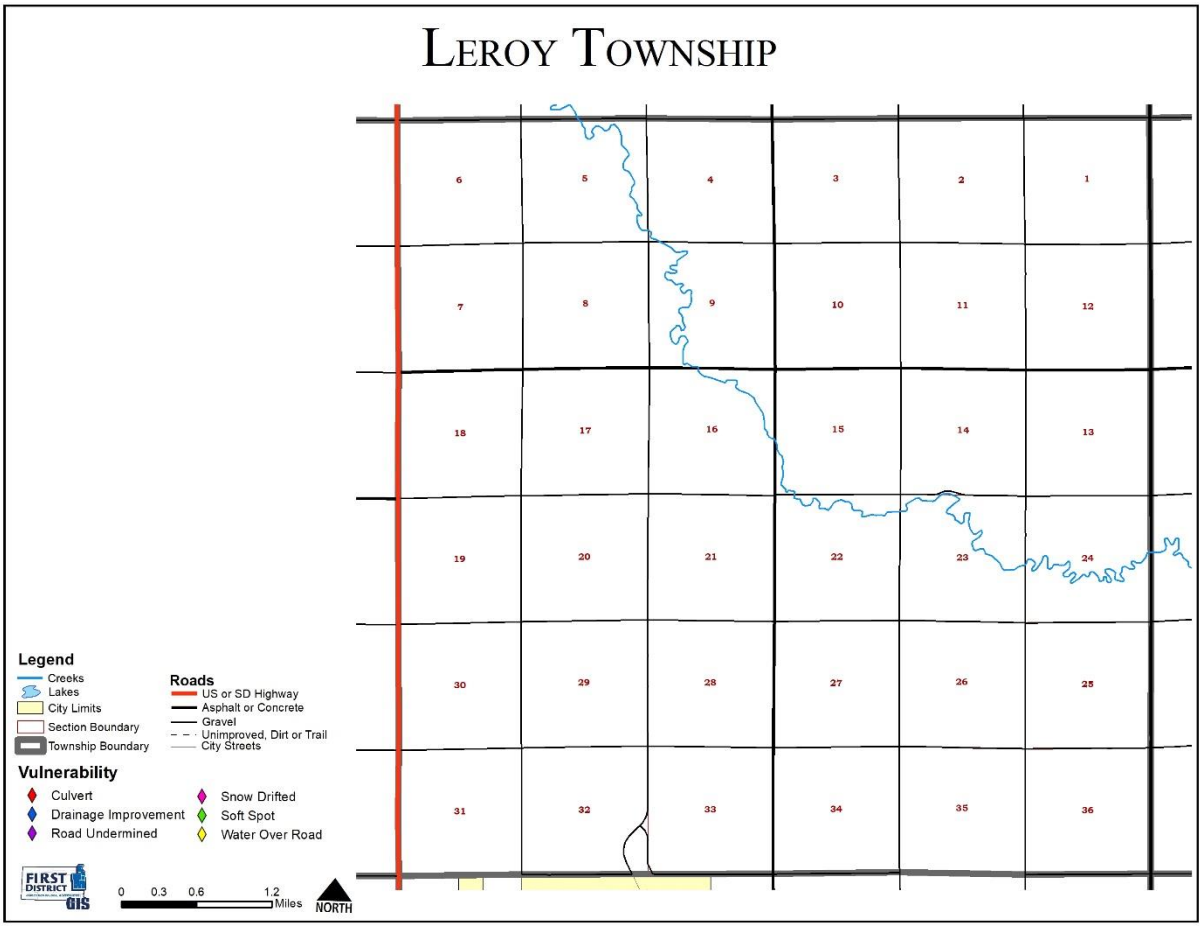


Lake View Township



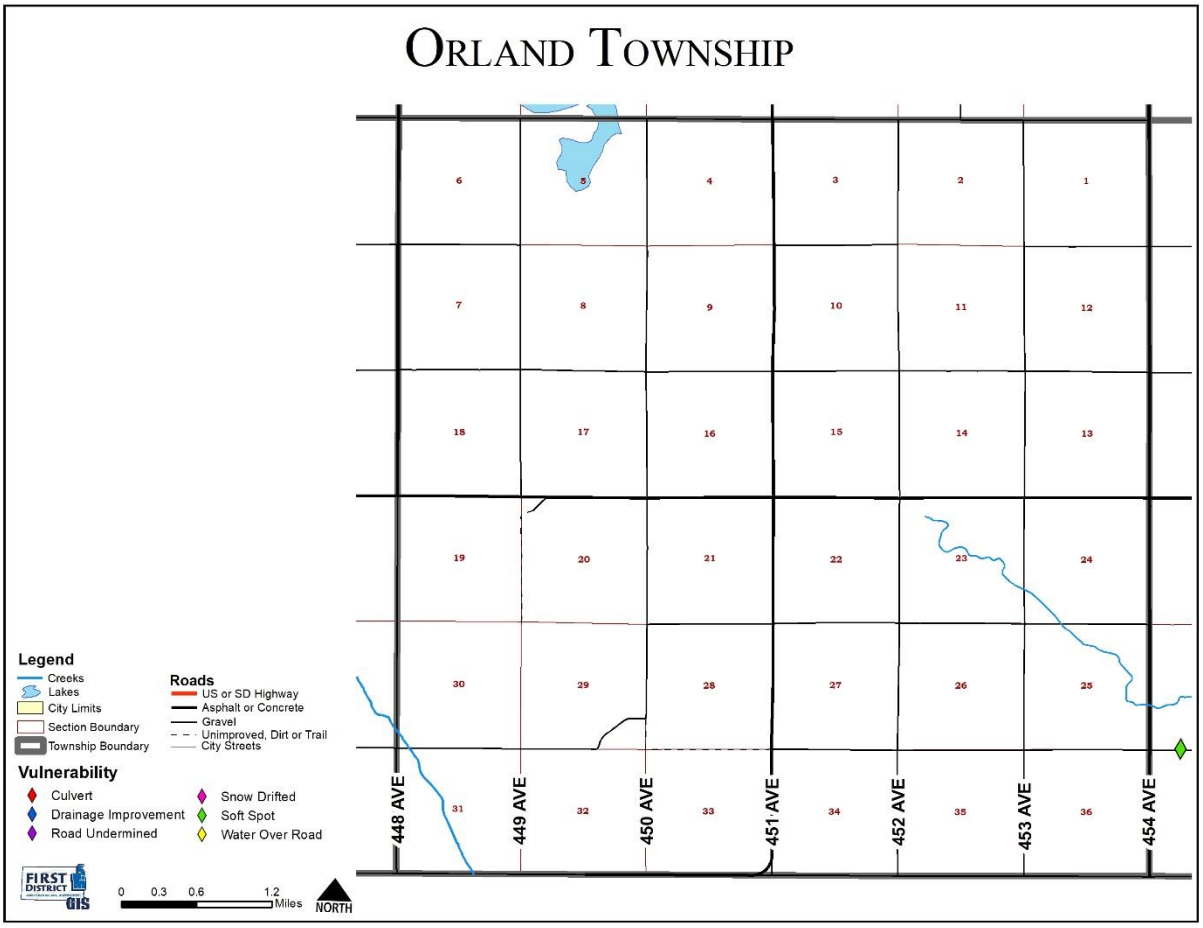
No areas of concern.

Le Roy Township

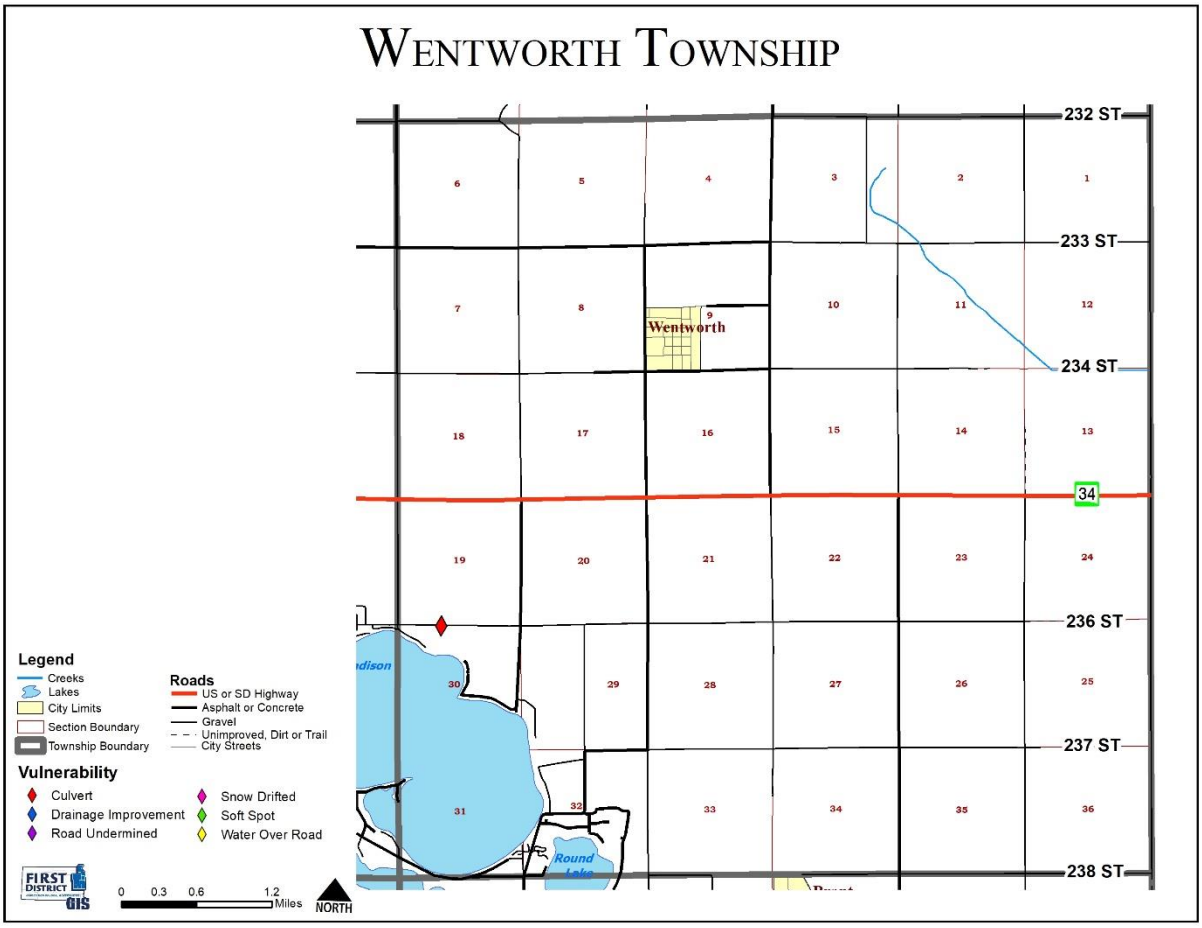


No areas of concern.

Orland Township

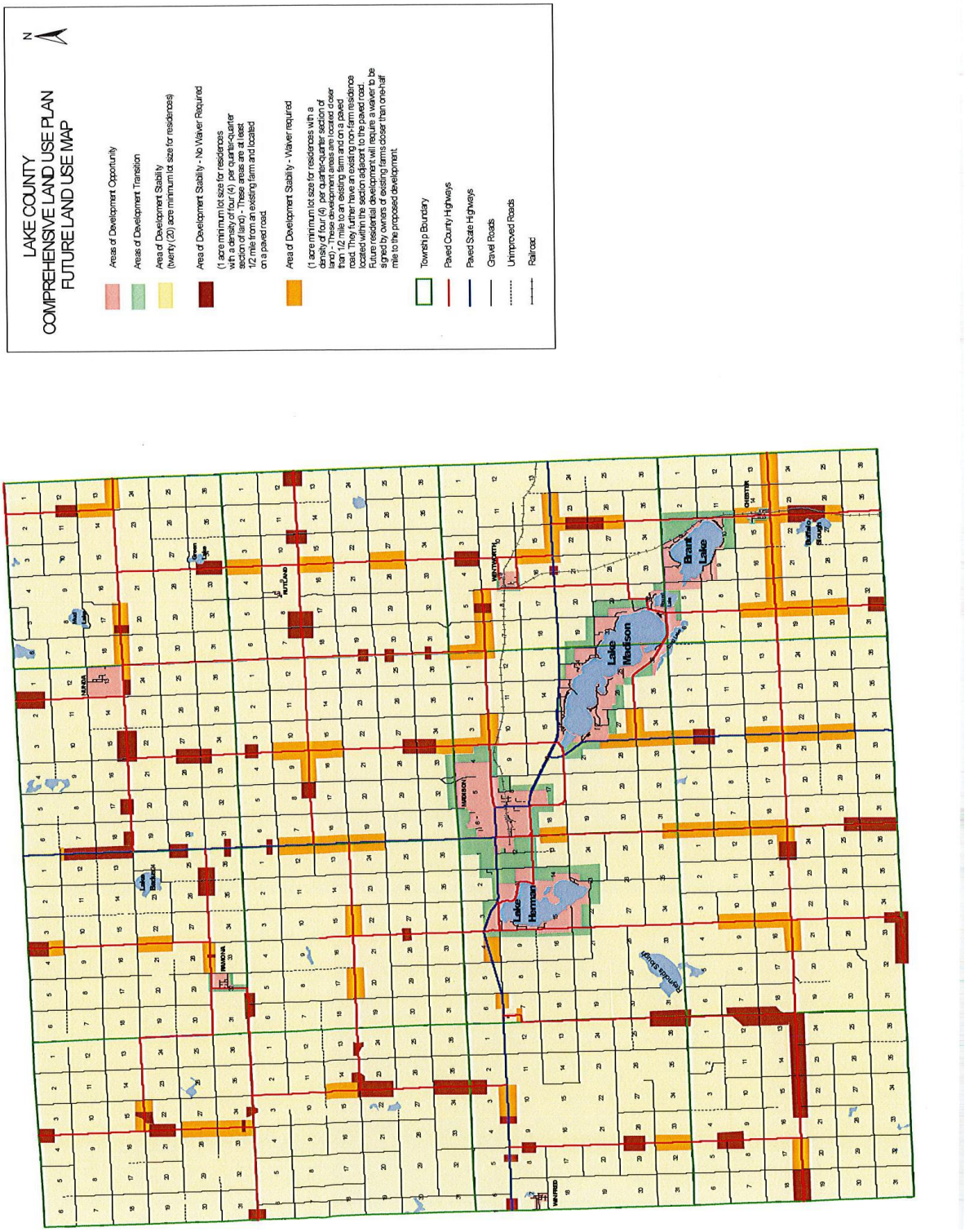


Wentworth Township

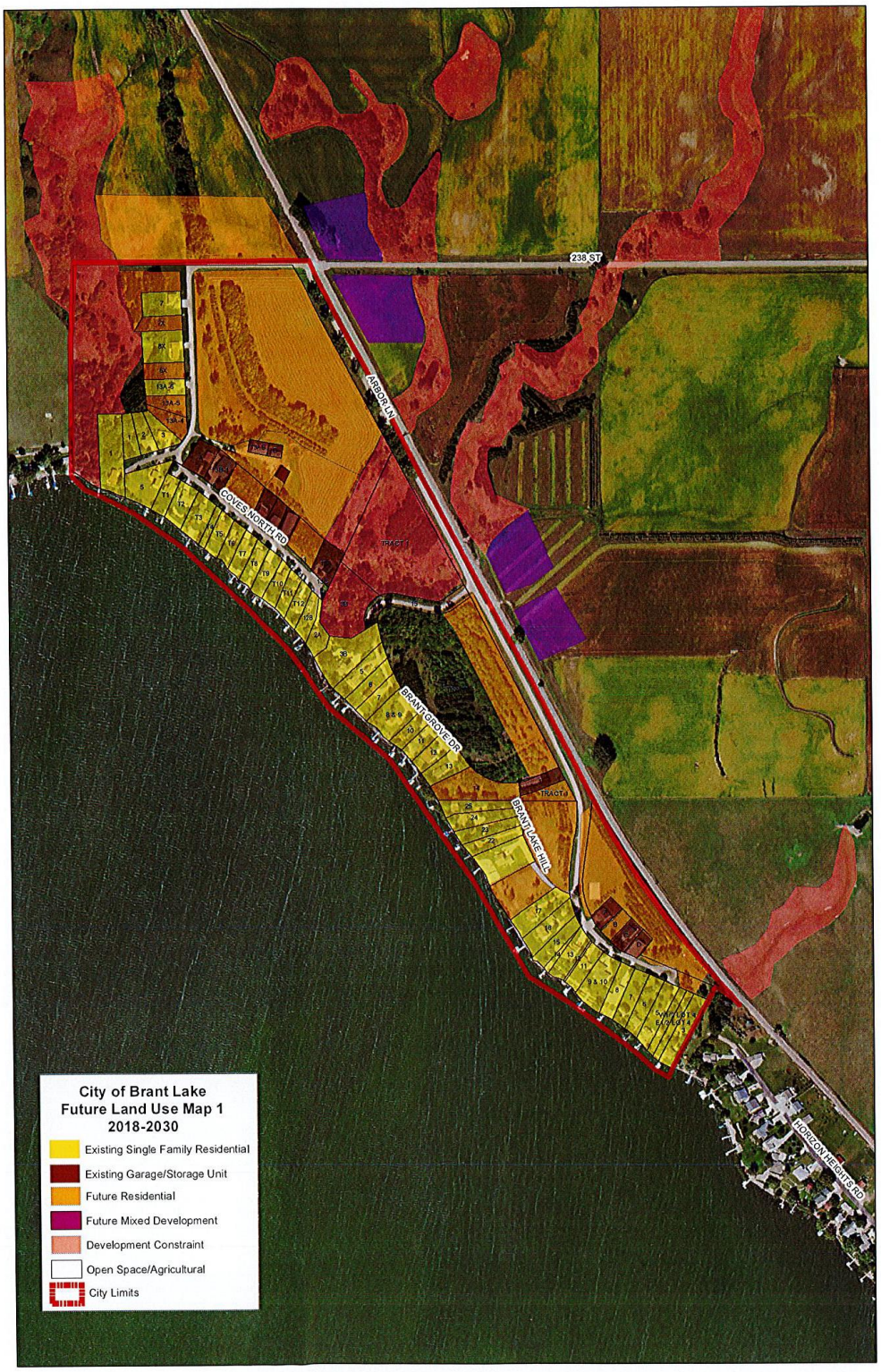


Appendix F – Comprehensive Land Use Maps

Lake County Future Land Use Map



City of Brant Lake Future Land Use Map



City of Madison Future Land Use Map

FIGURE 5.3

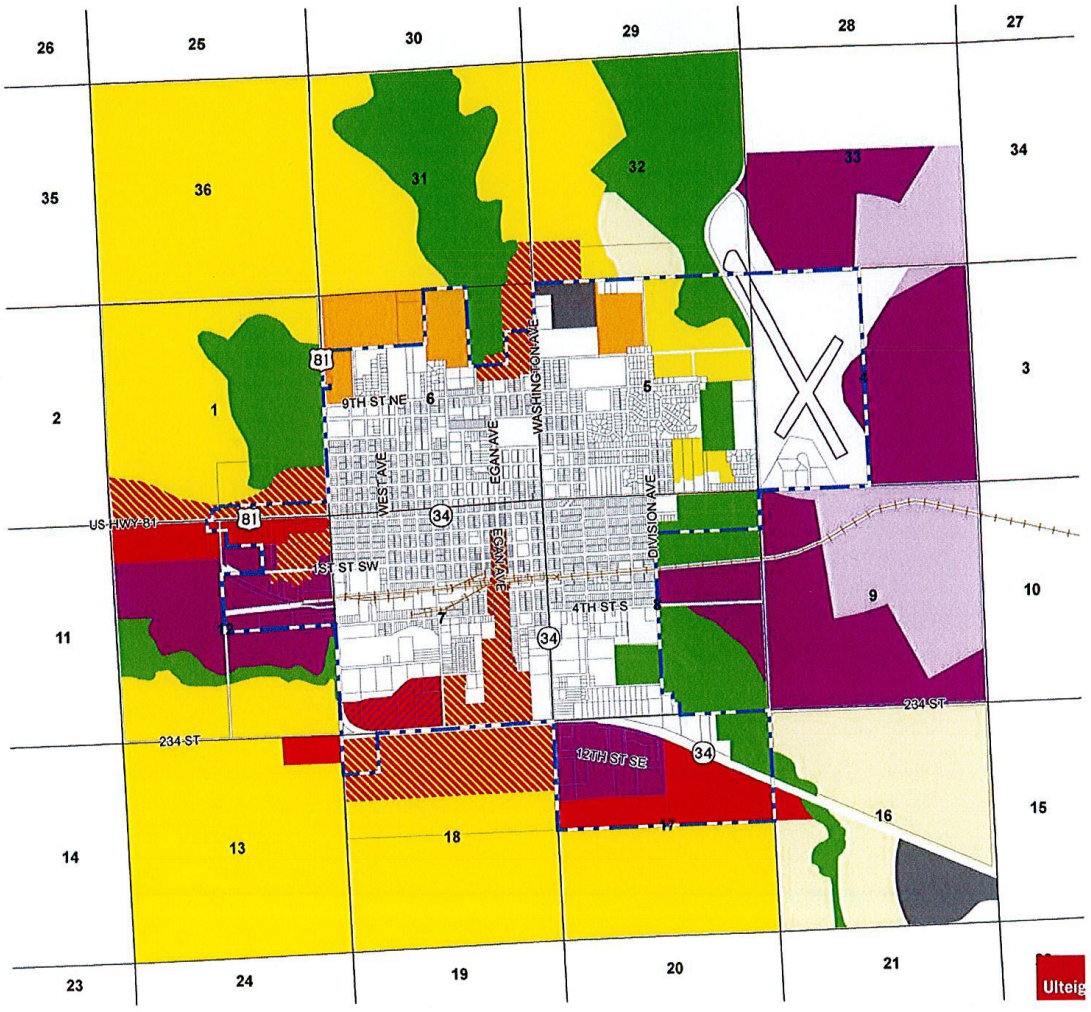
FUTURE LAND USE
Madison Comprehensive Plan

0 1,320 2,640 3,960 5,280 ft

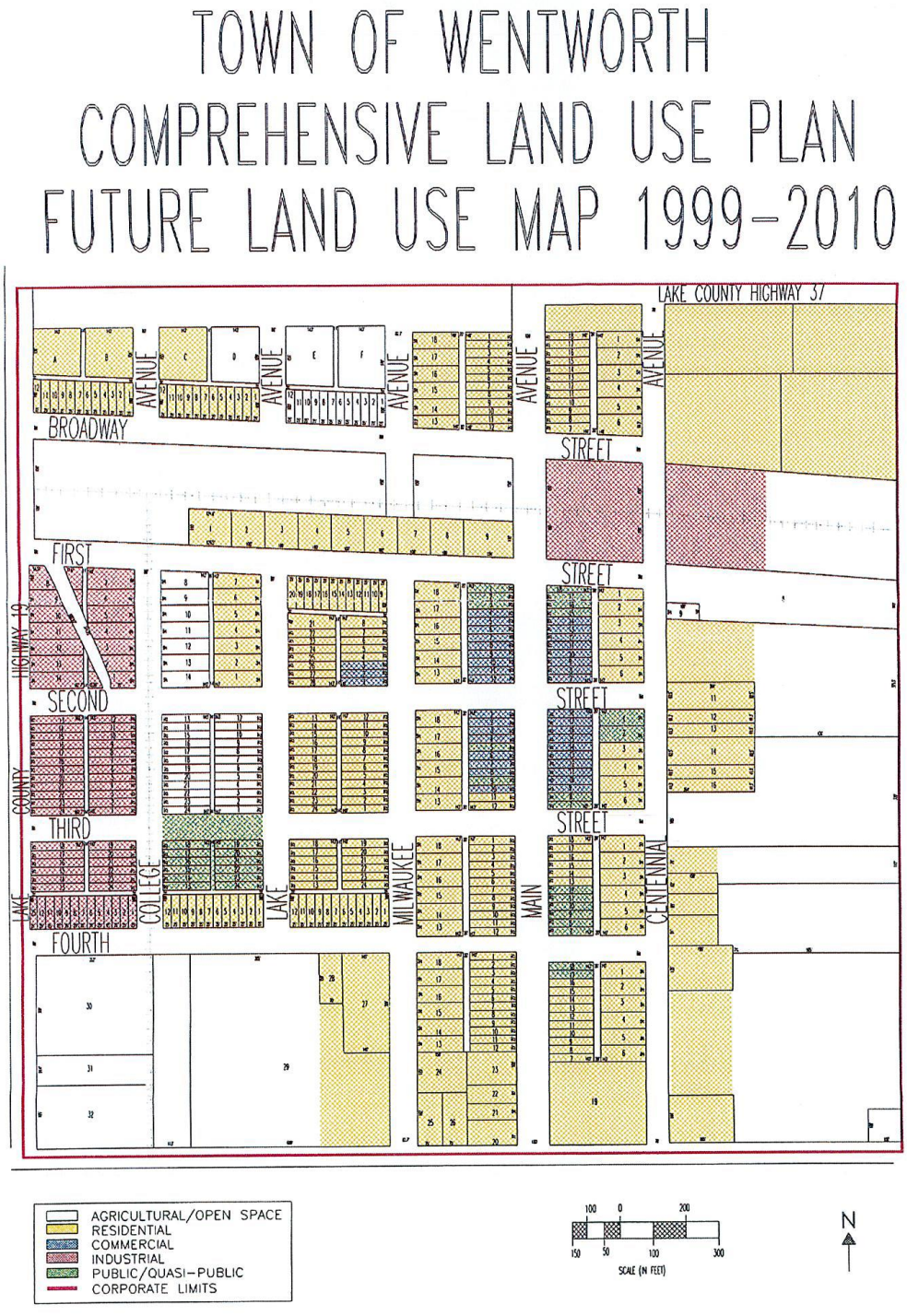
PLAN MADISON!

Corporate Limits
Madison Municipal Airport
Railroad

Future Land Use
Low Density Residential
Residential
Medium Density Residential
Mixed-Use
Commercial
Commerical/Industrial
Low Intensity Industrial
Industrial
Parks/Open Space/Drainage
Semi-Public



Town of Wentworth Future Land Use Map



Appendix G– Review of 2013 PDM Mitigation Project Implementation

COMMUNITY	POTENTIAL MITIGATION PROJECTS	HAZARD	INCLUDED IN 2018 PLAN?	STATUS
Lake County	Integrate the goals and action items from the Lake County PDM Plan into existing regulatory documents and programs where appropriate.	All	Yes	Ongoing
Lake County	Identify and pursue funding opportunities to develop and implement local and county mitigation activities.	All	Yes	Ongoing
Lake county	Establish a formal role for the Lake County PDM Committee to develop sustainable projects for implementing, monitoring, and evaluating countywide mitigation activities.	All	Yes	Ongoing
Lake County	Identify, improve, and sustain collaborative programs focusing on the real estate and insurance industries, public and private sector organizations, and individuals to avoid activity that increases risk to natural hazards.	Flooding	Yes	Ongoing
Lake County	Develop public and private partnerships to foster PDM program coordination and collaboration in Lake County.	All	Yes	Ongoing
Lake County	Develop inventories of at-risk buildings and infrastructure and prioritize projects.	Flooding	Yes	Ongoing
Lake County	Strengthen emergency services preparedness and response by linking emergency services with PDM programs and enhancing public education on a regional scale.	All	Yes	Ongoing

COMMUNITY	POTENTIAL MITIGATION PROJECTS	HAZARD	INCLUDED IN 2018 PLAN?	STATUS
Lake County	Develop, enhance, and implement education programs aimed at mitigating natural hazards, and reducing the risk to citizens, public agencies, private property owners, businesses and schools.	All	Yes	Ongoing
Lake County	Use technical knowledge of natural ecosystems and events to link natural resource management and land use organizations to mitigation activities and technical assistance.	All	Yes	Ongoing
Lake County	Analyze each repetitive flood property within Lake County and Identify feasible mitigation options.	Flooding	Yes	Ongoing
Lake County	Recommend revisions to requirements for development within the floodplain, where appropriate.	Flooding	Yes	Ongoing
Lake County	Enhance data and mapping for floodplain information within the county and identify and map flood-prone areas outside of designated floodplains.	Flooding	Yes	Ongoing
Lake County, Madison	Encourage development of acquisition and management strategies to preserve open space for flood mitigation, fish habitat and water quality in the floodplain.	Flooding	Yes	Ongoing
Lake County	Map culverts in unincorporated areas of the county.	Flooding	Yes	Ongoing
Lake County	All bridges have been identified and inspected.	Flooding	Yes	Ongoing

COMMUNITY	POTENTIAL MITIGATION PROJECTS	HAZARD	INCLUDED IN 2018 PLAN?	STATUS
Lake County	Raise county road grades as necessary to maintain rural resident access.	Flooding	Yes	Ongoing
Lake County	Conduct Public Awareness Training.	All	Yes	Ongoing
Lake County	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from storms.	All	Yes	Ongoing
Lake County	Increase public awareness of severe winter storm mitigation activities.	Winter Storms	Yes	Ongoing
Lake County	Enhance weather monitoring to attain earlier severe winter storm warnings.	Winter Storms	Yes	Ongoing
Lake County	Develop Storm Ready communities across Lake County.	Severe Storms and Tornadoes	Yes	Ongoing
Lake County	Initiate/Complete actions required to make all communities NWS Storm Ready communities.	Severe Storms and Tornadoes	Yes	Ongoing
Lake County	Map and publicize locations around the county that have the highest incidence or extreme wind storms.	Winter and Severe Storms and Tornadoes	Yes	Ongoing
Lake County	Support/encourage electric utilities to bury power lines where possible.	Winter and Severe Storms and Tornadoes	Yes	Ongoing
Lake County	Increase public awareness of wind storm mitigation activities.	Winter and Severe Storms and Tornadoes	Yes	Ongoing

COMMUNITY	POTENTIAL MITIGATION PROJECTS	HAZARD	INCLUDED IN 2018 PLAN?	STATUS
Madison	Install back up power for city shelters.	All	No	Completed
Madison	Install back up power for city water treatment plant.	All	No	Completed
Madison	Burial of overhead lines that are susceptible to severe weather damage.	Winter Storms, Severe Storms and Tornadoes	Yes	Ongoing
Madison	Install curb and gutter along undeveloped street as needed.	Severe Storms and Flooding	Yes	Ongoing
Madison	Construct retention dam on north city limits.	Flooding	Yes	Ongoing
Madison	Develop new storm safe rooms as needed.	Severe Storms and Tornados	Yes	Ongoing
Madison	Replace culvert on north Josephine Avenue.	Flooding	No	Completed
Madison	Replace culvert on east Center Street.	Flooding	Yes	Ongoing
Madison	Replace culvert on north Blanche Avenue.	Flooding	Yes	Ongoing
Madison	Replace culvert on south Egan Avenue.	Flooding	No	Completed
Madison	Replace culvert on northwest 9th Street.	Flooding	No	Completed
Madison	Replace box culvert on south Washington Avenue.	Flooding	No	Completed
Madison	Construct berm along Memorial Creek south of 2nd Street NE.	Flooding	Yes	Ongoing

COMMUNITY	POTENTIAL MITIGATION PROJECTS	HAZARD	INCLUDED IN 2018 PLAN?	STATUS
Madison	Construct berm along Silver Creek north of 8th Street SW.	Flooding	Yes	Ongoing
Madison	Raise grade on south Highland Avenue in conjunction with berm project.	Flooding	Yes	Ongoing
Madison	Construct berm along Silver Creek north of 7th Street SW.	Flooding	Yes	Ongoing
Madison	Replace bridge on south Garfield Avenue.	Flooding	Yes	Ongoing
Madison	Construct drainage improvements on south Washington Avenue.	Flooding	No	Completed
Madison	Construct drainage improvements at SD 34 and 456th Avenue.	Flooding	No	Project not feasible
Madison	Install wastewater check valves in city residences and businesses.	Flooding	Yes	Ongoing
Madison	Replace railroad trestle across Memorial Creek.	Flooding	Yes	Ongoing
Madison	Install storm sewer check valves in creeks.	Severe Storms and Flooding	No	No longer a priority.

COMMUNITY	POTENTIAL MITIGATION PROJECTS	HAZARD	INCLUDED IN 2018 PLAN?	STATUS
Madison	Construct a detention/retention pond on 15th Street.	Severe Storms and Flooding	No	No longer a priority
Madison	Maintain and improve drainage/basin areas including ROWs during dry season.	Flooding	Yes	Ongoing
Madison	Develop plan of priorities to widen stream areas.	Flooding	Yes	Ongoing
Madison	Review and update city building codes as needed.	Flooding and Fire	Yes	Ongoing
Madison	Upgrade storm drainage systems.	Severe Storms and Flooding	Yes	Ongoing
Lake County Fire Departments	Enhance emergency services to increase the efficiency of wildfire response and recovery activities	Fire	Yes	Ongoing
Lake County Fire Departments	Educate agency personnel on federal cost share and grant programs, Fire Protection Agreements, and other related federal programs	Fire	Yes	Ongoing
Lake County Fire Departments	Inventory alternative firefighting water sources and encourage the development of additional sources	Fire	Yes	Ongoing
Lake County Fire Departments	Inventory alternative firefighting water sources and encourage the development of additional sources	Fire	Yes	Ongoing

COMMUNITY	POTENTIAL MITIGATION PROJECTS	HAZARD	INCLUDED IN 2018 PLAN?	STATUS
Lake County Fire Departments	Encourage development and dissemination of maps relating to fire hazard and help educate and assist builders and homeowners in being engaged in fire mitigation activities and to help guide emergency services during response.	Fire	Yes	Ongoing
Lake County Fire Departments	Enhance outreach and education aimed at mitigating wildfire hazards and reducing or preventing the exposure of citizens, public agencies, private property owners and businesses to natural hazards.	Fire	Yes	Ongoing
Lake County Fire Departments	Increase communication, coordination and collaboration between wildland/urban interface property owners, planners, and fire prevention crews and officials to address risks, existing mitigation measures, and federal assistance programs.	Fire	Yes	Ongoing
Lake County Fire Departments	Encourage implementation of wildfire mitigation activities in a manner consistent with the goals of promoting sustainable ecological management and community stability.	Fire	Yes	Ongoing
Lake County and Cities	Enhance strategies for debris management for hazardous events.	All	Yes	Ongoing
Lake County and Cities	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from storms.	All	Yes	Ongoing

COMMUNITY	POTENTIAL MITIGATION PROJECTS	HAZARD	INCLUDED IN 2018 PLAN?	STATUS
Lake County and Cities	Develop and implement programs to keep trees from threatening lives, property and public infrastructure during wind storms.	Winter and Severe Storms and Tornadoes	Yes	Ongoing
Lake County and Cities	Encourage development and enforcement of wind resistant building siting and construction codes.	Winter and Severe Storms and Tornadoes	Yes	Ongoing
Nunda	Install back up power to water well.	All	No	Completed
Nunda	Install back up power to town shelter.	All	No	Completed
Nunda	Construct levees for storm water drainage.	Flooding	No	Not a priority
Nunda	Support/encourage electric utility to bury power lines where possible.	Winter and Severe Storms and Tornadoes	Yes	Ongoing
Nunda	Develop a storm shelter.	All	No	Completed
Ramona	Install back up power to wastewater system.	All	No	Completed
Ramona	Install back up power to city shelter.	All	No	Completed
Ramona	Install back up power to water treatment facility.	All	No	Not a priority
Ramona	Support/encourage electric utility to bury power lines where possible.	Winter and Severe Storms and Tornadoes	Yes	Ongoing
Ramona	Develop additional storm shelters.	All	No	Not a priority

COMMUNITY	POTENTIAL MITIGATION PROJECTS	HAZARD	INCLUDED IN 2018 PLAN?	STATUS
Ramona	Develop/implement a text messaging/telephone warning system for school/public.	All	No	Completed
Wentworth	Install back up power to the city water system.	All	No	Not a priority
Wentworth	Support/encourage electric utility to bury power lines where possible.	Winter and Severe Storms and Tornadoes	Yes	Ongoing
Wentworth	Develop additional storm shelters.	All	No	Not a priority
Wentworth	Install back up power to city shelter.	All	No	Not a priority

Appendix H - References

City of Madison Comprehensive Land Use Plan, Zoning and Subdivision Ordinances – Ulteig, 2008

Comprehensive Land Use Plan for Lake County – First District Association of Local Governments, 2001

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

Lake County Multi-Hazard Mitigation Plan, 2013

Lake County Zoning Ordinance – First District Association of Local Governments, 2006

NFIP Flood Insurance Rate Maps and Community Status Book Report

State of South Dakota Hazard Mitigation Plan. South Dakota Office of Emergency Management. 2011.

City of Brant Lake Comprehensive Land Use Plan and Zoning Ordinance – First District Association of Local Governments, 2018

Town of Wentworth Comprehensive Land Use Plan and Zoning Ordinance – First District Association of Local Governments, 1999