2020 Updated Multi-Jurisdictional Hazard Mitigation Plan
Black Hawk County, Iowa

Adopted by City Council / Board of Supervisors:

Black Hawk County	04/14/2020	City of Gilbertville	05/04/2020
City of Cedar Falls	05/18/2020	City of Hudson	05/11/2020
City of Dunkerton	05/11/2020	City of La Porte City	04/27/2020
City of Elk Run Heights	06/09/2020	City of Raymond	05/04/2020
City of Evansdale	05/05/2020	City of Waterloo	06/22/2020

Adopted by University of Northern Iowa TBD
Adopted by Cedar Falls Community School District Board of Directors 07/13/2020
Adopted by Waterloo Community School District Board of Directors 07/13/2020

Approved by FEMA: 06/08/2020
FEMA Approval Expiration: 06/28/2025

Prepared by:

INRCOG
Iowa Northland Regional Council of Governments

U.S. Department of Homeland Security
FEMA Region VII
11224 Holmes Road
Kansas City, MO 64131

FEMA

June 8, 2020

V. Joyce Flinn, Director
Iowa Homeland Security & Emergency Management Division
7900 Hickman Road, Suite 500
Windsor Heights, IA 50324

Subject: Review of the Black Hawk County, Iowa Hazard Mitigation Plan

Dear Ms. Flinn:

The purpose of this letter is to provide the status of the above referenced Local Hazard Mitigation Plan, pursuant to the requirements of 44 CFR Part 201 - Mitigation Planning and the Local Multi-Hazard Mitigation Planning Guidance. The Local Hazard Mitigation Plan Review Tool documents the Region's review and the plan compliance with all required elements of 44 CFR Part 201.6. The Plan Review Tool also identifies the jurisdictions participating in the planning process. FEMA's approval will be for a period of five years effective starting with the approval date indicated below.

Prior to the expiration of the plan the community will be required to review and revise their plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval in order to continue to be eligible for mitigation project grant funding.

Plan Name	Date Submitted	Date Approved	Date of Plan Adoption	Date of Plan Expiration	Review Status
Black Hawk County	May 1, 2020	June 8, 2020	April 14, 2020	June 8, 2025	Approved

If you have any questions or concerns, please contact Joe Chandler, Planning Team Lead, at (816) 283-7071.

Sincerely,

Catherine R. Sanders, Director
Mitigation Division

** This page intentionally left blank. **

BLACK HAWK COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

On the 14th day of April, 2020 the Black Hawk County Board of Supervisors adopted the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan. The Plan was submitted to FEMA and Iowa Homeland Security & Emergency Management for approval. It was subsequently approved on June 8, 2020 with an expiration date of June 8, 2025.

The Plan is available online at www.inrcog.org/pub.

TABLE OF CONTENTS

LIST OF TABLES & FIGURES

ACKNOWLEDGEMENTS

HAZARD MITIGATION PLANNING COMMITTEE

Over the course of the planning process a number of individuals donated their time and efforts toward providing information, attending meetings, and providing input for the successful completion of the plan. The following is a list of people who participated in the development of this multi-jurisdictional hazard mitigation plan:

Black Hawk County
Lorie Glover
Linda Laylin
Maureen Mehman
Cathy Nicholas
Rory Geving
Tony Thompson
Kim Veeder

City of Cedar Falls
John Bostwick
Craig Berte
Rob Green
Chase Schrage
Stephanie Sheetz

City of Dunkerton
Dennis Manahl
Michael Schares
Tim Schultz
Sheila Steffen
Brenda Thompson

City of Elk Run Heights
Kristi Lundy
Gary Wurtz

City of Evansdale
Troy Beatty
Chad Deutsch
Doug Faas
DeAnne Kobliska
Becky Walters

City of Gilbertville
Jane Walters
Teresa Adamson Mark
Thome

City of Hudson
ColleenDamon
Chrissi Wiersma
George Wessel

City of La Porte City
David Neil
Jane Whittlesey

City of Raymond
Nancy Miebach
Gary Vick

City of Waterloo
Jerome Amos
Noel Anderson
Quentin Hart
Jamie Knutson
Aric Schroeder

University of Northern Iowa
Helen Haire

Cedar Falls Community School District
Rick Gersema
Janelle Darst

Waterloo Community School District
Dan Huff

INRCOG
Lisa Ahern
Dan Schlichtmann
Brian Schoon

SECTION 1 – INTRODUCTION

INTRODUCTION

Natural hazards have the potential to cause property loss, loss of life, economic hardship, and threats to public health and safety. While an important aspect of emergency management deals with disaster recovery – those actions that a community must take to repair damages and make itself whole in the wake of a natural disaster – an equally important aspect of emergency management involves hazard mitigation. Hazard mitigation measures are efforts taken before a disaster happens to lessen the impact that future disasters of that type will have on people and property in the community. They are things you do today to be more protected in the future. Hazard mitigation actions taken in advance of a hazard event are essential to breaking the typical disaster cycle of damage, reconstruction, and repeated damage. With careful selection, hazard mitigation actions can be long-term, cost-effective means of reducing the risk of loss and help create a more disaster-resistant and sustainable community.

The Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan (M-J HMP) was developed to serve as an updated document to assist in making the planning area (currently the cities of Cedar Falls, Dunkerton, Elk Run Heights, Evansdale, Gilbertville, Hudson, La Porte City, Raymond, Waterloo and the Black Hawk County unincorporated area) less susceptible to these hazards. All participating cities have previously participated in the multi-jurisdictional hazard mitigation plans. This M-J HMP is intended to update the prior plan which expires July 23, 2020.

What is a Hazard Mitigation Plan?

Generally, the first question asked when communities begin the process of preparing a Hazard Mitigation Plan (HMP) is very simply "What is a Hazard Mitigation Plan and what is it intended purpose?" First, it is imperative to define what precisely the term mitigation entails. One definition of the term is stated most effectively by the Federal Emergency Management Agency (FEMA) and is as follows: *"Mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event. Mitigation, also known as prevention (when done before a disaster), encourages long-term reduction of hazard vulnerability. The goal of mitigation is to decrease the need for response as opposed to simply increasing the response capability." (www.fema.gov).*

A hazard mitigation plan is developed by local government(s) before a disaster strikes. The plan identifies local community policies, actions, and tools for on-going, short-, mid-, and long-term implementation to reduce risk and potential future losses of property and lives.

Purposes of Hazard Mitigation Planning

The following list identifies the importance of conducting hazard mitigation planning:

- To facilitate the protection of the health, safety and economic security of residents, workers, visitors and property owners by mitigating the impacts of natural and manmade hazards.
- Influence decision making in both the public and private sectors.
- Fulfill statutory requirements of the Disaster Mitigation Act of 2000 – as of November 1, 2004 a community must have a FEMA-approved hazard mitigation plan in order to be eligible for FEMA project grant monies under programs such as the Flood Mitigation Assistance Grant program (FMA), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Grant program (PDM), Severe Repetitive Loss Grant program (SRL), Repetitive Flood Claims Grant program (RFC), and certain categories of aid under the Public Assistance Grant program (PA).
- Fulfill contractual obligations under the Hazard Mitigation Grant Program (HMGP).
- Receive credit under the Community Rating System (CRS).

WHAT IS A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN?

A multi-jurisdictional hazard mitigation plan is a plan jointly prepared by more than one local government or jurisdiction. Local jurisdictions have the option to participate in a multi-jurisdictional hazard mitigation plan under the Disaster Mitigation Action of 2000 (DMA 2000). A local government is defined by Title 44 Part 201 Mitigation Planning in the Code of Federal Regulations (CFR) as *"any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity."*

The Multi-Jurisdictional Hazard Mitigation Plan planning area includes the following local governments that participated in the planning process: Black Hawk County unincorporated area; plus the cities of Cedar Falls, Dunkerton, Elk Run Heights, Evansdale, Gilbertville, Hudson, La Porte City, Raymond, and Waterloo.

Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning shall include: 1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval; 2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have authority to regulate development, as well as businesses, academia and other private non-profit interests to be involved in the planning process; and 3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): [The plan shall document} the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Benefits of Multi-Jurisdictional Mitigation Planning

The following bulleted statements identify the many benefits for jurisdictions that participate in the multi-jurisdictional mitigation planning.

- Enables comprehensive approaches to mitigation of hazards that affect multiple jurisdictions;
- Allows economies of scale by leveraging individual capabilities and sharing costs and resources;
- Avoids duplication of efforts; and
- Imposes an external discipline on the process.

Planning Process

With support of the Black Hawk County Board of Supervisors and participating City Councils, Black Hawk County applied for, and received, a FEMA HMGP Grant for the development of this updated Multi-Jurisdictional Hazard Mitigation Plan (M-J HMP) to replace all the individual hazard mitigation plans.

Figure 1: Hazard Mitigation Planning Process

The planning process for this HMP involved a variety of local decision makers and stakeholders within the planning area. The planning leaders were able to customize the process to meeting the needs of the municipalities. The process was developed around the requirements laid out in FEMA's *Local Mitigation Planning Handbook (March 2013), Local Mitigation Plan Review Guide (October 2011),* and *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (January 2013).* Figure 1 illustrates the key steps in the hazard mitigation planning process and the specifics of each planning step are provided below.

Step One: Organize Resources

The first step in developing the Multi-Jurisdictional HMP was to bring together a group of people with a variety of knowledge and backgrounds from all jurisdictions within the planning area, yet all having some connection to the goal of hazard mitigation.

Requirement §201.6(a)(3): Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process…Statewide plans will not be accepted as multi-jurisdictional plans.

Multi-Jurisdictional Planning Participation

The Planning Committee was formed with the cooperation of the BlackHawk County Emergency Management Commission. Working in conjunction with Iowa Northland Regional Council of Governments (INRCOG), Black Hawk County, Cedar Falls, Dunkerton, Elk Run Heights, Evansdale, Gilbertville, Hudson, La Porte City, Raymond, Waterloo, the University of Northern Iowa (UNI), and the Cedar Falls Community School District developed a list of departments and positions they determined would best represent the knowledge base required to begin the planning process. The idea was to first establish a base committee and then invite other organizations and/or individuals as necessary.

This initial group of people encompassed individuals representing local government, law enforcement, fire and rescue, local emergency management, public utilities, UNI, Cedar Falls Community School District, local non-profits and service providers, area employers, railroads, insurance, real estate, and citizen volunteers. Once established, this assembly was considered the Hazard Mitigation Planning Committee. Table 1 lists the Hazard Mitigation Planning Committee members. This list also includes individuals who have provided additional support and updates on specific hazard mitigation actions after the committee meetings took place. The list does not include INRCOG staff.

INRCOG organized meetings in conjunction with the County Emergency Management Coordinator. All sequential meetings were determined at committee meetings. Several additional conversations were made with individual jurisdictions as to the updates for their community. INRCOG was also responsible for compiling information and preparing the final document.

Beyond this core group of individuals, public notices for all committee meetings were published in the local newspaper, within the planning area, to inform neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties (including surrounding communities) and residents

TABLE 1 : HAZARD MITIGATION PLANNING COMMITTEE MEMBERS

Black Hawk County Lorie Glover Linda Laylin Maureen Mehman Cathy Nicholas Rory Geving Tony Thompson Kim Veeder **City of Cedar Falls** John Bostwick Craig Berte Rob Green Chase Schrage Stephanie Sheetz **City of Dunkerton** Dennis Manahl Michael Schares Tim Schultz Sheila Steffen Brenda Thompson **City of Elk Run Heights** Kristi Lundy Gary Wurtz **City of Evansdale** Troy Beatty Chad Deutsch DeAnne Kobliska Becky Walters	**City of Raymond** Nancy Miebach Gary Vick District Rick Gersema Janelle Darst **City of Evansdale** Troy Beatty Chad Deutsch DeAnne Kobliska Becky Walters **City of Gilbertville** Jane Walters Teresa Adamson Mark Thome **City of Hudson** Colleen Damon George Wessel Chrissi Wiersma **City of La Porte City** David Neil Jane Whittlesey	**City of Raymond** Nancy Miebach Gary Vick **City of Waterloo** Jerome Amos Noel Anderson Quentin Hart Jamie Knutson Aric Schroeder **University of Northern Iowa** Helen Haire **Cedar Falls Community School District** Rick Gersema Janelle Darst **Waterloo Community School District** Dan Huff **INRCOG** Lisa Ahern Dan Schlichtmann Brian Schoon

of the planning process and to invite all interested parties to attend and contribute to the development of the plan.

Prior to the adoption of the M-J HMP, each jurisdiction advertised and held public hearings. Public notices and public involvement materials can be found in Appendix M.

At each committee meeting, each jurisdiction was tasked with reviewing their previous HMP information; updating, developing, and providing new community fact information; updating, identifying, and rescoring their hazards; reviewing, discussing, and updating their previous mitigation activities; and reprioritizing the activities. All activities that were completed from the previous plans were marked as such and were omitted from this Plan (see Appendix L for a complete list of previous mitigation activities and their identified status). If a jurisdiction wasn't present at a meeting, meeting materials were emailed and completed by said jurisdiction and returned to INRCOG for placement in the document.

TABLE 2: MEETINGS SUMMARY

Location	Group	Date	Topic
Black Hawk County Emergency Management Room	Planning Committee	9/19/2019	Introductions, Purpose of HMP, Updating Community Profile, Updating Hazard Analysis/Risk Assessment, Updating Hazard Analysis/Risk Assessment
Black Hawk County Emergency Management Room	Planning Committee	10/17/2019	Review Hazard Analysis/Risk Assessment, Update Goals, Update Mitigation Action/Activities
Various	City Departments	Various	Review Mitigation Action/Activities, Reprioritize Action / Activities
Black Hawk County Emergency Management Room	Planning Committee	3/20/2020	Review Draft Plan
Individual Jurisdictions	Councils and Boards	Various	Adoptions

Requirement §201.6(c)(5): For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Committee Meetings

Three public meetings were held at the Black Hawk County Emergency Management building on various dates, during the HMP planning process. Each meeting was open to all residents and stakeholders in the planning area, as well as neighboring communities. These meetings were advertised in the local newspaper, the Waterloo-Cedar Falls Courier, to all jurisdictions in Black Hawk County. The newspaper's distribution also extends beyond Black Hawk County, so neighboring cities and counties also received notice of the meeting. Attendance for each meeting was documented and can be found in Appendix M. While public participation was minimal among individuals not employed or elected by the jurisdictions they represent, committee members are nonetheless members of the public intrinsically. Input from the meeting participant not employed or elected by any jurisdiction was incorporated into the plan just as input from any other committee member. Table 2 provides a list of the public meetings. All meetings, except for the Board of Supervisors and City Council meetings, started at 4:00 p.m. All public meetings were held in accordance with Open Meetings Laws as outlined in Chapter 21 of the State Code of Iowa.

Multi-Jurisdictional Plan Adoption

Once the Committee's feedback was addressed, a final draft MJ-HMP was prepared and sent to each jurisdiction's governing body along with a resolution for

adoption. Upon the first adoption, the final draft HMP was submitted to Iowa Homeland Security and FEMA for their review and feedback; at which time the draft was presented to the remaining governing bodies, including the School Board of the Cedar Falls Community School District and the University of Northern Iowa, for their adoption as well. Resolutions can be found in the Appendices.

Current & Previous Planning Documents Used

In addition to information obtained through the series of Committee Meetings, INRCOG also investigated other previously prepared documents in order to garner supplementary relevant information and contacted each jurisdiction for relevant information. These documents and data include:

- Previous Hazard Mitigation Plans for Cedar Falls, Dunkerton, Elk Run Heights, Evansdale, Gilbertville, Hudson, La Porte City, Raymond, Waterloo and the Black Hawk County (Appendix L);
- 2010 Iowa Hazard Mitigation Plan and Comprehensive Emergency Plan;
- 2015 Black Hawk County Multijurisdictional Hazard Mitigation Plan;
- Plans, studies, reports, maps and technical information that were not available five years ago, including updated Flood Insurance Rate Maps and data;
- Documentation of communities' current status in the National Flood Insurance Program (NFIP) and Community Rating System (CRS);
- Repetitive Loss Properties and /or Severe Repetitive Loss Properties information from FEMA;
- Reports of disaster and other hazard events that occurred within the past 5 years from available sources;
- Documentation of changes in the communities that impact vulnerability of structures and populations; and
- Documentation of mitigation projects and activities undertaken over the past 5 years.

Step Two: Identify & Assess Hazards

Identify and Profile Hazards

First, through the planning process the hazards that pose a risk to the entire planning area, as well as unique hazards for each jurisdiction, were reviewed, identified, and updated. Second, an updated assessment of the hazards was conducted that took into account historic occurrence, the number of people that would be or were impacted, the area of the planning area that was or would be affected, potential costs that the planning area, individuals, and organization have or may incur, the likelihood of future occurrence, and the amount of warning time before and event occurs. An updated composite score for each hazard was developed based on these factors. This process used information from previous and current hazard mitigation plans within the planning area, as well as the State of Iowa's hazard mitigation plan.

Vulnerability Assessment

An updated vulnerability assessment was conducted to identify: repetitive loss structures and repetitive loss properties and populations located in the identified

hazard areas; inventory of existing and proposed buildings, infrastructure, and critical facilities located within identified hazard area boundaries; estimating potential losses; and analysis of development trends.

Step Three: Establish Mitigation Goals & Actions (Action Plan)

Once Step Two was completed, an updated capability assessment was conducted on local municipalities' existing policies, practices, programs, regulations, and activities that either increase or decrease the planning area vulnerability to the identified hazards. Through this assessment, areas that can be improved upon were identified and developed into "action steps." Early in the planning process meeting attendees identified updated broad goals that briefly stated what the plan should attempt to accomplish. Every action step should, if implemented, work toward one or more of the goals of the plan. An action step may suggest continuing a current mitigation effort or propose a new project altogether.

Many of the identified action steps were projects that the local jurisdictions could independently accomplish. Other identified projects included efforts that either require the cooperation of two or more entities, or would not include the local jurisdiction at all. The intention is that each action step is considered at least on an annual basis. In order to increase the likelihood each jurisdiction implements the plan, each action step identifies the parties that would most likely be responsible for completing an annual review of that step.

During this step, the previous hazard mitigation plans for the planning area were consulted as a starting point in identifying goals and action steps.

Step Four: Implement the Plan and Monitor Progress

Finally, once the hazards have been assessed, mitigation steps identified, and the action steps have been prioritized, the updated MJ-HMP makes suggestions for implementation and makes estimates as to the costs of implementation. Some proposed projects are small in scope and thus relatively low cost. However, other projects are broad in nature and would require more funding than the local jurisdiction can reasonably provide. Therefore, the final piece of the plan suggests methods to implement the plan, how to keep the public involved, and what steps should be taken by local jurisdictions to ensure that the concept of hazard mitigation is always a priority.

When implemented appropriately, mitigation projects can save lives, reduce property damage, is cost-effective, and environmentally sound. This, in turn, can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities, reduce exposure to liability, and minimize disruption.

SECTION 2 – COMPOSITE COMMUNITY PROFILE

PHYSICAL ATTRIBUTES

Location

Black Hawk County is located in the Northeastern quadrant of the State of Iowa. The County includes a number of incorporated cities including, in alphabetical order, Cedar Falls, Dunkerton, Elk Run Heights, Evansdale, Gilbertville, Hudson, La Porte City, Raymond, and Waterloo. The Cities of Jesup and Janesville also have small portions of their incorporated limits that fall within the borders of Black Hawk County. Please refer to Map 1 in Appendix J for a location map of the county, which includes the locations of the aforementioned communities.

The most visible geographic feature within the County is the Cedar River, which flows from the northwest corner to the southeast corner of the County; in essence dividing the community into two fairly equal halves. The river has been a major factor in the historical development of the area and either passes through or borders four of the aforementioned incorporated cities. Please refer to Map 2 in Appendix J for a topographic representation of the county.

The County itself encompasses a total area of approximately 567 square miles. The population is the fourth largest in the state with 132,960 residents (2017 ACS). Most of this population falls within the Waterloo/Cedar Falls metropolitan area, with only 11,097 residents living in the unincorporated areas of the County.

History

It is believed the first non-Native American to visit Black Hawk County was a Frenchman named Gervais Paul Somaneaux. He came during the spring of 1837, left during the winter, and returned about ten years later to settle in Cedar Falls, where he lived until his death in 1850.

Black Hawk County was created in 1843 by the Territorial Legislature of Iowa and attached to Delaware County for judicial, election, and revenue purposes, because there were few, if any, white settlers at that time. The Sauk and Fox (Meskwaki) Indians had lived here for many years, owning the area until 1837. The County was named after the renowned Sauk Chief Black Hawk, although he never lived here.

Since there were no residents in the county at the time of its birth, it was attached to Delaware County for administration purposes. Settlers started arriving in 1844. In 1845, the administration of Black Hawk County was transferred from Delaware County to Benton County.

The year 1845 brought with it the first settlers to what would eventually be the county seat, Waterloo. George and Mary Hanna, along with their family were the first to arrive in Waterloo, then known as “Prairie Rapids Crossing.” In the summer of 1846 two more families arrived, the Virdens and the Mullans. Charles

Mullan was able to obtain seven signatures on a petition in order to get a post office designation for the community. Mr. Mullan felt that the name Prairie Rapids Crossing was too burdensome for a mailing address. As a result, the name of the settlement was changed to Waterloo. The census of 1850 found 26 families in Black Hawk County. The 135 people included 75 males and 60 females. Four children attended the county's first school. In the same year, Andrew Mullarky opened "The Black Hawk Store" in Cedar Falls, and the county's first post office opened.

Following another administrative transfer in 1851, this time to Buchanan County, the legislature passed an act allowing the county to organize its own government and elect officers in 1853. At the same time, the counties of Bremer, Grundy and Butler were administratively attached to Black Hawk County. The act also formed a commission to fix the seat of justice for the county. Cedar Falls (then called Sturgis Falls), as the county's largest town, was selected. Waterloo eventually became the county seat after residents persuaded the legislature to permit a countywide election to decide between the two cities. The election favored Waterloo, 388-260.

NATURAL ENVIRONMENT

Black Hawk County's terrain is generally a flat to rolling slope topography that characterizes the agricultural areas of northeast Iowa. There are several areas of steeper than normal slope with these being dispersed throughout the county adjacent to watercourses. The highest point in the county lies at approximately 1,040 feet above sea level and is located near the unincorporated community of Voorhies. Another high point, approximately 1,008 feet above mean sea level is recorded three miles north of the City of Dunkerton. Conversely, the lowest point in the county is located in the extreme southeastern corner near the Cedar River.

Soils

About 72 percent of Black Hawk County is cropland; 20 percent is urban land; 5 percent is used for recreational activities; 2 percent is woodland; and 1 percent is permanent pasture. According to the U.S. Department of Agriculture Soil Conservation Service, there are seven soil type associations in the county:

- **Dinsmore-Klingmore-Maxmore** (4%) – Level to gently sloping loess soils that are moderately well drained, somewhat poorly drained, and poorly drained
- **Dinsdale-Klinger-Maxfield** (11%) – Level to moderately sloping loess soils that are moderately well drained, somewhat poorly drained, and poorly drained
- **Kenyon-Clyde-Floyd** (34%) – Level to steep loamy soils that are moderately well drained, somewhat poorly drained, and poorly drained
- **Readlyn-Tripoli** (6%)– Nearly level loamy soils that are somewhat poorly drained and poorly drained
- **Sparta-Finchford-Saude** (23%) – Level to moderately sloping eolian sands and alluvium soils that are excessively drained and well drained
- **Coland-Spillville** (11%) – Level to nearly level alluvium soils that are somewhat poorly drained and poorly drained
- **Marquis-Clyde-Floyd** (11%) – Level to gently sloping loamy soils that are moderately well drained, somewhat poorly drained, and poorly drained

Climate

The climate is characterized as having cold snowy winters with humid hot summers. The climate is located in the polar front zone, the battleground of polar and tropical air masses. Being far removed from moderating influences of a large body of water, seasonal contrasts are quite distinctive and weather highly variable. Ample precipitation throughout the year is increased in the summer by invading maritime tropical air masses from the Gulf of Mexico. Cold winters are dominated by continental polar masses from the arctic regions.

The annual precipitation ranges from about 31.5 inches to 32.5 inches. Approximately 71 percent of a year's precipitation falls during the months of April to September. Precipitation can be expected to exceed one-half inch or more 20 days per year, or one-tenth inch or more 56 days a year. Precipitation can occur in amounts of multiple inches within one hour or less during intense rainstorms. These storms, usually associated with extreme humidity, are capable of causing extensive damage to infrastructure. Often times it is the intensity of these rainstorms that are as telling as the frequency or duration. An extremely intense rainfall can render detention basins and small streams useless due to the extreme speed of onset of surface flow.

The annual temperature range is large, typical of a continental climate, with January, the coldest month, averaging 18.6 degrees Fahrenheit. July is the warmest month averaging 74.3 degrees Fahrenheit.

TABLE 3: BLACK HAWK COUNTY STREAMS AND TRIBUTARIES

Stream	Tributary To:
Cedar River	Iowa River
Beaver Creek	Cedar River
Black Hawk Creek	Cedar River
Dry Run Creek	Cedar River
Elk Run Creek	Cedar River
Indian Creek	Cedar River
Miller Creek	Cedar River
Poyner Creek	Cedar River
Rock Creek	Cedar River
Sink Creek	Cedar River
Spring Creek	Cedar River
Virden Creek	Cedar River
West Fork Cedar River	Cedar River
Wolf Creek	Cedar River
No Name Creek	Cedar River
Pleasant Valley Creek	Elk Run Creek
Wapsipinicon River	Mississippi River
East Branch Spring Creek	Spring Creek
Buck Creek	Wapsipinicon River
Camp Creek	Wapsipinicon River
Crane Creek	Wapsipinicon River
Shell Rock River	West Fork Cedar River
Prescott's Creek	Black Hawk Creek
Wilson Creek	Black Hawk Creek

Vegetation

The vast majority of rural Black Hawk County is planted or sowed to corn and soybeans. Grass and brush are present in uncultivated and undeveloped areas of the county. Trees and grasses are often incorporated with otherwise urbanized areas in the county for aesthetics, shade, or erosion control.

There are problems associated with cultivation methods used in the rural areas of the county. The high percentage of cultivated land and the relatively low percentage of conservation methods used in farming cause excessive runoff to occur during rain events. This can lead to problems that are discussed later in this plan, specifically erosion and silting in and around bridges and drainage ditches.

Surface Water Systems

The primary stream in Black Hawk County is the Cedar River. The Cedar River enters the county in the northeast near the City of Janesville. The river flows diagonally through the county from northwest to southeast and eventually exits the county in the extreme southeast corner. A list of streams in Black Hawk County is listed in Table 3. It should be noted however that this is not an all-inclusive list, as many smaller streams and tributaries, many of which have not been named, are not included below.

INFRASTRUCTURE

Transportation

Black Hawk County has within its boundaries a variety of transportation systems. These systems include highways, multi-use trails, gravel roads, blacktop roads, and interstate highways.

There is a total of approximately 139 miles of state and federal roadways in the county. These roadways include one Interstate system; I-380. Federal Highways that pass through the community include United States 20, 63, and 218. State Highways present in Black Hawk County include Iowa 21, 57, 58, 175, and 281.

In addition to the State and Federal Highway systems, the County maintains 526 miles of gravel roads and 246 miles of hard surface roadways. The County also owns and maintains 311 bridges.

Air travel is an important form of transportation and several airports are present throughout the county. Although there are several small private runways, the largest and only commercial airport is the Waterloo Municipal Airport. The airport provides service to private and commercial aircraft. Commercial airlines providing service at the Waterloo Regional Airport include American Airlines. The Waterloo Regional Airport has the fourth longest runway in the state at 8,401 feet. In addition to the commercial airport, there are also a number of small privately-owned airports located throughout rural Black Hawk County.

The newest form of transportation being developed in Black Hawk County is the multi-use trails. The trail systems in the county (incorporated areas included) already run for approximately 75 miles. This total included 15 miles of the Cedar Valley Nature Trail, which extends approximately 52 miles and crosses three counties. The trail system is an ever-evolving system. Efforts are made on an annual basis to either extend the trails to new areas or to improve existing trails.
Potable Water Systems

Additional information for each city can be found in Appendices A-I.

Wastewater Treatment Facility and Collection System

There are several wastewater treatment facilities in the planning area: the Easton Avenue Treatment Plant in Waterloo, the Satellite Treatment Plant in Waterloo, the Water Reclamation Facility in Cedar Falls, the Evansdale Waste Water Plant, the Gilbertville Waste Water Plant, the Hudson Wastewater Treatment Plant, the Elk Run Heights Wastewater Treatment Plant, and the La Porte City Wastewater Treatment Plant. Studies are underway to determine the feasibility of a regional waste water treatment system. General information on each community's wastewater treatment system can be found in the Appendix section.

In rural, unincorporated areas, the primary means of disposing sewage is by individual, on-site septic systems. These on-site systems include tanks and septic fields for disposal of household sewage. The County Environmental Health Program regulates private on-site waste treatment system, provides new septic system inspections, and reviews waste treatment plans in connection with rezoning and subdivision requests in the County.

Storm Water Systems

The metropolitan area of Black Hawk County handles storm water largely through a system of storm drains. Each city has its own program for managing storm water pollution including fines for unlawful discharges into the system. Rural and unincorporated areas of the county rely on open ditches to handle storm water.

Other Utilities

The table on the next page lists the utility providers for the planning area.

TABLE 4: PRIMARY PROVIDERS FOR COMMUNITY UTILITIES WITHIN BLACK HAWK COUNTY							
Community	**Electric**	**Natural Gas**	**Telephone/ Internet***	**Cable TV***	**Water**	**Sewer**	**Sanitation**
City of Cedar Falls, IA	CFU	CFU, Northern Natural Gas	CFU, CenturyLink, Mediacom	CFU, Mediacom	CFU	City	City
City of Dunkerton, IA	Mid-American Energy	Mid-American Energy	Dunkerton Telephone Cooperative	Dunkerton Telephone Cooperative, Mediacom	City	City	Thomas-James Co.
City of Elk Run Heights, IA	Mid-American Energy	Mid-American Energy	CenturyLink, Mediacom	Mediacom	Waterloo Waterworks	City	Waste Management
City of Evansdale, IA	Mid-American Energy	Mid-American Energy	CenturyLink, Mediacom	Mediacom	City	City	Black Hawk Waste Disposal
City of Gilbertville, IA	Mid-American Energy	Mid-American Energy	CenturyLink, Mediacom	Mediacom	City	City	Black Hawk Waste Disposal
City of Hudson, IA	Hudson Municipal Utility, Mid-American Energy	Mid-American Energy	CenturyLink, Mediacom	Mediacom	Waterloo Waterworks	City	Black Hawk Waste Disposal
City of La Porte City, IA	La Porte City Utilities	Black Hills Energy	La Porte City Telephone Company, Mediacom	Mediacom La Porte City Telephone	La Porte City Utilities	City	City
City of Raymond, IA	Mid-American Energy	Mid-American Energy	CenturyLink, Mediacom	Mediacom	Waterloo Waterworks	City of Elk Run Heights	Waste Management
City of Waterloo, IA	Mid-American Energy	Mid-American Energy	CenturyLink, Mediacom	Mediacom	Waterloo Waterworks	City	City
Black Hawk County (unincorporated), IA	Mid-American Energy, CFU, Alliant Energy, East-Central Rural Energy Cooperative	Mid-American Energy, CFU, Alliant Energy, People's Natural Gas EnergyOne	CenturyLink, Mediacom, CFU, Dunkerton Telephone Cooperative, La Porte City Telephone Company, Farmer Mutual Telephone Company	Mediacom, CFU, Jesup Cable television	Individual Wells, Waterloo Waterworks, Central Iowa Water Association	Individual Septic	Individual, Private Contractors

** In addition to the telephone, internet, and cable TV providers listed, there are several mobile and satellite companies that offer these services throughout the county.*
Source: Communities

Communication

All participating jurisdictions have public websites and social media accounts to provide the public with information as well as local newspapers and public postings their communities.

DEMOGRAPHICS

Population

Table 5 illustrates the population trend for Black Hawk County from 1950 to 2010, according to the decennial Census. As is evident in the table, the County has fewer people than it did at its peak in 1980. After its decline throughout the 1980s, the population of Black Hawk County has grown steadily since 1990. As of 2017 American Community Survey, the population was 132,960.

TABLE 5: HISTORIC POPULATION CHANGES BLACK HAWK COUNTY

Year	Population	Change
1950	100,448	--
1960	122,482	+21.9%
1970	132,916	+8.5%
1980	137,961	+3.8%
1990	123,798	-10.3%
2000	128,012	+3.4%
2010	131,090	+2.4%

Source: U.S. Census Bureau

TABLE 6: TOTAL POPULATION IN BLACK HAWK COUNTY

Jurisdiction	2010	2017
City of Cedar Falls	39,260	41,167
City of Dunkerton	852	876
City of Elk Run Heights	1,117	1014
City of Evansdale	4,751	4,780
City of Gilbertville	712	750
City of Hudson	2,282	2,472
City of La Porte City	2,285	2,496
City of Raymond	788	763
City of Waterloo	68,406	68,146
Black Hawk County (unincorporated)	10,637	10,496
Black Hawk County (total)	**131,090**	**132,960**

Source: U.S. Census Bureau & 2013-2017 ACS

Waterloo is the largest city and county seat of Black Hawk County, with a population of 68,416 in 2017. The second largest city is Cedar Falls with 41,167 residents in 2017. The remaining juristictions in Black Hawk County have much lower populations. Table 6 shows the change in population from the 2010 Census to the 2013-2017 ACS. There are slight changes by City, with the largest population growth occuring in Cedar Falls and a modest overall growth countywide.

Population Projections

Projections are only estimates of future population, and many factors have an effect on future population, such as employment, housing, and educational opportunities. While some projections use some of this data in order to estimate future population, they cannot plan for unknown events, such as drastic changes in employment opportunities or the perilous effects of natural disasters.

The following projections are provided by the Washington D.C based firm, Woods & Poole Economics, whose methodology for county projections is based upon several factors: population trends, income levels, employment by industry, earning by industry, inflation rates and net migration rates. Table 7 shows the actual number change and the percentage change rate for each decade based on the Woods & Poole estimates.

TABLE 7: POPULATION PROJECTIONS BLACK HAWK COUNTY

Year	Projected Population	Percent Change
2020	132,638	1.2%
2030	136,837	3.2%
2040	141,175	3.2%

Source: 2009 Woods & Poole Economics, Inc.

Given the planning area's population trends, it is projected the area will continue to experience an increase in population over the next twenty years. It is

important to note that these projections are just estimates based on past trends and other factors that could vary in the future. Many variables can affect an area's growth and/or decline in population. Nevertheless, projecting population can give some idea as to how to plan for the future.

Housing and Development Trends

According to 2017 ACS data, there are 57,300 total housing units in the County (Table 8). Of these units, 34,857 are owner-occupied, 17,954 are renter occupied, and 4,489 are vacant.

During a flood or tornado event, certain housing types are more vulnerable to damage than others. In addition, residents of certain housing units also face a higher risk during these events. Some examples of these housing units include mobile homes, multi-unit apartment buildings, and group quarters (e.g. nursing homes, correctional facilities, dorm rooms). According to the U.S. Census Bureau's 2013-2017 American Community Survey, there are 13,162 housing units in multi-unit apartment buildings and 2009 mobile homes in Black Hawk County. In addition, there are 5,967 people living in group quarters. The average household size for Black Hawk County is 2.4 persons.

Age of Housing

Approximately 44.7 percent of the housing units in Black Hawk County were built in 1959 or earlier. In the decades following, the 1970s saw the largest number of houses being built. The 1980s witnessed a dramatic decline in the number of houses being built. Table 8 shows the number of structures built in each decade since 1939 as well as the number built before that time. The numbers represented in Table 8 encompass all houses within the county, including incorporated areas.

TABLE 8: AGE OF HOUSING IN BLACK HAWK COUNTY

Year Built	Number	Percent
2014 or later	443	0.8
2010-2013	1485	2.6
2000-2009	4,738	8.3
1990-1999	3,864	6.7
1980-1989	3,672	6.4
1970-1979	8,884	15.5
1960-1969	8,571	15.0
1950-1959	9,875	17.2
1940-1949	4,290	7.5
1939 or earlier	11,478	20.0
Total	**57,300**	**100.0%**

Source: U.S. Census Bureau, 2008-2012 American Community Survey

TABLE 9: MEDIAN HOUSEHOLD INCOME BLACK HAWK COUNTY

Community	2010	2013-2017 ACS
City of Cedar Falls	48,727	58,855
City of Elk Run Heights	55,481	58,073
City of Evansdale	47,432	48,651
City of Gilbertville	47,083	50,250
City of Hudson	75,833	88,750
City of Waterloo	41,275	44,429
City of Dunkerton	51,103	54,688
City of La Porte City	52,530	52,083
City of Raymond	61,417	69,625
Black Hawk County (total)	**45,610**	**50,916**
Source: U.S. Census Bureau		

Value of Housing

According to U.S. Census data, median housing values in the planning area increased by approximately 13.9% percent from $122,300 in 2010, to 139,300 in 2017. Figure 2 on the next page represents the distribution of housing values in Black Hawk County at the time of the 2013-2017 American Community Survey.

Economy

Income

According to the 2013-2017 American Community Survey, there were a total of 52,811 households located within the planning area. Among these households, the median income was $50,916, meaning that half of the households earned more than $50,916 and half earned less than $50,916.

Among the planning area's households, income was mostly derived from wages and salaries. A total of 78 percent of households received income in this form. Other forms of income include social security benefits, retirement income, and public assistance programs. 30 percent of households in Black Hawk County receive income from Social Security and 20 percent receive retirement income.

The poverty level in Black Hawk County is 10.3 percent for families and 16.5 percent for individuals. At the time of the survey, 13.3 percent of households in Black Hawk County receive Food Stamp/SNAP benefits, 4.5 percent receive Supplemental Security Income, and 3.6 percent receive cash public assistance income. Figure 3 shows the income distribution for Black Hawk County.

Employment Sectors

At the time of the 2013-2018 American Community Survey, there were 67,444 persons, aged 16 years and over, in the labor force. The largest industry in Black Hawk County by number of workers is "education services, and health care and social assistance" with 24.2 percent of the employed civilian workforce, followed by manufacturing at 17.7 percent and retail trade at 13.0 percent.

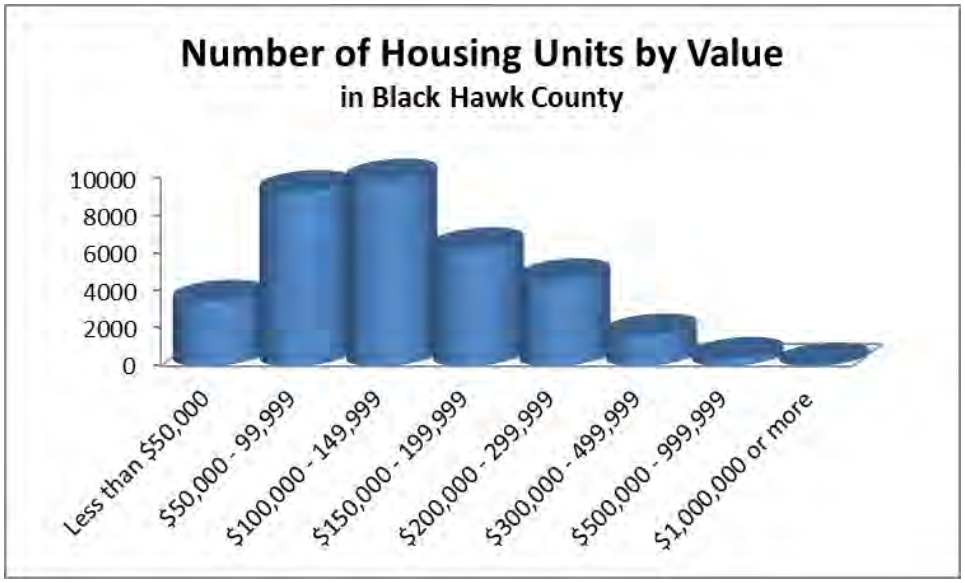


FIGURE 2: VALUE OF HOUSING IN PLANNING AREA

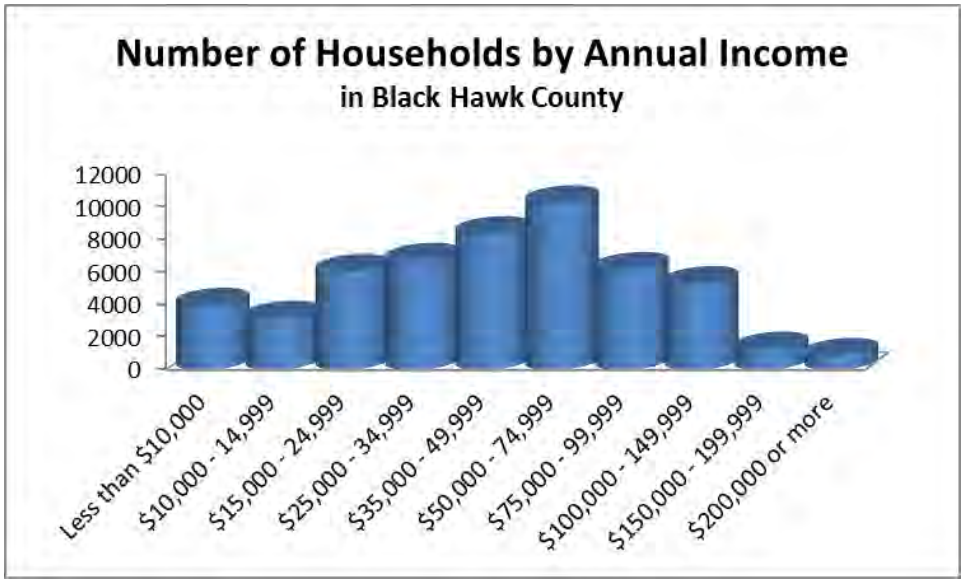


FIGURE 3: HOUSING VALUE

Black Hawk County's ten major employers are listed below on Table 10.

TABLE 10: TEN MAJOR EMPLOYERS IN BLACK HAWK COUNTY	
Company Name	**Product / Service**
John Deere Waterloo Operations	Manufacturing
Tyson Fresh Meats	Pork Processing
Mercy One	Healthcare
University of Northern Iowa	Education
Waterloo Community Schools	Education
Unity Point Health	Healthcare
Hyvee Food Stores	Grocery
Western Home Communities	Health Care / Housing
CBE Companies	Accounts Receivable Management
VGM Group	Diversified
Source: Greater Cedar Valley Alliance - 2019 Major Employers	

SECTION 3 – RISK ASSESSMENT

This updated risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The goal of the risk assessment is to estimate the potential loss in Black Hawk County, including loss of life, personal injury, property damage, and economic loss, from a hazard event. The risk assessment process allows the community to better understand their potential risk to various hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the …location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and the probability of future hazard events.

Requirement §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The risk assessment follows the methodology described in the FEMA publication 386-2, *Understanding Your Risks: Identifying Hazards and Estimating Losses* (2002), which includes a four-step process:

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

- Identify Hazards
- Profile Hazard Events
- Inventory Assets
- Estimate Losses

This section is divided into three parts: hazard identification, hazard profiles, and vulnerability assessment:

- **Hazard Identification** identifies the hazards that threaten the planning area and describes why some hazards have been omitted from further consideration.
- **Hazard Profiles** discusses the threat to the planning area and describes previous occurrences of hazard events and the probability of future occurrence.
- **Vulnerability Assessment** assesses the total exposure to natural hazards, considering critical facilities and other community assets at risk, and assessing growth and development trends. Hazards that vary geographically across the planning area are addressed in greater detail.

Hazard Identification

In order to properly identify mitigation strategies and projects, the hazards that may affect the planning area must be identified and/or updated. The following section lists the potential hazards to the planning area that were identified by the Planning Committee. This section also discusses previous occurrences of the hazards, the areas of the planning area most at risk from each hazard, and the populations most at risk. By identifying the hazards and quantifying the risks, the planning area can better assess current mitigation strategies, develop future mitigation strategies and identify needed mitigation projects.

The hazard analysis identifies potential hazards that could affect the planning area for the purposes of mitigation planning. It is important to note that the focus of mitigation is on reducing long-term risks of damage or threats to public health and safety caused by hazards and their effects. Thus, in some cases the hazards identified for mitigation will not include all of or the same hazards identified for preparedness, response or recovery.

The Committee reviewed the hazards identified in the current hazard mitigation plan, and the 2018 Iowa Hazard Mitigation Strategies. Hazards were considered for elimination if there was no historical occurrence and Committee members determined there was no chance of occurrence in the future. However, the Committee decided to retain all the hazards contained in the previous plan, although some hazards were combined due to their relatedness with other hazards and as an effort to streamline the plan document.

To comply with requirements CFR 201.6(c)(2)(i), the risk assessment must include a description of the location and extent of all natural hazards that can affect the jurisdiction. Natural hazards include those that "are a source of harm or difficulty created by a meteorological, environmental, or geological phenomenon or combination of phenomena (U.D. Department of Homeland Security Risk Lexicon, 2010). "Natural" hazards do not include biological hazards, such as disease. However, additional hazards were also identified in this multi-jurisdictional plan based on their occurrence since the previously approved plans were adopted or that may occur in the next five years. The 2018 Iowa Hazard Mitigation Plan identified the hazards as identified in Table 11. Hazards identified for Black Hawk County and its communities are listed in Table 12.

TABLE 11: State of Iowa List of Hazards

NATURAL HAZARDS	OTHER HAZARDS
Dam / Levee Failure	Animal/Plant/Crop Disease
Drought	Hazardous Materials Incident
Earthquake	Infrastructure Failure
Expansive Soils	Pandemic Human Disease
Extreme Heat	Radiological Incident
Flooding-River	Terrorism
Flooding – Flash	Transportation Incident
Grass or Wildland Fire	
Landslides	
Severe Winter Storms	
Sinkholes	
Thunderstorm- Hail and Lighting	
Tornado / Windstorm	
Source: 2018 State of Iowa Hazard Mitigation Plan	

Table 12: Black Hawk County Hazard List

NATURAL HAZARDS	OTHER HAZARDS
Dam / Levee Failure	Animal/Plant/Crop Disease
Drought	Hazardous Materials Incident
Earthquake	Infrastructure Failure
Expansive Soils	Pandemic Human Disease
Extreme Heat	Radiological Incident
Flash Flooding	Terrorism
Grass or Wildland Fire	Transportation Incident
Landslides	Riot/Violent Demonstration
River Flooding	Watershed Health
Severe Winter Storms	
Sinkholes	
Thunderstorm- Hail and Lighting	
Tornado / Windstorm	
Source: Community	

The identified hazards are discussed at length on the following pages. The discussion will include known historical occurrence, probability of future occurrence, magnitude/severity, warning time, and duration. The overall average results of the Committee's scoring efforts will be provided following this discussion, under Vulnerability Assessment. The individual community scores can be found in each respective appendix.

Disaster Declaration History

One method used by the HMPC to identify hazards was to examine events that triggered federal and/or state disaster declarations. Federal and/or state declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance.

Should the disaster be so severe that both the local and state governments' capacities are exceeded, a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors.

TABLE 13: PRESIDENTIAL DISASTER DECLARATION HISTORY FOR BLACK HAWK COUNTY

Declared Date	Incident Type	FEMA Declaration #
04/22/1965	Flooding	DR-193
08/04/1968	Heavy Rains & Flooding	DR-248
8/14/1969	Heavy Rains & Flooding	DR-269
09/06/1990	Severe Storms & Flooding	DR-879
07/12/1991	Severe Storms & Flooding	DR-911
04/26/1993	Severe Storms & Flooding	DR-986
07/09/1993	Severe Storms & Flooding	DR-996
07/02/1998	Severe Storms, Tornados, & Flooding	DR-1230
05/21/1999	Severe Storms, Tornados, & Flooding	DR-1277
07/22/1999	Severe Storms & Flooding	DR-1282
05/25/2004	Severe Storms, Tornados, & Flooding	DR-1518
09/10/2005	Hurricane Katrina Evacuation	DR-3239
03/14/2007	Severe Winter Storms	DR-1688
05/27/2008	Severe Storms, Tornados, and Flooding	DR-1763
08/13/2009	Severe Storm	DR-1854
07/29/2010	Severe Storms, Tornados, & Flooding	DR-1930
08/05/2014	Severe Storms, Tornadoes, Straight-line Winds, & Flooding	DR-4187
07/23/2014	Severe Storms, Tornadoes, Straight-line Winds & Flooding	DR-4181
10/30/2016	Severe Storms & Flooding	DR-4289
09/28/16	Severe Storms, Straight-line Winds & Flooding	DR-4281

Source: FEMA (https://www.fema.gov/disasters/year/

Table 13 lists state and federal disaster declarations received by Black Hawk County.

HAZARD PROFILES

Once hazards were identified and profiled, a vulnerability assessment was conducted. The vulnerability assessment identifies how people, properties, and structures will be damaged by the event. If the hazard can harm people or damage their homes and other structures, they are vulnerable. Finding the weak points in the system, for example, identifying building types that are vulnerable to damage and anticipating the loss in high risk areas, will help the planning area decide what mitigation measure should be undertaken and how to implement the activities they select.

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Methodology

The risk assessment identifies how people, properties, and structures will be damaged by the event. If the hazard can harm people or damage their homes and other structures, they are vulnerable. Finding the weak points in the system, for example, identifying building types that are vulnerable to damage and anticipating the loss in high risk areas, will help the community decide what mitigation measure should be undertaken and how to implement the activities they select.

The Hazard Mitigation Planning Committee used the following updated factors in determining the hazard risk assessment (as used by the State of Iowa in their HMP Update). The Planning Committee considered the following for each identified hazard:

- Probability
- Magnitude / Severity
- Warning Time
- Duration

(Probability x.45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)
= Final Hazard Assessment Score

Each hazard identified in this section is profiled individually. The level of information presented in the profiles varies by hazard based on the information available. With each update of this plan, new information will be incorporated to provide for better evaluation and prioritization of the hazards that affect the planning area.

The sources used to collect information for these profiles included previous and current hazard mitigation plans, available data from the National Climatic Data Center, the State of Iowa updated HMP and other available data from the county and incorporated communities. Detailed profiles for each of the identified hazards include information categorized as follows.

Probability

The probability score reflects the likelihood of the hazard occurring again in the future, considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year. Many times the historical occurrence can be extrapolated into the future using best available data, but others, due to the nature of the hazard are more difficult to estimate the probability of future occurrence. If a hazard or its impacts have been mitigated against, the probability of future occurrences decreases. Conversely, hazards that have not occurred in the past may present themselves to the community in the future.

TABLE 14: PROBABILITY

Score	Description	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2	Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3	Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33% or the event is likely to occur.
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.

Magnitude / Severity

The magnitude of the impact of a hazard event (past and perceived) is related directly to the extent that hazards affect the State and is measured using technical measures specific to the hazard. This is also a function of when the event occurs (year-round, seasonal), the location affected (both geographically and non-geographically determined), the resilience of the community, and the effectiveness of the emergency response and disaster recovery efforts.

TABLE 15: MAGNITUDE / SEVERITY

Rating	Description	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least two weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

Warning Time

The speed of onset is the amount of warning time available before the hazard occurs. This should be taken as an average warning time. For many of the atmospheric natural hazards there is a considerable amount of warning time as opposed to the human caused accidental hazards that occur instantaneously or without any significant warning time.

TABLE 16: WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

Duration

This consists of the typical amount of time that the jurisdiction is impacted by the hazard. As an example, a snowstorm will likely last several hours, whereas a lightning strike would last less than a second.

TABLE 17: DURATION	
Score	**Description**
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

Hazard Analysis Summary

Table 18 lists the composite (total) scores for all jurisdictions in the planning area. Individual assessment scores for each jurisdiction can be found in their respective appendix. Certain hazard rankings are different depending upon the jurisdiction affected, due to different topography, historical occurrences, vulnerability, severity of impact, and probability to that community. In a small number of instances, hazards were not scored in jurisdictions where that particular hazard is impossible. For example, there are no dams or levees in Elk Run Heights. As a result, the levee failure and dam failure hazards were not scored in that jurisdiction.

The identified hazards are discussed at length on the following pages. The discussion will include known historical occurrence, probability, magnitude/severity, warning time, and duration. For each of these elements, not only discussion will take place, but the results of the Planning Committee's scoring efforts will be provided following the discussion, under Vulnerability Assessment. The hazards identified in Table 18, with in depth discussion, are as follows.

TABLE 18: COMPOSITE OF IDENTIFIED HAZARD SCORES FOR ENTIRE PLANNING AREA					
Hazards	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Total**
Tornado/Windstorm	3.3	2.7	3.8	1.7	3.0
Flash Flood	3.4	2.0	3.3	2.1	2.9
Severe Winter Storm	3.8	2.0	2.0	2.1	2.8
Thunderstorm/Lighting/Hail	3.7	2.0	2.4	1.2	2.7
Transportation Incident	2.7	1.8	3.6	1.7	2.4
River Flooding	2.8	2.0	1.3	3.8	2.4
Extreme Heat	2.4	1.7	1.4	3.2	2.1
Grass/Wild Fire	2.2	1.6	3.3	1.6	2.1
HAZMAT Incident	1.9	1.7	3.6	2.2	2.1
Drought	2.2	1.6	1.0	3.7	2.0
Terrorism	1.2	2.1	3.6	2.6	2.0
Infrastructure Failure	1.4	1.7	3.3	2.4	1.9
Earthquake	1.2	2.1	3.2	1.4	1.8
Dam / Levee Failure	1.1	1.7	3.1	2.9	1.8
Sinkholes	1.3	1.3	3.3	2.4	1.7
Radiological Incident	1.0	1.7	3.1	2.3	1.7
Expansive Soils	1.2	1.0	2.8	2.0	1.5
Human Disease	1.3	1.4	1.1	2.7	1.5
Animal/Plant/Crop Disease	1.4	1.1	1.2	2.7	1.4
Landslide	1.0	1.1	3.0	1.4	1.4

TABLE 19: HAZARD RISK ASSESSMENT FOR BLACK HAWK COUNTY UNINCORPORATED AREA					
Hazard Name	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Total**
Tornado/Windstorm	4	3	4	4	3.7
Thunderstorm/Lighting/Hail	4	3	4	2	3.5
Flash Flood	4	2	4	4	3.4
River Flooding	4	2	1	4	2.95
Severe Winter Storm	4	2	1	3	2.85
Dam / Levee Failure	2	3	4	4	2.8
Terrorism	2	3	4	4	2.8
Extreme Heat	3	3	1	3	2.7
Animal/Plant/Crop Disease	3	2	2	4	2.65
Human Disease	3	2	1	4	2.5
HAZMAT Incident	2	2	4	2	2.3
Sinkholes	2	2	3	2	2.15
Drought	2	2	1	4	2.05
Infrastructure Failure	1	2	4	4	2.05
Transportation Incident	2	1	4	2	2
Grass/Wild Fire	2	1	3	2	1.85
Landslide	1	1	4	3	1.65
Earthquake	1	1	4	2	1.55
Expansive Soils	1	1	1	4	1.3
Radiological Incident	1	1	1	2	1.1

River Flooding

Definition and Description

River flooding is a rising or overflowing of a tributary or body of water that covers adjacent land not usually covered by water when the volume of water in a stream exceeds the channel's capacity.

River floods are the most common and widespread of all-natural disasters, except fire. Most communities in the U.S. can experience some kind of flooding after spring rains, heavy thunderstorms, winter storm thaws, waterway obstructions, or levee or dam failures. Often it is a combination of these elements that causes damaging floods. Floodwaters can be extremely dangerous. The force of six inches of swiftly moving water can knock people off their feet and two feet of water can float of car. Floods can be slow-, or fast-rising but generally develop over a period of days. Flooding is a natural and expected phenomenon that occurs annually, usually restricted to specific streams, rivers or watershed areas.

Historical Occurrences

According to data from the National Climatic Data Center, there have been 104 reported flood events in Black Hawk County between January 1, 1996 and December 31, 2019. These events caused $15.1 million in property damage and $25.8 million in crop damage. There were no injuries or deaths reported as a result of these flooding events. Table 20 outlines the details of these flood events.

The table of historical occurrences appears on the next page.

TABLE 20: RECORDED FLOOD EVENTS IN BLACK HAWK COUNTY 1996-2019					
DATE	**PROPERTY DAMAGE**	**CROP DAMAGE**	**DATE**	**PROPERTY DAMAGE**	**CROP DAMAGE**
2/18/1997	$0	$0	3/23/2007	$10,000	$0
3/9/1997	$0	$0	4/3/2007	$20,000	$0
3/19/1997	$0	$0	4/27/2007	0	$0
6/21/1997	$0	$0	8/22/2007	$50,000	$50,000
6/20/1998	$75,000	$5,000	8/22/2007	$50,000	$50,000
6/27/1998	$50,000	$10,000	8/22/2007	$50,000	$50,000
8/5/1998	$10,000	$0	3/15/2008	$50,000	$0
5/16/1999	$750,000	$50,000	3/15/2008	$50,000	$0
5/21/1999	$50,000	$10,000	4/11/2008	$10,000	$0
6/9/1999	$50,000	$75,000	4/18/2008	$25,000	$0
7/2/1999	$500,000	$100,000	4/18/2008	$10,000	$0
7/19/1999	$1,000,000	$250,000	4/18/2008	$10,000	$0
7/28/1999	$25,000	$10,000	4/18/2008	$10,000	$0
5/30/2000	$10,000	$0	4/18/2008	$10,000	$0
6/9/2000	$25,000	$25,000	4/18/2008	$10,000	$0
6/13/2000	$20,000	$50,000	4/19/2008	$10,000	$0
7/10/2000	$50,000	$25,000	4/25/2008	$150,000	$0
3/23/2001	$7,500	$0	4/25/2008	$30,000	$0
4/7/2001	$150,000	$0	4/25/2008	$20,000	$0
5/1/2001	$75,000	$0	4/25/2008	$200,000	$0
5/22/2004	$100,000	$298,039	4/25/2008	$20,000	$0
9/15/2004	$50,000	$100,000	4/25/2008	$250,000	$0
6/26/2005	$74,070	$50,000	4/25/2008	$25,000	$0
6/26/2005	$100,000	$10,000	5/26/2008	$25,000	$20,000
7/26/2005	$10,000	$30,000	5/27/2008	$10,000	$20,000
4/1/2006	$5,000	$0	5/30/2008	$25,000	$0

TABLE 20: RECORDED FLOOD EVENTS IN BLACK HAWK COUNTY 1996-2019 (cont.)

DATE	PROPERTY DAMAGE	CROP DAMAGE	DATE	PROPERTY DAMAGE	CROP DAMAGE
3/14/2007	$50,000	$0	6/1/2008	$500,000	$1,000,000
6/7/2008	$2,000,000	$250,000	6/14/2013	$500,000	$0
2/14/2009	$10,000	$0	6/25/2013	$500,000	$0
5/29/2009	$10,000	$0	6/25/2013	$250,000	$0
5/30/2009	$0	$0	6/25/2015	$250,000	$0
11/1/2009	$10,000	$0	8/28/2015	$25,000	$0
11/1/2009	$10,000	$0	12/14/2015	$50,000	$0
3/11/2010	$50,000	$0	12/15/2015	$50,000	$0
3/12/2010	$100,000	$0	1/17/2016	0	$0
3/12/2010	$100,000	$0	2/20/2016	$20,000	$0
6/12/2010	$0	$2,0000,000	6/16/2016	$20,000	$0
6/25/2010	$100,000	$500,000	8/26/2016	$100,000	$200,000
6/25/2010	$100,000	$250,000	9/10/2016	$0	$0
6/29/2010	$50,000	$0	9/17/2016	$0	$0
7/1/2010	$50,000	$200,000	9/22/2016	$0	$0
7/1/2010	$50,000	$50,000	9/23/2016	$0	$0
7/24/2010	$10,000	$50,000	9/24/2016	$0	$0
7/25/2010	$0	$0	10/1/2016	$0	$0
2/20/2011	$25,000	$0	10/28/2016	$0	$0
3/21/2011	$75,000	$0	2/22/2017	$10,000	$0
3/21/2011	$100,000	$0	3/9/2017	$0	$0
4/28/2011	0	$0	2/28/2018	$0	$0
5/21/2013	$250,000	$0	4/16/2018	$100,000	$0
5/22/2013	$500,000	$0	4/24/2018	$100,000	$0
5/27/2013	$250,000	$0	5/5/2018	$200,000	$0
5/28/2013	$500,000	$0	5/6/2018	$200,000	$0
5/30/2013	$200,000	$0	6/10/2018	$50,000	$100,000
6/1/2013	0	$0	6/11/2018	$50,000	$100,000

TABLE 20: RECORDED FLOOD EVENTS IN BLACK HAWK COUNTY 1996-2019 (cont.)

DATE	PROPERTY DAMAGE	CROP DAMAGE	DATE	PROPERTY DAMAGE	CROP DAMAGE
6/1/2013	0	$0	6/22/2018	$25,000	$0
7/1/2018	$250,000	$500,000	3/15/2019	$0	$0
9/2/2018	$100,000	$0	3/15/2019	$0	$0
9/3/2018	$250,000	$500000	3/15/2019	$0	$0
10/2/2018	$0	$0	5/25/2019	$50,000	$50,000
10/9/2018	$50,000	$100000	5/29/2019	$100,000	$50,000
10/9/2018	$50,000	$0	6/1/2019	$0	$0
3/14/2019	$1,000,000	$0			
National Centers for Environmental Information / https://www.ncdc.noaa.gov/*– December 2019* (DATA APPEARING IN CHART MAY VARY FROM LOCAL SOURCES)					

Because Black Hawk County has such a vast array of streams and rivers, there is an extensive history of flooding. The following is not intended to be a complete historical record of every flood event to have occurred within the county, but rather a brief summary of some of the more severe events that have taken place.

Flood of April 1933 – This flood occurred as a result of heavy rain on the last three days in March. At the time, that March was the wettest ever recorded. The upper end of the Winnebago River drainage area had a monthly accumulation of more than six inches of rainfall. Furthermore, Black Hawk and Beaver Creek had significant rainfall amounts in their basin, therefore contributing to the local flooding situation.

Flood of June 1947 – The spring of 1947 was a very wet spring, at the time one of the wettest on record. The most severe rainfall occurred from June 10-13th. The highest rainfall amounts recorded above the metropolitan area occurred in Shell Rock on the Shell Rock River with 4.9 inches in a 19-hour time frame. Although more specific data was not available, damages for the Iowa-Cedar River Basin included damage of $2,500,000 and property damage of $1,500,000 of which about $1,000,000 was urban damage.

Flood of April 1951 – This flood was caused by melting snow accompanied by moderate rains. Snow cover during the winter was unusually heavy. Sudden warm temperatures and light rainfall began in late March. In early April, two inches of rainfall occurred in a three-day time period. The Cedar River eventually flooded necessitating the evacuation of an estimated 400 families in the Waterloo/Cedar Falls metropolitan area.

Flood of June 1954 – This flood was the result of extensive rainfall events. Although the month of May experience normal rainfall amounts, early rainfall events in June quickly saturated the soil. Then, before the soil moisture subsided additional heavy rains occurred from June 15-19th. The crests from the Shell Rock River and West Fork Shell Rock River coincided with the crest on the Cedar River producing a near record crest at the Waterloo gauging station.

Flood of March and April 1961 – The flood was produced by rapid melting of a very heavy snow cover in conjunction with several warm rainfall events. As in the 1954 flood event crests from the Shell Rock, West Fork Shell Rock, and Cedar Rivers nearly coincided. According to published reports in the Waterloo Daily Courier the Fourth Street bridge was closed due to pressure buildup and cracks found in the structure. Sans Souci bridge was also closed, as the east end of the bridge appeared to be trembling. In the City of Evansdale approximately 50 families were forced to leave their homes. It is estimated that in Waterloo there were 400 acres under water. Approximately 300 families were evacuated in east Cedar Falls. Damage estimates concluded that about 3,000 homes in Waterloo were flooded as water covered 2,800 acres; Cedar Falls, some 700 homes flooded; Evansdale, 500 homes flooded, and another 500 with basement water. There were also several areas along West Conger and Sans Souci Island.

Flood of March and April 1962 – Late March and early April flooding was the result of snowmelt of unusually heavy snow cover. Snow surveys made prior to the melt indicated 16 inches of snow on the ground at Waterloo with a water content of 4.8 inches. Crest stage at the Waterloo gauge was 2.6 feet lower than the 1961 flood event.

Flood of April 1965 – Flooding resulted due to the release of an ice pack that had formed on the Cedar River just upstream from Cedar Falls. The ice pack, before letting loose had backed up for approximately three miles. A number of streets and bridges were closed in the metropolitan area including Highway 20 near the Waterloo-Cedar Falls city limits. This event was also the largest recorded event to have occurred along Black Hawk Creek. The gage at the peak registered in excess of 18 feet and the discharge for the stream was measured at 19,300 cubic feet/second (cfs). This particular flood was estimated at approximately an 85-year flood.

Floods of 1993 – Many unincorporated areas of Black Hawk County were plagued with high water levels throughout the summer months, due to heavy rains falling repeatedly on already saturated soils with high ground water levels. Numerous secondary collector roads were under water in late June and early July, including Dysart Road south of Waterloo, Washburn Road west of Gilbertville and Brandon Road east of La Porte City. Some local roads, such as Big Woods Road north of Cedar Falls and Ordway Road northwest of Dunkerton were under water for several weeks. Ground water filled many residential basements in the Washburn area for two to three months that summer as well.

Flood of 1999 – At the time, the flood of 1999 was the flood of record for portions of the Waterloo/Cedar Falls metropolitan area. This flooding was due to three days of extreme rainfall in both the Shell Rock and Upper Cedar watersheds north of the county in addition to a six to eight-inch rainfall in the northern portion of Black Hawk County. A gage on the Cedar River at Janesville registered record gage heights. The gage at Waterloo, conversely, recorded only a twenty-year flood. This situation would have been entirely different had the heavy rains also fallen in the West Fork Cedar, Beaver Creek and Black Hawk Creek watersheds that contribute to the Cedar between Janesville and Waterloo.

In May of 1999 flash flooding on Crane Creek did great damage in the City of Dunkerton, in Black Hawk County. The town of Dunkerton was approximately 50% evacuated as waters rose. The city's sewage treatment plant was inundated by the high water. Some of the bridges over small creeks were declared unsafe. Nearly 1,000 feet of two paved secondary roads (C57 & C66) over the Wapsipinicon River east of Dunkerton were completely destroyed by floodwaters in July of 1999 as well. Officials estimated that repair costs in Black Hawk County were at least $1,700,000, including $560,000 for roads, culverts and bridges. Damage

estimates in the City of Dunkerton were placed at $500,000 to public infrastructure alone. The county also reported $183,000 in damage to parks.

One area of the county, in particular, that has had reoccurring damage as a result of flooding and high-water tables is the area along Highway 218 north of Cedar Falls. This area is the focus of many of the planning efforts being made by the county and other organizations in an effort to mitigate future water damage. The area is hampered by floodwaters entering the area and then remaining there, as opposed to draining away. This problem is compounded by the fact that the soil in the area has a relatively high infiltration rate that allows much water to soak into the ground causing the water table to rise. This elevated water table results in many basements taking on water for extended periods of time. The City of Elk Run Heights and the Washburn subdivision also experienced tremendous flood damage as a result of flooding in 1999. Many areas that had never flooded before sustained damage due to overflow water, flooded basements, storm and sanitary sewer backups, to name a few.

Flood of 2008 – Record flooding in 2008 devastated many areas in Black Hawk County. Primarily residential districts were negatively impacted. The river eventually crested at 27.01 ft, 5.15 ft above the previous record. This event was estimated to be a 500-year flood event.

Floods of 2013 – As a result of heavy rain events throughout the months of May and June, there were several floods in 2013 which led to an estimated $3,200,000 in property damage. While presidential disaster declarations were established for the same events in several neighboring counties, there was no such declaration for Black Hawk County. This can likely be attributed to all of the flood mitigation actions implemented by the communities in Black Hawk County over the years.

Floods of 2016 – In 2016, the Cedar River experienced near record-breaking flood levels. 17 Iowa counties were impacted by the 2016 floods and the National Guard was activated to assist with local responses. 2016 Floods accounted for $340,000 in property and crop damage in the planning area.

Floods of 2018 – The Cedar River rose to moderate flood stage in September of 2018. Damages caused to property and crop land exceeded $3,600,000. While the financial impact was significant, it was mitigated by earlier efforts of removing structures form flood plain areas, along with preventative measures such as HESCO barriers, sandbags on hand, and construction of levees.

Floods of 2019 – Flooding events occurring in the spring of 2019 caused damage to structures and area parks, including the Black Hawk Park. The high water coupled with large ice floats creating more damage than a normal high-water event (*Black Hawk County Conservation Board).*

Finally, it should be noted that there have been several flood events that go unrecorded for several reasons. Either they do not cause substantial damage to houses or structures or they may occur around the same time of a larger, more publicized event. Nevertheless, these events do result in flood costs

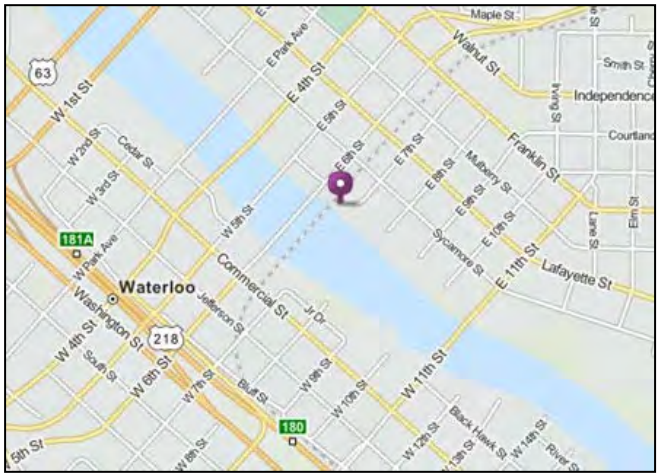


FIGURE 4: WATERLOO RIVER GAUGE LOCATION
©2014 MapQuest - Portions ©2014 NAVTEQ

that the county taxpayers and individual property owners must finance. The closest river gauge, for which historic stream flow information is available, is located on the Cedar River near downtown Waterloo.

Jurisdiction	Historical Occurrence of River Flooding by Jurisdiction
Cedar Falls, UNI, and Cedar Falls Community School District	The City of Cedar Falls was affected by all of the aforementioned flood events. Since the nearest gauge station to Cedar Falls is in downtown Waterloo, most statistics relating to Cedar Falls are broad in scope. At the time of the 1999 flood, a flood control levy that now protects much of the downtown area had been approximately 2/3 completed. If not for that scenario, the flood event would likely have caused much more extensive damage than it did. Since the flood of 2008, the city has undergone an extensive series of flood buyouts. Cedar Falls participated in federally-funded programs to remove properties damaged in the flood. According to available data, the city has facilitated the purchase and removal of structures from over 344 properties, at a total cost of nearly $21 Million. Map 6 and Map 7 show the areas in Cedar Falls situated within the floodplain, and Map 52 shows the location of critical facilities in the city. As shown, portions of the University of Northern Iowa (UNI) campus are within the floodplain, particularly along Dry Run Creek. The Cedar Falls Community School District has two facilities situated on parcels identified to be affected during a one-percent annual chance flood scenario: North Cedar Elementary School and Peet Junior High School. The Price Laboratory School, which had been situated along the floodplain, was demolished in 2013.
Dunkerton	In May of 1999 flash flooding on Crane Creek did great damage in the City of Dunkerton. The City of Dunkerton was approximately 50% evacuated as waters rose. The city's sewage treatment plant was inundated by the high water. Some of the bridges over small creeks were declared unsafe. Nearly 1,000 feet of two paved secondary roads (C57 & C66) over the Wapsipinicon River east of Dunkerton were completely destroyed by floodwaters in July of 1999 as well. Damage estimates in the City of Dunkerton were placed at $500,000 to public infrastructure alone. In 2013, evacuations began in downtown Dunkerton after heavy rains caused Crane Creek to rise by several feet.
Elk Run Heights	Elk Run Heights experienced its first flood event in 1969, which resulted in the sewer treatment plant being submerged and temporarily rendered ineffective. The 1969 flooding event occurred when water backed up into the community due to the high level of the Cedar River. With the 1990's the frequency and severity of flooding increased in Elk Run Heights, as was the case in much of the Midwest. The flooding of 1993 was arguably the most severe event on record until 2008. Many residences experienced flooding in their basements due to an extremely high-water table coupled with some surface water flow through the city. The floodwater came across Lafayette Road and passed through town en route to Elk Run Creek and the Cedar River. The greatest damage occurred along Sutton Avenue, where two houses experienced substantial damage due to flooding.

Jurisdiction	Historical Occurrence of River Flooding by Jurisdiction
	The flood of 1999 was serious, but not as far-reaching as the 1993 flooding. Houses were once again flooded along Sutton Avenue, but residences in other portions of the community were not as wet as they had been in the 1993 event. This was largely attributed to the construction of a large drainage ditch north of Dubuque Road, which routed most of the water north of the City west to Elk Run Creek. The record flooding in 2008 devastated many areas in Black Hawk County along the Cedar River and its tributaries. Fortunately, due to Elk Run Height's previous mitigation actions, there was little damage to the community.
Evansdale	From an aerial view, it appears that a portion of the city was built on an ox bow of the Cedar River. The community had major flooding in 1947, 1961, and 1965. The city worked with the U.S. Army Corps of Engineers and purchased the right-of-way for flood control. In 1980-1982, the Corps extended the Waterloo Flood Control Levee through Evansdale along the east side of the Cedar River and on the west side of Elk Run Creek which runs through the community from north to south. This project was completed on October 1, 1982. The southern portion of the levee is Interstate 380 as it runs through the community. During several flood events, a low arch concrete railroad bridge has contributed to an ice jam on the Cedar River backing up flood water for miles upstream. The bridge was no longer used for a railroad; however, it was later converted into a highly used bike and recreational trail link for the Cedar Valley Nature Trail which connects the Waterloo and Cedar Rapids metro areas together. This bridge was later destroyed in the 2008 flood. It has since been replaced in 2013. Evansdale suffered flooding in June 2008 and it was estimated that 250 to 300 residences took water. The levee on the south side of Evansdale protects the city from a 100-year flood event and the levee performed well in protecting the city. The wastewater treatment plant did suffer damage, however. The flooding that affected residential areas in Evansdale came from Elk Run Creek, which runs through the community to the Cedar River. The city is prone to flash flooding and has had several occurrences over the years. Due to the city's high-water table, low elevation, and proximity to the Cedar River and Elk Run Creek, many homes have sump pumps. These sump pumps expel water into the sanitary sewer or into the street, which exacerbates flooding during a heavy rainfall. The city continually works to improve the local storm sewer system to improve drainage and prevent flash flooding.
Gilbertville	The only river flowing through Gilbertville is the Cedar River which has a long history of flood events in Black Hawk County. However, there is no indication that any substantial flood damage has occurred in the city as a result of these events. This is because the majority of the city is situated on a hill approximately 30 feet above the river.

Jurisdiction	Historical Occurrence of River Flooding by Jurisdiction
Hudson	The primary flood hazard in the City of Hudson generally occurs as a result of overflow from Black Hawk Creek, the only stream of consequence in the community. Due to the location of Hudson, on the banks of Black Hawk Creek, the probability of flooding is high. Although the probability of flooding is high, because the City has been successful in prohibiting growth in the identified flood hazard areas, the majority of flood damage has been to crops, and otherwise unpopulated areas. Conversely, flooding has caused some damage to structures in the developed portion of the community on several occasions in the past decade. According to FEMA information, there are 10 residential units and several streets within the flood hazard area.
La Porte City	Wolf Creek is the only major creek that runs through La Porte City. Wolf Creek flows into the Cedar River which is exactly two miles away from the city center. La Porte City endured notable flood and high-water events in 1872, 1881, 1902, 1944, 1946, 1947, 1949, 1969, 1974, 1993, 1999, and 2008, 2016 and 2018. The magnitude of each flood varies, but considerable damage occurred during several of these events including damage or destruction to bridges, housing, railroad tracks, commercial buildings, and public utilities.
Raymond	Poyner Creek, a tributary of the Cedar River, is the only water body in Raymond. This creek located within the 100-year floodplain is in the south east corner of the city and has potential for concern during heavy downpours. Fortunately, there are no residential or commercial areas located within this floodplain. Conversely, the city has experienced several flash flooding events, as heavy rains have occurred.
Waterloo	The City of Waterloo was impacted in some way by all of the aforementioned flood events. In the summer of 2008, the City of Waterloo experienced a sustained period of river flooding that would become the worst natural disaster in the city's history. The river crested on June 11 and was 3.5 feet higher than any previous record. It was determined that the city had experienced a 500-year flood. Thankfully, the city's levee system and flood panels saved much of the downtown from flooding. The "west" side of downtown flooded when water overran the protection at Blower's Creek and sewers backed up with floodwater. Several bridges spanning the Cedar River were closed and the Union Pacific rail bridge was destroyed by the flooding. Damage estimates of the flood are in the millions: $18 million for the city and $15 million for private property. The city's investment in flood mitigation projects in the past and staff and volunteer efforts minimized the impact of this otherwise devastating flood.

Probability

Considering the historical occurrence of flood events and the number of streams and rivers located within Black Hawk County, the probability of future flooding remains highly likely (see Table 14 for definition of this probability) for portions of the planning area. The locations where flooding might occur can vary substantially.

Jurisdiction	Probability of River Flood Events by Jurisdiction
Cedar Falls, UNI, and Cedar Falls Community School District	Due to the location of Cedar Falls in relation to the Cedar River, Black Hawk Creek, Snag Creek, Beaver Creek, Dry Run Creek, and several smaller unnamed creeks, the City of Cedar Falls, UNI, and Cedar Falls Community School District can expect there to be additional flooding events at some time in the future. The probability is highly likely.
Dunkerton	The entire community of Dunkerton lies within the Crane Creek drainage area. In addition, the small, unnamed tributary located within the city also has a small floodplain. Considering the previous flood events in Dunkerton, the probability of future flooding remains highly likely.
Elk Run Heights	Due to the location of Elk Run Heights on the banks of Elk Run Creek and near the Cedar River the probability of flooding remains highly likely. However, the recent construction of a large drainage ditch on the north side of town has reduced the chance a flood event will occur.
Evansdale	Due to the location of Evansdale on the banks of the Cedar River and Elk Run Creek, the probability of flooding remains highly likely.
Gilbertville	Because Gilbertville is situated along the Cedar River, the probability of flooding is highly likely. However, the area affected by such flooding is relatively minimal compared to other cities in the planning area, as the city is situated on a hill next to the river.
Hudson	Due to the location of Hudson, on the banks of Black Hawk Creek, the probability of flooding is high. Although the probability of flooding is high, because the City has been successful in prohibiting growth in the identified flood hazard areas, the majority of flood damage has been to crops, and otherwise unpopulated areas. Conversely, flooding has caused some damage to structures in the developed portion of the community on several occasions in the past decade. Due to increased development in the community over the past couple of decades, it is likely that runoff from properties within city limits has increased, thereby increasing the risk of flash flooding in the community.
La Porte City	Due to the location of La Porte City in relation to the Cedar River and Wolf Creek, the community can expect there to be additional flooding events at some time in the future. The community identified the probability of flooding in La Porte City as occasional.

Jurisdiction	Probability of River Flood Events by Jurisdiction
Raymond	Given the limited historical occurrences of significant flooding in Raymond, the probability of future river flooding is unlikely. However, flash flood events are more likely.
Waterloo	Due to the location of Waterloo in relation to the Cedar River, Black Hawk Creek, Dry Run Creek, Virden Creek, Blower's Creek and several other previously identified streams, the City of Waterloo can expect there to be additional flooding events at some time in the future. The river gage readings below show 42 peak flows reaching flood stage (12 feet or above) on the Cedar River between March 16, 1929 and April 29, 2009. Based on this historical record, the probability of the Cedar River reaching flood stage is 52.5 percent in a given year.

Magnitude / Severity

Significant flooding would likely affect the entire planning area in some regard through road closures resulting in limited access to business or residential areas. Those who are at the greatest risk are those living in identified flood zones.

Jurisdiction	Magnitude / Severity of River Flood Events by Jurisdiction
Cedar Falls, UNI, and Cedar Falls Community School District	Critical facilities that could be impacted during a river flood event include Cedar Falls Utilities, which is situated in close proximity to the Cedar River. If a large enough flood occurred, it is possible that the power plant would not be able to operate, as was the case in the June 2008 floods when the CFU Streeter Station was knocked out of commission for 8 months. The water reclamation facility was at one time in an identified flood area, and still is officially, but since the construction of levees along the Cedar River, it would likely take a levee failure for the plant to be affected. A record flood which occurred in September of 2016 threatened to come close to topping the levee which at the time was 102.9'. The City has since increased the levee height by an additional two feet, through a $6.7 million project. This project expanded the City's existing levee system for increased capacity to protect critical structures and the downtown. Approximately 2,274 parcels in the City of Cedar Falls are within the 100 and 500-year floodplain, representing 4,783.5 acres, as determined by official Flood Insurance Rate Maps (FIRMs) for the community. This represents 25.1% of the City. Total value of properties in the 100-year floodplain is $344,598,470. Total value of properties within the 500-year floodplain is $32,793,580. There are two schools situated in the floodplain in the in City of Cedar Falls. Peet Junior High School, located near the interchange of University Avenue and Iowa Highway 58, and the North Cedar Elementary School, located near Center Street and W Lone Tree Road, are

Jurisdiction	Magnitude / Severity of River Flood Events by Jurisdiction
	situated on parcels identified to be affected during a one-percent annual chance flood scenario. All other schools in the district are situated outside of areas identified as affected during a flood event. There are a number of facilities located on the UNI campus situated on parcels identified to be affected by a floodway and a one-percent annual chance flood scenario: the UNI-Dome, the Wellness and Recreation Center, the McLeod Center, the Center for Energy and Environmental Education, the Center of Business and Community Services, the Industrial Technology Center, the Biology Research Complex, Bender and Dancer Halls* (known locally as "the towers"), Hillside Courts*, Jennings Courts*, the ROTH Complex*, the campus's running track and tennis courts, and several parking lots. Facilities marked with an asterisk (*) are residence halls or apartments which present unique problems such as overnight flooding events which could pose a hazard to the residents inside. All other campus facilities not mentioned above are situated outside of areas identified as affected during a flood event.
Dunkerton	In a 100-year flood event, approximately 178 parcels would be impacted, representing 202.1 acres. In a 500-year flood event, a small tributary that flows into Crane Creek would also overflow causing flood damage to surrounding homes and impacting potentially 12.7 acres. Public structures situated within the floodplain include the main wastewater lift station, the City maintenance garage, the Public Library, and two City wells. The total estimated value of all property within the floodway, 100-year and 500-year floodplain is $11,282,680.
Elk Run Heights	According to analysis of 2018 parcel values and the 2011 floodplain designations in Black Hawk County, IA a 100-year flood event would impact an estimated 18 parcels, representing 68.7 acres, valued at $1,590,010.
Evansdale	Flooding would likely affect the entire city in some regard. Whether it is closed roads resulting in limited access to business or residential areas or simply the cost incurred by the community as a result to increased staff-hours, most of the city would be affected. A 100-Year flood would impact 158 parcels, representing 77.7% of all acres in the City, with a value of $6,897,860.
Gilbertville	There are 68 parcels of land, representing 27.4 acres, located within the 100-year floodplain. However, there are no persons currently living within the floodplain. The total value of all property in the floodplain is $6,815,810. The main concern regarding flooding in Gilbertville is damage to bridges and roadways.
Hudson	The City of Hudson has been successful in prohibiting growth in the identified flood hazard areas. However, there are 207 parcels, representing 1,535 acres, that would be impacted by a 100-year flood event, with buildings and dwellings valued at $20,910,980. The majority of flood damage to date has been to crops and otherwise unpopulated areas. However, due to increased development, the likelihood of flash flooding has increased as a result of increased runoff.
La Porte City	La Porte City has 387 parcels, representing 760.6 acres, that would be impacted by a 100-year flood event. This would damage an estimated 57.79% of the City, valued at approximately $31,382,520. Critical facilities that could stand to be impacted include the Wastewater

Jurisdiction	Magnitude / Severity of River Flood Events by Jurisdiction
	Treatment Facility, two lift stations, the Municipal Power Plant, two bridges, City Hall, the Police Department, and the local Fire Department.
Raymond	The City of Raymond has 13 parcels, on approximately 74.1 acres, located within the 100-year floodplain with structures and land valued at $1,034,840. This represents 1.85% of the entire City. Significant flooding in nearby cities and counties could affect the residents of Raymond in some regard, such as closed roads resulting in limited access to nearby businesses or residential areas.
Waterloo	There are a total of 8,943 floodplain parcels across 11,948.9 acres within the City of Waterloo. 1096 parcels are in the floodway, 1,485 are in the 100-year floodplain, 6,127 are protected by levee and 235 are within the 500-year flood plain. Together, if impacted, this would damage 31.27% of the entire city. Critical facilities that could be impacted include the waste water treatment plant, which lies in close proximity to the Cedar River but is relatively well protected from large flood events.

Warning Time

Flood warnings are disseminated from the National Weather Service, IAWAS, and Tornado Spotters to the Black Hawk County Sheriff's Department who, in turn, disseminate warnings to the affected areas of the city and county, using established procedures.

People in the path of river floods may have time to take appropriate actions to limit harm to themselves and their property. Floods may occur in the form of flash flooding which can result in a matter of tens of minutes. Other floods can be forecasted to allow for several hours, perhaps even days notification.

Duration

The duration of river flooding is dependent on the severity of the flooding event.

Flash Flood

Definition and Description

A flash flood event occurs with little or no warning where water levels rise at an extremely fast rate. Flash flooding results from intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Most flash flooding occurs within the designated FEMA 1% annual chance flood zone. The flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area.

Flash flooding is an extremely dangerous form of flooding, which can reach full peak in only a few minutes and allows little or no time for protective measures to be taken by those in its path. Flash flood water move at very fast speeds and can roll boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. Flash flooding often results in higher loss of life, both human and animal, than slower developing river and stream flooding.

Historical Occurrence

According to data from the National Climatic Data Center, there have been 42 reported flash flood events in Black Hawk County between January 1, 1996 and November 30, 2019. These events have caused $5.56 Million in property damage and $570,000 in crop damage. Table 21 identifies the Historical Flash Flood Events in Black Hawk County.

It should be noted that there have been several flood events that go unrecorded for several reasons. Either they do not cause substantial damage to houses or structures or they may occur around the same time of a larger, more publicized event. Nevertheless, these events do result in flood costs that the county taxpayers and individual property owners must finance.

TABLE 21: HISTORICAL FLASH FLOOD EVENTS IN BLACK HAWK COUNTY (1996-2019)					
Location	**Date**	**Death**	**Injuries**	**Property Damage ($)**	**Crop Damage ($)**
Dunkerton	5/16/1999	0	0	$1,200,000	$0
Waterloo	5/17/1999	0	0	$150,000	$0
La Porte City	6/8/1999	0	0	$150,000	$25,000
Waterloo	7/2/1999	0	0	$1,000,000	$250,000
Waterloo	5/31/2000	0	0	$50,000	$5,000
Black Hawk County	7/10/2000	0	0	$250,000	$250,000
Waterloo	7/24/2001	0	0	$250,000	$0
Waterloo	5/22/2004	0	0	$75,000	$0
Dunkerton	8/19/2007	0	0	$50,000	$10,000
Dunkerton	8/19/2007	0	0	$100,000	$10,000
Waterloo	8/19/2007	0	0	$25,000	$10,000
Waterloo	8/19/2007	0	0	$25,000	$0
Cedar Falls	4/25/2008	0	0	$20,000	$0
Cedar Falls	4/25/2008	0	0	$10,000	$0
Cedar Falls	6/7/2008	0	0	$25,000	$0
Waterloo	6/7/2008	0	0	$20,000	$0
Castle Hill	6/12/2008	0	0	$50,000	$0
Waterloo	6/12/2008	0	0	$150,000	$0
Waterloo	4/26/2009	0	0	$50,000	$0
Waterloo	4/26/2009	0	0	$10,000	$0
Waterloo	4/26/2009	0	0	$5,000	$0
Cedar Falls	6/18/2010	0	0	$10,000	$0
Orange	6/18/2010	0	0	$25,000	$0

TABLE 21 (CONT.): HISTORICAL FLASH FLOOD EVENTS IN BLACK HAWK COUNTY (1996-2019)					
Location	**Date**	**Death**	**Injuries**	**Property Damage ($)**	**Crop Damage ($)**
Orange	7/7/2010	0	0	$100,000	$0
Cedar Falls	7/7/2010	0	0	$100,000	$0
Waterloo	7/7/2010	0	0	$50,000	$0
Dewar	7/7/2010	0	0	$100,000	$0
Dewar	7/7/2010	0	0	$200,000	$0
Evansdale	7/7/2010	0	0	$500,000	$0
Dewar	7/24/2010	0	0	$100,000	$10,000
Castle Hill	5/29/2013	0	0	$200,000	$0
Waterloo	5/29/2013	0	0	$75,000	$0
Evansdale	5/29/2013	0	0	$250,000	$0
Dewar	6/26/2013	0	0	$50,000	$0
Dewar	6/26/2013	0	0	$50,000	$0
Orange	6/29/2014	0	0	$10,000	$0
La Porte City	6/29/2014	0	0	$50,000	$0
Waterloo	6/22/2016	0	0	$0	$0
Waterloo	06/30/2018	0	0	$20,000	$0
Waterloo	07/01/2018	0	0	$0	$0
North Cedar	09/03/2018	0	0	$0	$0
Cedar Falls	09/03/2018	0	0	$10,000	$0
TOTALS	**N/A**	**0**	**0**	**$5,565,000**	**$570,000**

Source: National Centers for Environmental Information. https://www.ncdc.noaa.gov/

Jurisdiction	Historical Occurrence of Flash Flood Events by Jurisdiction
Cedar Falls, UNI, and Cedar Falls Community School District	Since 1996, Cedar Falls has faced six flash flood events that resulted in property damage. The flood event on April 25, 2008 was reported as both a flood and a flash flood, illustrating the inherent similarities in the two event types. Since the flood of 2008, the city has undergone an extensive series of flood buyouts. Cedar Falls participated in federally-funded programs to remove properties damaged in the flood. According to available data, the city has facilitated the purchase and removal of structures from approximately 344 properties. Cedar Falls has also experienced flash flooding events in 2010 and 2018 .
Dunkerton	In May of 1999 flash flooding on Crane Creek caused great damage in the City of Dunkerton. The City of Dunkerton was approximately 50% evacuated as waters rose. The city's sewage treatment plant was inundated by the high water. Some of the bridges over small creeks were declared unsafe. Nearly 1,000 feet of two paved secondary roads (C57 & C66) over the Wapsipinicon River east of Dunkerton were completely destroyed by floodwaters in July of 1999 as well. Damage estimates in the City of Dunkerton were placed at $500,000 to public infrastructure alone.
Elk Run Heights	Elk Run Heights experienced its first flood event in 1969, which resulted in the sewer treatment plant being submerged and temporarily rendered ineffective. The 1969 flooding event occurred when water backed up into the community due to the high level of the Cedar River. With the 1990's the frequency and severity of flooding increased in Elk Run Heights, as was the case in much of the Midwest. The flooding of 1993 was arguably the most severe event on record until 2008. Many residences experienced flooding in their basements due to an extremely high water table coupled with some surface water flow through the city. The floodwater came across Lafayette Road and passed through town en route to Elk Run Creek and the Cedar River. The greatest damage occurred along Sutton Avenue, where two houses experienced substantial damage due to flooding. The flood of 1999 was serious, but not as far-reaching as the 1993 flooding. Houses were once again flooded along Sutton Avenue, but residences in other portions of the community were not as wet as they had been in the 1993 event. This was largely attributed to the construction of a large drainage ditch north of Dubuque Road, which routed most of the water north of the City west to Elk Run Creek. The record flooding in 2008 devastated many areas in Black Hawk County along the Cedar River and its tributaries. Fortunately, due to Elk Run Height's previous mitigation actions, there was little damage to the community.

Jurisdiction	Historical Occurrence of Flash Flood Events by Jurisdiction
Evansdale	From an aerial view, it appears that a portion of the city was built on an ox bow of the Cedar River. The community had major flooding in 1947, 1961, and 1965. The city worked with the U.S. Army Corps of Engineers and purchased the right-of-way for flood control. In 1980-1982, the Corps extended the Waterloo Flood Control Levee through Evansdale along the east side of the Cedar River and on the west side of Elk Run Creek which runs through the community from north to south. This project was completed on October 1, 1982. The southern portion of the levee is Interstate 380 as it runs through the community. During several flood events, a low arch concrete railroad bridge contributed to an ice jam on the Cedar River backing up flood water for miles upstream. The bridge is no longer used for a railroad and had been converted into a highly used bike and recreational trail linking to the Cedar Valley Nature Trail and connecting the Waterloo and Cedar Rapids metro areas together. However, this bridge was destroyed in the 2008 flood and has yet to be replaced. Evansdale suffered flooding in June 2008 and it was estimated that 250 to 300 residences took water. The levee on the south side of Evansdale protects the city from a 100-year flood event and the levee performed well in protecting the city. The wastewater treatment plant did suffer damage, however. The flooding that affected residential areas in Evansdale came from Elk Run Creek, which runs through the community to the Cedar River. There is currently no meaningful flood protection in place along the creek and when the Cedar River water levels rose, it backed up water into Elk Run Creek, causing it to flood. The city is prone to flash flooding and has had several occurrences over the years. Due to the city's high-water table, low elevation, and proximity to the Cedar River and Elk Run Creek, many homes have sump pumps. These sump pumps expel water into the sanitary sewer or into the street, which exacerbates flooding during a heavy rainfall. The city continually works to improve the local storm sewer system to improve drainage and prevent flash flooding. The city has also experienced two other recorded flash food events in 2010 and 2013, causing approximately $750,000.
Gilbertville	The only river flowing through Gilbertville is the Cedar River which has a long history of flood events in Black Hawk County. However, there is no indication that any substantial flood damage has occurred in the city as a result of these events. This is because the majority of the city is situated on a hill approximately 30 feet above the river.
Hudson	The primary flood hazard in the City of Hudson generally occurs as a result of overflow from Black Hawk Creek, the only stream of consequence in the community. Due to the location of Hudson, on the banks of Black Hawk Creek, the probability of flooding is high. Although the probability of flooding is high, because the City has been successful in prohibiting growth in the identified flood hazard areas, the majority of flood damage has been to crops, and otherwise unpopulated areas. Conversely, flooding has caused some damage to structures in the developed portion of the community on several occasions in the past decade. According to FEMA

Jurisdiction	Historical Occurrence of Flash Flood Events by Jurisdiction
	information, there are 10 residential units and several streets within the flood hazard area.
La Porte City	Wolf Creek is the only waterway that runs through La Porte City. Wolf Creek flows into the Cedar River which is exactly two miles away from the city center. La Porte City endured notable flood and high-water events in 1872, 1881, 1902, 1944, 1946, 1947, 1949, 1969, 1974, 1993, 1999, 2008 and 2014. The magnitude of each flood varies, but considerable damage occurred during several of these events including damage or destruction to bridges, housing, railroad tracks, commercial buildings, and public utilities.
Raymond	Poyner Creek, a tributary of the Cedar River, is the only water body in Raymond. This creek located within the 100-year floodplain is in the south east corner of the city and has potential for concern during heavy downpours. Fortunately, there are no residential or commercial areas located within this floodplain. Conversely, the city has experienced several flash flooding events, as heavy rains have occurred.
Waterloo	As reported in the Historical Occurrence of River Flooding, the City of Waterloo experienced a sustained period of flooding in 2008 that would become the worst natural disaster in the city's history. The river crested on June 11 and was 3.5 feet higher than any previous record. It was determined that the city had experienced a 500-year flood. Thankfully, the city's levee system and flood panels saved much of the downtown from flooding. The "east" side of downtown flooded when water overran the protection at Blower's Creek and sewers backed up with floodwater. The "west" side experienced flooding due to Dry Run Arch being overwhelmed. Several bridges spanning the Cedar River were closed and the Union Pacific rail bridge was destroyed by the flooding. Damage estimates of the flood are in the millions: $18 million for the city and $15 million for private property. The city's investment in flood mitigation projects in the past and staff and volunteer efforts minimized the impact of this otherwise devastating flood. The city also endured significant flooding in 1947, 1951, 1954, 1961, 1962, 1993, 2016 and 2018.

Probability

Considering the historical occurrence of flood events and the number of streams and rivers located within Black Hawk County, the probability of future flooding remains highly likely (see Table 14 for definition of this probability) for portions of the planning area.

Jurisdiction	Probability of Flash Flood Events by Jurisdiction
Cedar Falls, UNI, and Cedar Falls Community School District	Based on historical data of flash flooding in Cedar Falls, the probability of future flash flooding events was occasional (see Table 14 for definition of this probability). Between the years of 1996 and 2019, there have been only three years where flash flooding events in Cedar Falls have been reported, 2008, 2016 and 2018. Community members, however, identified the probability of future flash flooding events as highly likely, which likely accounts for flash flooding events that go unreported as well as similar storm events that aren't classified as flash floods, e.g. heavy rains, river flooding.
Dunkerton	Based on historical data of flash flooding in Dunkerton, it was determined the probability of future flash flooding events was occasional (see Table 14 for definition of this probability). Between the years of 1996 and 2019, there have been three years where flash flooding events in Dunkerton have been reported: 1999, 2007, and 2010. In 2007, three unique flood events were reported in Dunkerton on the same day, August 19th. In 2010, the flash flood event reported to have started in Dewar was reported to have ended in Dunkerton.
Elk Run Heights	Two flood events are known to have affected Elk Run Heights between 1996 and 2019. These events took place on April 26, 2009 and May 29, 2013. Accordingly, the probability of future flash flood events in the city is occasional.
Evansdale	Four flood events are known to have affected Evansdale between 1996 and 2019. These events took place on August 19, 2007, April 26, 2009, July 7, 2010, and May 29, 2013. Accordingly, the probability for future flash flood events remains likely.
Gilbertville	The topography of Gilbertville, as well as the absence of any recorded flash flood events from 1996-2019, suggests that the probability for future flash flood events remains unlikely. However, there have been two flash flood events in the nearby populated place of Washburn (3 mi W), one on July 7, 2010 and the other on June 29, 2014. In addition, there have been three flood events in the nearby City of Raymond (3 mi N) described below. Based on the context of these nearby flood events, the probability of flash flooding in Gilbertville could be considered to be occasional rather than unlikely.

Jurisdiction	Probability of Flash Flood Events by Jurisdiction
Hudson	Based on historical information from 1996-2019, there have been no flash flood events known to have occurred in Hudson, thereby suggesting that the probability for future flash flood events is unlikely. However, there have been multiple flash flood events in nearby populated places of Orange (5 mi ENE) and Cedar Falls Junction (3 mi NE) from the town center in Hudson. In Orange, flash flood events were recorded on June 18, 2010, July 7, 2010, and June 29, 2014. In Cedar Junction, flash flood events were recorded on June 12, 2008 and July 7, 2010. Based on the context of these nearby flood events, the probability of flash flooding in Hudson could be considered to be occasional rather than unlikely.
La Porte City	Based on historical information from 1996-2014, there have been two years with reported flash flood events in the city, 1999 and 2014. This suggests the probability of future flash flood events is occasional. There were two unique flash floods events in 1999, one on June 8th and the other on June 29th.
Raymond	Three flood events are known to have affected Raymond between 1996 and 2018. These events took place on August 19, 2007, April 26, 2009, and July 7, 2010. Accordingly, the probability for future flash flood events is occasional.
Waterloo	Based on historical information as well as community feedback, the probability of flash flooding in Waterloo is highly likely. Between 1996 and 2019, there have been eleven years in which flash flood events were reported in Waterloo: 1999, 2000, 2001, 2004, 2007, 2008, 2009, 2010, 2013, 2016 and 2018.

Magnitude / Severity

Significant flooding would likely affect the entire planning area in some regard through road closures resulting in limited access to business or residential areas. Those who are at the greatest risk are those living in identified flood zones.

Jurisdiction	Magnitude / Severity of Flash Flood Events by Jurisdiction
Cedar Falls, UNI, and Cedar Falls Community School District	Critical facilities that could be impacted include Cedar Falls Utilities, which lies in close proximity to the Cedar River. If a large enough flood occurred, it is possible that the power plant would not be able to operate, as was the case in the June 2008 floods when the CFU Streeter Station was knocked out of commission for 8 months. The water reclamation facility was at one time in an identified flood area, and still is officially, but since the construction of levees along the Cedar River, it would likely take a levee failure for the plant to be affected. There are 2274 parcels in the City of Cedar Falls designated as being in the floodplain, representing 4,783 acres as determined by official Flood Insurance Rate Maps (FIRMs) for the community. That calculates to approximately 25 percent of the city being exposed to damages as a result of 100 and 500-year flooding, valued at $344,598,470. There are two schools situated in the floodplain the in City of Cedar Falls. Peet Junior High School, located near the interchange of University Avenue and Iowa Highway 58, and the North Cedar Elementary School, located near Center Street and W Lone Tree Road, are situated on parcels identified to be affected during a one-percent annual chance flood scenario. The Price Laboratory School located near the UNI Campus was situated adjacent to parcels identified to be affected during a one-percent annual chance flood scenario until its demolition in 2013. All other schools in the district are situated outside of areas identified as affected during a flood event. There are a number of facilities located on the UNI campus situated on parcels identified to be affected by a floodway and a one-percent annual chance flood scenario: the UNI-Dome, the Wellness and Recreation Center, the McLeod Center, the Center for Energy and Environmental Education, the Center of Business and Community Services, the Industrial Technology Center, the Biology Research Complex, Bender and Dancer Halls* (known locally as “the towers”), Hillside Courts*, Jennings Courts*, the ROTH Complex*, the campus’s running track and tennis courts, and several parking lots. Facilities marked with an asterisk (*) are residence halls or apartments which present unique problems such as overnight flooding events which could pose a hazard to the residents inside. All other campus facilities not mentioned above are situated outside of areas identified as affected during a flood event.

Jurisdiction	Magnitude / Severity of Flash Flood Events by Jurisdiction
Dunkerton	In a 100-year flood event, approximately 105 parcels, representing 13.31% of the City valued at $7,416,150, would sustain some degree of flood damage. In a 500-year flood event, a small tributary that flows into Crane Creek would also overflow causing flood damage to surrounding homes. Public structures situated within the floodplain include the main wastewater lift station, the City maintenance garage, the Public Library, and two City wells. The total estimated value of all property within the 500-year floodplain is $1,673,510.
Elk Run Heights	A 100-year flood event would impact an estimated 18 properties on approximately 74 acres worth a total of $1,590,010.
Evansdale	Flooding has potential to impact 2,031 acres, representing 77.7% of the city in the 100-year and 500-year floodplain.
Gilbertville	There are 62 parcels of land, representing 27.4 acre, located within the 100-year floodplain. The total value of all property in the 100-year floodplain is $6,620,120 The main concern regarding flooding in Gilbertville is damage to bridges and roadways.
Hudson	There are 1619 acres in the floodplain within the city of Hudson, representing 29.8% of the city. The city has been successful in prohibiting growth in the identified flood hazard areas. The majority of flood damage has been to crops and otherwise unpopulated areas. However, due to increased development, the likelihood of flash flooding has increased as a result of increased runoff.
La Porte City	Approximately 1,095 acres or 65.3 percent of La Porte City is within the 100-year floodplain as determined by official Flood Insurance Rate Maps for the community. It is estimated that there are 809 residential, commercial, and accessory structures in the 100-year floodplain. Critical facilities that could stand to be impacted include the Wastewater Treatment Facility, two lift stations, the Municipal Power Plant, two bridges, City Hall, the Police Department, and the local Fire Department.
Raymond	Approximately 7.15% of the City's acreage is located within the floodplain. According to the city's existing land use plan, there is one residential property located within the 100-year floodplain. This property appears to be a vacant lot, however, so there are no existing structures that lie within the 100-year floodplain. Significant flooding in nearby cities and counties could affect the residents of Raymond in some regard, such as closed roads resulting in limited access to nearby businesses or residential areas.
Waterloo	Approximately 12,672 acres or 31.2 percent of Waterloo is within the 100-year and 500-year floodplain, as determined by the official Flood Insurance Rate maps for the community. While a good portion of this area is in undeveloped portions of the community, an estimated 2,852 structures are located within the floodplain. Critical facilities that could be impacted include the waste water treatment plant, which lies in close proximity to the Cedar River but is relatively well protected from large flood events.

Warning Time

Flood warnings are disseminated from the National Weather Service, IAWAS, and Tornado Spotters to the Black Hawk County Sheriff's Department who, in turn, disseminates warnings to the affected areas of the City and county, using established procedures. People in the path of river floods may have time to take appropriate actions to limit harm to themselves and their property. Floods may occur in the form of flash flooding which can result in a matter of tens of minutes. Other floods can be forecasted to allow for several hours, perhaps even days notification.

Duration

The duration of flash flooding is dependent on the severity of the flooding event.

Tornados

Definition and Description

A tornado is a violent, destructive, rotating column of air or wind characteristically accompanied by a funnel shaped cloud extending down from a cumulonimbus cloud.

A tornado can be a few yards to about a mile wide where it touches the ground. An average tornado, however, is a few hundred yards wide. It can move over land for distances ranging from short hops to many miles, causing great damage wherever it descends. The funnel is made visible by the dust sucked up and by condensation of water droplets in the center of the funnel.

The rating scale used to rate tornado intensity is the Fujita Scale. The Fajita Scale categorizes tornado severity based on observed damage. The six-step scales range from F0 (light damage) to F5 (incredible damage). As of February 2007, the National Weather Service uses the Enhanced Fujita Scale (EF Scale). This new scale ranges from EF0-EF5 (see Table 22).

TABLE 22: ENHANCED FUJITA SCALES FOR TORNADOS

Fujita Scale		Enhanced Fujita Scale		Type of Tornado	Description of Damage
Scale	3-Second Gust Speed (mph)	Scale	3-Second Gust Speed (mph)		
F0	45-78	EF0	65-85	Gale	Some damage to chimneys, broken tree branches, push over shallow rooted trees, damage to sign boards
F1	79-117	EF1	86-109	Moderate	The lower limit is the beginning of hurricane wind speed, peel surface off roofs, mobile homes pushed off foundations or overturned, moving automobiles pushed off roads
F2	118-161	EF2	110-137	Significant	Considerable damage: roofs torn off frame homes, mobile homes demolished, boxcars pushed over, large trees snapped or uprooted, light object missiles generated
F3	162-209	EF3	138-167	Severe	Severe damage: roofs and some walls torn off well-constructed houses, trains overturned, most trees in forest uprooted, heavy cars lifted off ground and thrown
F4	210-261	EF4	168-199	Devastating	Devastating damage: well-constructed houses leveled, structure with weak foundation blown off some distance, cars thrown and large missiles generated
F5	262-317	EF5	200-234	Incredible	Incredible damage: strong frame houses lifted off foundations and carried considerable distance to disintegrate, automobile sized missiles fly through the air in excess of 100 yards, trees debarked, incredible phenomena will occur.

Source: NOAA

Historical Occurrence

Between 1950 and 2019, there have been 36 recorded occurrences of tornado events in Black Hawk County. These events caused $56.25 Million in property damage, $178,000 in crop damage, 2 deaths and 79 injuries. The

tornado event on May 25, 2008 was the cause of the vast majority of this damage, causing $25,000,000 in property damage and $155,000 in crop damage. The recorded tornado events for Black Hawk County can be referenced on Table 23. Data used in this table was collected from the National Oceanic and Atmospheric Administration and the private website TornadoProject.com. The data gathered indicates reported tornados only, and does not account for unreported or misreported information. Accordingly, this information is intended for reference only, and not as a true and accurate historical account. A graphic representation of historic tornado events and the paths they roughly traveled can be seen on Map 28: Historic Tornado Map of the County.

TABLE 23: BLACK HAWK COUNTY TORNADO EVENTS

Location	Date	Deaths	Injuries	Fujita Scale	Prop Damage ($)	Crop Damage ($)	Location	Date	Deaths	Injuries	Fujita Scale	Prop Damage ($)	Crop Damage ($)
Black Hawk Co.	4/16/1960	1	5	F3	250,000	0	Waterloo	6/16/1992	0	0	F1	25,000	0
Waterloo	5/7/1964	0	27	F2	25,000,000	0	Cedar Falls	5/11/2000	1	25	F3	1,750,000	10,000
Waterloo	5/7/1964	0	0	F1	25,000	0	Dunkerton	5/11/2000	0	0	F2	350,000	5,000
La Porte City	7/18/1965	0	0	F2	250	0	Dunkerton	5/11/2000	0	0	F2	300,000	2,000
La Porte City	8/26/1965	0	0	F4	2,500,000	0	La Porte City	4/11/2001	0	0	F1	125,000	0
Waterloo	6/27/1966	0	0	F1	2,500	0	Gilbertville	4/23/2001	0	0	F0	40,000	0
Hudson	5/31/1971	0	0	F2	25,000	0	Cedar Falls	6/1/2001	0	0	F0	0	0
Hudson	5/7/1973	0	0	F0	0	0	Finchford	6/1/2001	0	0	F0	0	0
Black Hawk Co.	6/16/1973	0	0	F1	250,000	0	Cedar Falls	6/1/2001	0	0	F0	3,000	0
Tama Co.	11/9/1975	0	0	F3	2,500,000	0	Dunkerton	6/1/2001	0	0	F0	0	0
Black Hawk Co.	6/12/1976	0	2	F2	25,000	0	Gilbertville	6/1/2001	0	0	F0	5,000	0
Black Hawk Co.	6/13/1976	0	0	F2	25,000	0	Eagle Center	4/18/2002	0	0	F0	1,000	0
Waterloo	5/19/1984	0	0	F0	0	0	Waterloo	5/21/2004	0	0	F0	0	0
Black Hawk Co.	6/21/1985	0	0	F0	0	0	Castle Hill	6/21/2007	0	0	F0	0	2,000
Black Hawk Co.	7/14/1987	0	0	F0	2,500	0	Benson	5/25/2008	0	20	F2	25,000,000	155,000
Elk Run Heights	7/18/1987	0	0	F1	25,000	0	Farmer	08/31/2014	0	0	F0	1,000	1,000
Black Hawk Co.	5/8/1988	0	0	F1	250,000	0	Boies	08/31/2014			F0	0	2,000
Black Hawk Co.	5/19/1990	0	0	F1	250,000	0	Boies	10/09/2018			F0	2,000	0
Black Hawk Co.	6/27/1990	0	0	F0	25,000	0							

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

Cedar Falls, UNI, and Cedar Falls Community School District

Since 1950, the most notable tornado that affected Cedar Falls, an F3 tornado on May 11, 2000 which caused $1,750,000 in property damage, $10,000 in crop damage, and one fatality just outside City limits. On May 25, 2008, another tornado passed just north of Cedar Falls which ultimately led to $25,000,000 in property damage, $155,000 in crop damage, and 20 injuries. Both tornados continued along an east-northeast trajectory until finally exiting Black Hawk County near the northeast border. Three other tornados have been reported in Cedar Falls since 1950: one on June 1, 2001 which caused $3,000 in property damage, another on June 1, 2001 which didn't cause any reported damage, and one on June 21, 2007 which also didn't cause any reported damage.

A number of high wind events have also affected Cedar Falls. Around 1983, a microburst event near Lincoln Street was reported resulting in a number of downed trees and power lines. Wind speeds as high as 107 miles per hour were recorded at the Waterloo Regional Airport during this event. On August 24, 1998, high wind and rain resulted in downed power lines and tree limbs which resulted in sporadic power outages across the city affecting 500 customers. The power outage caused some traffic lights to malfunction, resulting in an increased transportation risk. One downed tree branch stuck in a transformer caused a fire to occur. On May 28, 2002, a high wind event caused localized damage to a horse shed on the north edge of Cedar Falls. This same area had significant damage on the May 11, 2000 event.

Dunkerton

Considering its small size, the City of Dunkerton has an impressive history of tornados. Between 1950 and 2018, there were seven tornados in a three-mile radius of Dunkerton (specifically the intersection of State Highway 281 and E Dunkerton Rd), including three tornados within Dunkerton city limits. All of these tornados were rated at least F2 on the Fujita Scale. The largest tornado to go through Dunkerton city limits passed through on November 9, 1975. This was an F3 tornado which began in Tama County, IA and travelled north-northeast through Evansdale, Elk Run Heights, and Raymond before passing through Dunkerton and ultimately leaving Black Hawk County near the northeast corner.

Elk Run Heights

Two tornados have passed through Elk Run Heights since 1950, an F3 tornado in 1975 and an F2 tornado in 1976. The two tornados travelled along nearly identical paths moving north-northeastward through the county (see Map 28: Historic Tornado Map of the County).

Evansdale

The two tornados which passed through neighboring Elk Run Heights also passed through the southeast portion of Evansdale. Fortunately, this part of Evansdale has very little in terms of development, so it can be inferred that there has been little property damage, if any, caused by a tornado in Evansdale.

Gilbertville

The closest tornado to the City of Gilbertville on record occurred on June 1, 2001 near the city's boundary. There have been a total of nine recorded tornados that have occurred within a five-mile radius of Gilbertville since 1950.

Hudson

Two tornados have impacted the City of Hudson, both of which were rated F0. Though the vast majority of Hudson's total area is farmland, the two tornados that impacted the city were formed in the most developed portion of the city near the Hudson High School. These tornados occurred on May 31, 1971 and May 7, 1973. In 1960, an F3 tornado passed through the county just one mile south of Hudson.

La Porte City

Since 1950, three tornados have affected La Porte City. The first was an F2 tornado that formed in 1965 near the south border of the city. The second tornado occurred just one month later on August 28, 1965. This tornado was an F4 tornado that also formed near the south border of the city before promptly turning southeast and exiting the county. LPC experienced a third tornado in 2001.

Raymond

Five tornados have impacted the City of Raymond: two F1 tornados, two F2 tornados, and one F3 tornado. Property damage data is only available for one of these tornados, an F1 tornado that occurred on April 11, 2001. This tornado caused a total of $125,000 in property damage.

Waterloo

There have been a total of 12 tornados that have occurred within or very close to (i.e. within one-mile of) Waterloo's city boundaries. Surprisingly, the vast majority of the development in Waterloo, including the downtown business district, was unaffected by these tornados. Historically, tornados have either passed through or been formed along the fringes of the city.

Probability

There have been 36 recorded tornados in Black Hawk County since 1950. Because tornados are sporadic, there cannot be a reliable long-term prediction made as to when or if they may occur. However, if the tornado events hold to their average, it is likely that Black Hawk County will experience approximately five tornados within the next ten years.

One risk assessment was found online at the website www.disastercenter.com. The Disaster Center based its risk assessment by dividing the square mileage of each state against the frequency of death, injury, number of tornados, and cost of damages for each state. Each state was ranked by these individual categories. They then added the total of each state's individual rankings and divided by the number of factors (four). The data used covers the period of 1950 to 1995. According to their findings, the State of Iowa ranked 14th out of the 50 states in the amount of risk of tornados.

Magnitude / Severity

Tornados consist of strong, often destructive, winds. The winds in the strongest tornados are the fastest winds experienced anywhere on Earth, with rotation velocities up to 300 miles per hour. Generally, the damage associated with a tornado is greatest within several hundred feet of the column. The maximum threat of a tornado occurs when a tornado stays on the ground for an extended period of time. The risk becomes even greater when the tornado event is accompanied by hail, heavy rain, and lighting.

The severity of a tornado event would likely be determined by five primary components: (1) the size of the tornado (see Table 22), with an F5 posing the most severe risk to the community, (2) the time the tornado stayed in or around the vicinity, (3) the time of day the event takes place, (4) the density of the population at the point of impact, and (5) the area of the community that was directly impacted, e.g. a mobile home park or an undeveloped portion of the community.

Since 1960, there have been 12 fatalities and 146 injuries as a result of tornados in Black Hawk County. These values include reported fatalities and injuries in neighboring counties where tornados have crossed county lines into or out of Black Hawk County. The tornado with the highest number of fatalities occurred in 2008 where most of the damage occurred in Butler County to the west.

Table 24 through Table 32 show damage estimates if a tornado were to go directly through each city in Black Hawk County at intensities ranging from EF0 to EF5. Parcel values were made available by the Black Hawk County MIS Department and are current as of September 25, 2018. The incorporated boundaries are current as of November 1, 2019. The damage estimates show a realistic damage level to buildings and land; these were calculated using the following percentages:

- EF0, EF1: 25% damage to affected buildings and land
- EF2, EF3: 50% damage to affected buildings and land

- EF4, EF5: 100% damage to affected buildings and land

Cedar Falls, UNI, and Cedar Falls Community School District

Using available data, a tornado scenario was developed (see Maps 29 and 30: Tornado Scenario Hypothetical Path and Affected Buildings). Estimates of potential damage based on an EF0 through an EF5 tornado impacting Cedar Falls are listed in Table 24.

TABLE 24: CEDAR FALLS TORNADO SCENARIO

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	374	$19,281,202	$20,811,191	$48,686,899	$146,758	$69,644,848	$17,411,212	2.07%
EF1	150 Meters	492 Feet	744	$34,914,758	$31,969,904	$96,457,786	$224,382	$128,652,072	$32,163,018	3.82%
EF2	250 Meters	820 Feet	1116	$51,530,798	$49,101,914	$143,620,856	$788,722	$193,511,492	$96,755,746	5.75%
EF3	500 Meters	1640 Feet	1988	$85,104,358	$73,505,164	$257,659,726	$2,414,072	$333,578,962	$166,789,481	9.91%
EF4	900 Meters	2953 Feet	3362	$135,408,358	$124,794,679	$446,242,781	$4,125,392	$575,162,852	$575,162,852	17.09%
EF5	1100 Meters	3609 Feet	3995	$155,669,405	$136,610,161	$526,841,619	$4,637,095	$668,088,875	$668,088,875	19.85%

Dunkerton

Using available data, a tornado scenario was developed (see Maps 31 and 32: Tornado Scenario Hypothetical Path and Affected Buildings). Estimates of potential damage based on an EF0 through an EF5 tornado impacting Dunkerton are listed in Table 25.

TABLE 25: DUNKERTON TORNADO SCENARIO

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	41	$1,001,710	$535,380	$4,703,740	$50,160	$5,289,280	$1,322,320	9.49%
EF1	150 Meters	492 Feet	69	$1,616,470	$535,380	$7,829,830	$50,160	$8,415,370	$2,103,843	15.11%
EF2	250 Meters	820 Feet	96	$2,104,070	$1,111,300	$9,461,260	$50,160	$10,622,720	$5,311,360	19.07%
EF3	500 Meters	1640 Feet	146	$3,553,060	$5,648,440	$14,373,500	$50,160	$20,072,100	$10,036,050	36.03%
EF4	900 Meters	2953 Feet	253	$5,450,460	$6,382,200	$25,280,730	$50,160	$31,713,090	$31,713,090	56.93%
EF5	1100 Meters	3609 Feet	312	$6,179,690	$6,382,200	$28,612,150	$50,160	$35,044,510	$35,044,510	62.91%

Elk Run Heights

Using available data, a tornado scenario was developed (see Maps 33 and 34: Tornado Scenario Hypothetical Path and Affected Buildings). Estimates of potential damage based on an EF0 through an EF5 tornado impacting Elk Run Heights are listed in Table 26.

TABLE 26: ELK RUN HEIGHTS TORNADO SCENARIO

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	41	$1,001,710	$535,380	$4,703,740	$50,160	$5,289,280	$1,322,320	9.49%
EF1	150 Meters	492 Feet	69	$1,616,470	$535,380	$7,829,830	$50,160	$8,415,370	$2,103,843	15.11%
EF2	250 Meters	820 Feet	96	$2,104,070	$1,111,300	$9,461,260	$50,160	$10,622,720	$5,311,360	19.07%
EF3	500 Meters	1640 Feet	146	$3,553,060	$5,648,440	$14,373,500	$50,160	$20,072,100	$10,036,050	36.03%
EF4	900 Meters	2953 Feet	253	$5,450,460	$6,382,200	$25,280,730	$50,160	$31,713,090	$31,713,090	56.93%
EF5	1100 Meters	3609 Feet	312	$6,179,690	$6,382,200	$28,612,150	$50,160	$35,044,510	$35,044,510	62.91%

Evansdale

Using available data, a tornado scenario was developed (see Maps 35 and 36: Tornado Scenario Hypothetical Path and Affected Buildings). Estimates of potential damage based on an EF0 through an EF5 tornado impacting Evansdale are listed in Table 27.

TABLE 27: EVANSDALE

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	113	$2,444,550	$108,880	$6,856,640	$235,500	$7,201,020	$1,800,255	2.90%
EF1	150 Meters	492 Feet	231	$4,324,670	$108,880	$15,868,970	$235,500	$16,213,350	$4,053,338	6.52%
EF2	250 Meters	820 Feet	319	$5,859,440	$3,468,060	$20,757,630	$235,500	$24,461,190	$12,230,595	9.84%
EF3	500 Meters	1640 Feet	586	$10,316,590	$7,984,400	$39,023,330	$356,500	$47,364,230	$23,682,115	19.06%
EF4	900 Meters	2953 Feet	1060	$19,081,483	$9,560,002	$76,232,448	$359,147	$86,151,597	$86,151,597	34.67%
EF5	1100 Meters	3609 Feet	1318	$23,129,973	$10,952,352	$93,914,318	$359,147	$105,225,817	$105,225,817	42.35%

Gilbertville

Using available data, a tornado scenario was developed (see Maps 37 and 38: Tornado Scenario Hypothetical Path and Affected Buildings). Estimates of potential damage based on an EF0 through an EF5 tornado impacting Gilbertville are listed in Table 28.

TABLE 28: GILBERTVILLE

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	80	$1,164,268	$646,762	$5,338,748	$28,412	$6,013,922	$1,503,481	10.64%
EF1	150 Meters	492 Feet	157	$2,270,928	$699,432	$11,207,178	$28,412	$11,935,022	$2,983,756	21.12%
EF2	250 Meters	820 Feet	221	$3,535,288	$5,750,142	$16,665,978	$57,332	$22,473,452	$11,236,726	39.77%
EF3	500 Meters	1640 Feet	334	$5,708,838	$6,233,892	$28,401,708	$57,332	$34,692,932	$17,346,466	61.39%
EF4	900 Meters	2953 Feet	458	$7,602,008	$6,235,532	$38,075,518	$57,332	$44,368,382	$44,368,382	78.51%
EF5	1100 Meters	3609 Feet	496	$8,236,628	$6,377,612	$41,636,288	$57,332	$48,071,232	$48,071,232	85.07%

Hudson

Using available data, a tornado scenario was developed (see Maps 39 and 40: Tornado Scenario Hypothetical Path and Affected Buildings). Estimates of potential damage based on an EF0 through an EF5 tornado impacting Hudson are listed in Table 29.

TABLE 29: HUDSON

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	97	$1,953,420	$177,530	$11,522,930	$0	$11,700,460	$2,925,115	5.57%
EF1	150 Meters	492 Feet	201	$3,976,300	$270,160	$24,424,670	$0	$24,694,830	$6,173,708	11.75%
EF2	250 Meters	820 Feet	307	$5,911,250	$428,990	$37,186,120	$12,600	$37,627,710	$18,813,855	17.91%
EF3	500 Meters	1640 Feet	516	$10,081,240	$2,561,330	$59,142,040	$12,600	$61,715,970	$30,857,985	29.37%
EF4	900 Meters	2953 Feet	786	$16,437,438	$9,374,956	$87,807,754	$130,252	$97,312,962	$97,312,962	46.31%
EF5	1100 Meters	3609 Feet	902	$19,998,908	$13,868,106	$100,844,584	$198,652	$114,911,342	$114,911,342	54.69%

La Porte City

Using available data, a tornado scenario was developed (see Maps 45 and 46: Tornado Scenario Hypothetical Path and Affected Buildings). Estimates of potential damage based on an EF0 through an EF5 tornado impacting La Porte City are listed in Table 30.

TABLE 30: LAPORTE CITY

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	149	$2,233,370	$3,808,842	$9,010,138	$16,030	$12,835,010	$3,208,753	10.18%
EF1	150 Meters	492 Feet	292	$4,187,010	$5,362,795	$18,967,095	$21,540	$24,351,430	$6,087,858	19.32%
EF2	250 Meters	820 Feet	420	$6,178,098	$6,049,350	$29,349,530	$63,622	$35,462,502	$17,731,251	28.13%
EF3	500 Meters	1640 Feet	675	$9,732,758	$9,063,480	$46,251,470	$76,722	$55,391,672	$27,695,836	43.94%
EF4	900 Meters	2953 Feet	1011	$14,386,602	$12,957,686	$67,530,354	$214,888	$80,702,928	$80,702,928	64.02%
EF5	1100 Meters	3609 Feet	1126	$16,309,242	$15,484,796	$74,969,934	$265,908	$90,720,638	$90,720,638	71.96%

Raymond

Using available data, a tornado scenario was developed (see Maps 47 and 48: Tornado Scenario Hypothetical Path and Affected Buildings). Estimates of potential damage based on an EF0 through an EF5 tornado impacting Raymond are listed in Table 31.

TABLE 31: RAYMOND

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	88	$2,142,400	$214,090	$10,780,070	$0	$10,994,160	$2,748,540	19.64%
EF1	150 Meters	492 Feet	176	$3,888,370	$287,660	$20,660,490	$14,210	$20,962,360	$5,240,590	37.44%
EF2	250 Meters	820 Feet	224	$4,863,143	$604,603	$25,346,787	$17,977	$25,969,367	$12,984,684	46.38%
EF3	500 Meters	1640 Feet	328	$7,411,893	$1,296,493	$35,731,637	$17,977	$37,046,107	$18,523,054	66.17%
EF4	900 Meters	2953 Feet	366	$8,391,433	$1,324,883	$39,414,547	$32,857	$40,772,287	$40,772,287	72.82%
EF5	1100 Meters	3609 Feet	389	$9,049,843	$1,325,723	$41,728,227	$32,857	$43,086,807	$43,086,807	76.96%

Waterloo

Using available data, a tornado scenario was developed (see Maps 49 and 50: Tornado Scenario Hypothetical Path and Affected Buildings). Estimates of potential damage based on an EF0 through an EF5 tornado impacting Waterloo are listed in Table 32.

TABLE 32: WATERLOO

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	520	$14,196,237	$36,133,974	$24,509,946	$186,523	$60,830,443	$15,207,611	1.51%
EF1	150 Meters	492 Feet	1062	$23,934,838	$46,880,113	$54,545,617	$269,932	$101,695,662	$25,423,916	2.53%
EF2	250 Meters	820 Feet	1594	$33,572,502	$53,963,323	$88,965,007	$522,138	$143,450,468	$71,725,234	3.57%
EF3	500 Meters	1640 Feet	3024	$56,006,495	$74,112,928	$175,739,422	$971,355	$250,823,705	$125,411,853	6.24%
EF4	900 Meters	2953 Feet	5260	$90,354,363	$107,978,551	$312,119,239	$1,311,097	$421,408,887	$421,408,887	10.49%
EF5	1100 Meters	3609 Feet	6489	$107,668,937	$115,411,695	$382,730,685	$1,500,843	$499,643,223	$499,643,223	12.43%

Warning Time

Although the advancement in radar and forecasting has improved and continues to improve it cannot predict when and where a tornado may strike. They can however inform a community of when the conditions are right for an event to occur. In fact, it is estimated that approximately 95 percent of all tornados occur in areas where a tornado watch has been issued. Nevertheless, the five percent of the time that they do not accurately predict, or someone is simply uninformed can result in an almost immediate onset, with little or no warning time.

Duration

The duration of a tornado event is dependent up on the amount of damage it has on the planning area, which was hit. It would be just a few hours with down tree branches to more than a week for major structural damages.

Windstorms

Definition and Description

Extreme winds are often associated with severe winter storms, severe thunderstorms, downbursts, and very steep pressure gradients. Extreme winds other than tornados are experienced in all regions of Iowa. It is difficult to separate the various wind components that cause damage from other wind-related natural events that often occur with or generate windstorms. For this reason, windstorms and tornado were considered together in their hazard ranking.

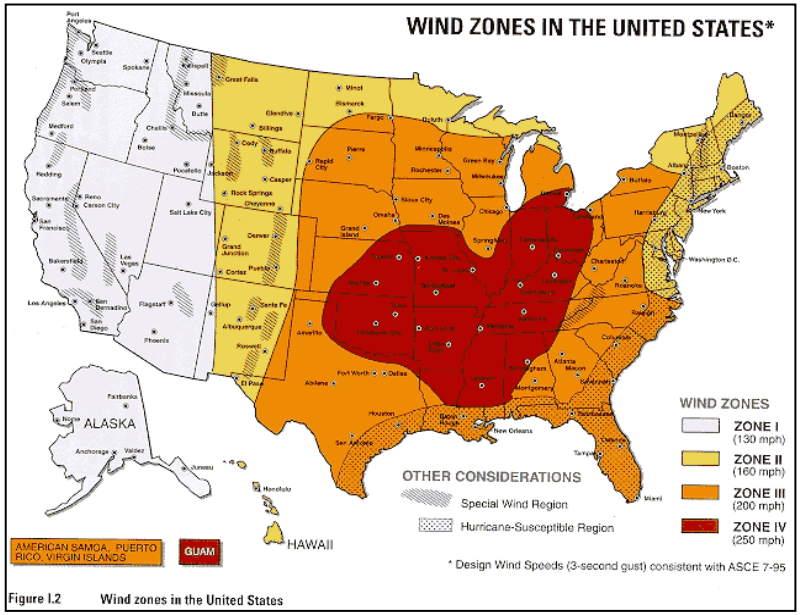


FIGURE 5: WIND ZONES IN THE UNITED STATES

Historical Occurrence

According to the National Centers for Environmental Information, there were 32 reported high wind events in Black Hawk County between January 1, 1996 and April 11, 2019. The magnitude of these storms reached upwards of 61 knots and caused $3,155,110 in property damage and $30,100 in crop damage altogether. No injuries or deaths resulted from any of these storms.

The NCDC website lists high wind events by zone rather than by community, so the smallest scale data available is at the county level. Table 33 lists details of each reported windstorm event in Black Hawk County since 1996. The table does not include thunderstorm wind events which are more numerous and more destructive. The most powerful thunderstorm wind event was recorded in Cedar Falls on July 10, 2009 when wind gusts were estimated to be as high as 91 knots, or 104.7 miles per hour.

TABLE 33: HISTORICAL WINDSTORMS IN BLACK HAWK COUNTY								
Community	**Date**	**Type**	**Magnitude**	**Wind Speed Measurement***	**Death**	**Injuries**	**Property Damage ($)**	**Crop Damage ($)**
Black Hawk Co.	1/17/1996	High Wind	55 kts.	N/A	0	0	0	0
Black Hawk Co.	2/10/1996	High Wind	56 kts.	N/A	0	0	0	0
Black Hawk Co.	3/24/1996	High Wind	54 kts.	N/A	0	0	0	0
Black Hawk Co.	4/25/1996	High Wind	52 kts.	N/A	0	0	0	0
Black Hawk Co.	6/21/1996	High Wind	57 kts.	N/A	0	0	0	0
Black Hawk Co.	10/29/1996	High Wind	57 kts.	N/A	0	0	0	0
Black Hawk Co.	4/6/1997	High Wind	55 kts.	N/A	0	0	0	0
Black Hawk Co.	5/5/1997	High Wind	52 kts.	N/A	0	0	0	0
Black Hawk Co.	4/12/1998	High Wind	N/A	N/A	0	0	50,000	0
Black Hawk Co.	11/10/1998	High Wind	61 kts.	N/A	0	0	1,000,000	5,100
Black Hawk Co.	3/17/1999	High Wind	50 kts.	N/A	0	0	45,000	0
Black Hawk Co.	3/8/2000	High Wind	50 kts.	E	0	0	10,000	0
Black Hawk Co.	4/7/2001	High Wind	50 kts	M	0	0	50,000	0
Black Hawk Co.	4/23/2001	High Wind	56 kts.	E	0	0	100,000	0
Black Hawk Co.	3/9/2002	High Wind	N/A	N/A	0	0	50,000	0
Black Hawk Co.	5/11/2002	High Wind	50 kts.	E	0	0	75,000	0
Black Hawk Co.	2/11/2003	High Wind	60 kts.	M	0	0	10,000	0
Black Hawk Co.	11/12/2003	High Wind	50 kts.	EG	0	0	50,000	0
Black Hawk Co.	3/7/2004	High Wind	36 kts.	MS	0	0	50,000	0
Black Hawk Co.	4/18/2004	High Wind	35 kts.	MS	0	0	80,000	0
Black Hawk Co.	4/27/2004	High Wind	35 kts.	MS	0	0	75,110	0
Black Hawk Co.	12/12/2004	High Wind	52 kts.	EG	0	0	75,000	0
Black Hawk Co.	1/22/2005	High Wind	35 kts.	MS	0	0	10,000	0
Black Hawk Co.	5/12/2005	High Wind	35 kts.	MS	0	0	10,000	0
Black Hawk Co.	6/8/2005	High Wind	50 kts.	EG	0	0	20,000	0
Black Hawk Co.	11/15/2005	High Wind	35 kts.	MS	0	0	30,000	0
Black Hawk Co.	1/24/2006	High Wind	37 kts.	MS	0	0	10,000	0
Black Hawk Co.	10/26/2008	High Wind	51 kts.	MG	0	0	1,250,000	25,000
Black Hawk Co.	7/16/2010	High Wind	52 kts.	EG	0	0	5,000	0
Black Hawk Co.	7/16/2010	High Wind	52 kts.	EG	0	0	25,000	0
Black Hawk Co.	10/27/2010	High Wind	50 kts.	MG	0	0	25,000	0
Black Hawk Co.	04/11/2019	High Wind	51 kts.	MG	0	0	50,000	0
TOTALS	**N/A**	**N/A**	**N/A**	**N/A**	**0**	**0**	**$ 3,155,110**	**$ 30,100**
** - M = Measured, E = Estimated, S = Sustained Wind, G = Wind Gust / Source: National Centers for Environmental Information*								

Probability

Based on historical occurrences of high wind events, the probability of future windstorms occurring in Black Hawk County is highly likely (see Table 14 for a definition of this probability). The planning area has a humid continental climate; therefore, there is generally enough moisture to form clouds and rain, relatively warm and unstable air that can rise quickly, and fluctuating weather fronts that work to cause uplift in air masses.

Magnitude / Severity

The maximum threat of a windstorm is usually several hundred or thousand feet wide, as they are often associated with large thunderstorm cells. Much of the damage incurred during a windstorm event is often due to the accompanying hail, lightning, and wind shear.

Warning Time

Tornado and thunderstorm watches can warn of likely conditions hours in advance of an upcoming storm. Although significant advances in meteorological technology has allowed for more effective forecasting, it is impossible to predict, in advance, when and where a windstorm will strike. A windstorm's rapid change in direction makes it difficult to say with certainty, the path the windstorm will continue on after it has been identified. Therefore, warning time is often very short or non-existent. Wind advisories are issued by the National Weather Service when there are sustained winds 25 to 39 mph and/or gusts to 57 mph. Issuance is normally site specific; however, winds of this magnitude often occur over an area that frequently experiences high winds.

Duration

The duration of the effects of a windstorm event would depend upon the amount of damage sustained. For instance, broken tree limbs would impact the affected area for only a few hours; whereas, more significant damage may take days to weeks to repair.

Impacts can vary from broken tree limbs, broken corn stocks, to the total destruction of buildings and other structures depending upon the built environment and the speed of the winds.

Thunderstorm & Lightning

Definition and Description

Thunderstorms result from an atmospheric imbalance and turbulence resulting in heavy rains, winds reaching or exceeding 58 mph, tornados, or surface hail at least 0.75 inches in diameter. Lightning is the flashing of light produced by a discharge of atmospheric electricity. Thunderstorms are common in Iowa and can occur singly, in clusters, or in lines. They are formed from a combination of moisture, rapidly raising warm air, and lifting mechanism such clashing warm and cold air masses. It is possible for several thunderstorms to affect one location in the course of a few hours. Some of the most severe weather occurs when a single thunderstorm affects one location for an extended time.

It is important to note that although hail and lightning are described and defined separately from thunderstorm they generally occur as a result of a thunderstorm. Therefore, when a thunderstorm occurs, the likelihood of hail and lightning dramatically increases. Furthermore, besides hail and lightning, thunderstorms are often responsible for other cascading events such as flash flooding, river flooding, tornados, and windstorm events.

Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt." This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches a temperature approaching 50,000 degrees Fahrenheit in a split second. The rapid heating and cooling of air near the lightning causes thunder.

Historical Occurrences

Thunderstorms are common events in Black Hawk County. Each spring and summer bring many thunderstorms, often accompanied by lightning, high winds, hail, funnel clouds, and tornados. Since this document discusses high wind, hail, tornado, and flood events individually, this section will focus only on thunderstorm related weather events not mentioned in other sections.

Since 1996, Black Hawk County has experienced 12 reported lightning events causing a combined total of $1,154,000 in property damage. The county has also experienced 225 thunderstorm wind events causing $4,628,000 in property damage and $102,000 in crop damage, 61 heavy rain events causing $105,000 in property damage and no crop damage, and six funnel cloud events causing no damage.

Probability

The probability of a thunderstorm occurring in Black Hawk County is highly likely (see Table 14 for definition of this probability). This conclusion is based on the historical occurrences of thunderstorms in the area and the fact that the climate in the upper Midwest is very conducive to the development of thunderstorms. The climate in the area is of humid continental variety and therefore there is generally enough moisture to form clouds and rain, relatively warm and unstable air that can rise quickly, and fluctuating weather fronts that work to cause uplift in air masses.

Lightning strikes in Iowa an average of 8.1 flashes per square mile per year. As Black Hawk County is approximately 571.91 square miles in size, the county can anticipate approximately 4,632 flashes on an annual basis.

Magnitude / Severity

Thunderstorms affect relatively small areas when compared to winter storms. The typical thunderstorm is 15 miles in diameter and lasts an average of 20 to 30 minutes. Of the estimated 100,000 thunderstorms that occur each year in the United States, only about 10 percent are classified as severe.

Despite their relatively small size, thunderstorms are large enough to impact the entire community. The severity of the storm would likely determine the extent of any associated damage. Thunderstorms may occur singly, in clusters, or in lines. Some of the most severe weather occurs when a single thunderstorm affects one location for an extended time. Lightning is a major threat during a thunderstorm. It is the lightning that produces thunder in a thunderstorm. Lightning is very unpredictable, which increases the risk to individuals and property.

Warning Time

The National Weather Service has developed effective weather advisories, which are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public in advance of the storm. Again, weather prediction capabilities have made significant improvements in the past few years. There are several notifications made by the National Weather Service. These include severe thunderstorm watch, severe thunderstorm warning, tornado watch, tornado warning, flash flood watch, and flash flood warning.
Despite these advancements in technology, the potential for a storm to form quickly and without warning still exists. Therefore, the committee staggered the score for the speed of onset. This allowed for the possibility of minimal or no warning time, but also acknowledged that there is generally some warning time before an event occurs.

Duration

This type of hazard stays in the area a relatively short amount of time, depending upon the wind speeds.

Hailstorms

Definition and Description

Hailstorms are an outgrowth of a severe thunderstorm in which balls or irregularly shaped lumps of ice greater than 0.75 inches in diameter fall with rain. Hail is produced by many strong thunderstorms. Strong rising currents of air within a storm carry water droplets to a height where freezing occurs. Ice particles grow in size until they are too heavy to be supported by the updraft. Hail can be smaller than a pea or as large as a softball and can be very destructive to plants and crops. The hail scale extends from H0 to H10 with incremental levels of intensity and damage potential. Table 34 outlines the different sizes of hail, and Table 35 describes the categories used to classify hailstorms.

TABLE 34: HAILSTONE SIZE CODES

Size code	Maximum Diameter mm	Description
0	5-9	Pea
1	10-15	Mothball
2	16-20	Marble, grape
3	21-30	Walnut
4	31-40	Pigeon's egg, squash ball
5	41-50	Golf ball, pullet's egg
6	51-60	Hen's egg
7	61-75	Tennis ball, cricket ball
8	76-90	Large orange, soft ball
9	91-100	Grapefruit
10	>100	Melon

Source: The Tornado and Storm Research Organization

TABLE 35: TORRO HAILSTORM INTENSITY SCALE

	Intensity Category	Typical Hail Diameter (mm)*	Probable Kinetic Energy, J-m^2	Typical Damage Impacts
H0	Hard Hail	5	0-20	No damage
H1	Potentially Damaging	5-15	>20	Slight general damage to plants, crops
H2	Significant	10-20	>100	Significant damage to fruit, crops, vegetation
H3	Severe	20-30	>300	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-40	>500	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-50	>800	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-60		Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	50-75		Severe roof damage, risk of serious injuries
H8	Destructive	60-90		(Severest recorded in the British Isles) Severe damage to aircraft bodywork
H9	Super Hailstorms	75-100		Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100		Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: The Tornado and Storm Research Organization

Historical Occurrences

Between January 1, 1996 and June 2017, there have been 174 hail events recorded in Black Hawk County. The largest hail produced from these storms was on July 16, 2007 with baseball sized hail near Waterloo and softball sized hail in the Cedar Falls area. This hail was associated with a very unstable airmass that produced thunderstorms and winds as high as 80 miles per hour in the northwest of the state. Table 34 outlines the details of each hail event. This table is divided into six sections spanning three pages.

Probability

Since 1996, there has been an average of 7.63 hail events each year in Black Hawk County. Oftentimes, there are several reported hail events associated with the same storm on the same day, sometimes even in the same city. Based on the historical occurrence of reported hail events, it is highly likely a hailstorm will affect the planning area in the future (see Table 14 for a definition of this probability).

Magnitude / Severity

Hailstorms are typically associated with thunderstorms. Despite their relatively small size, thunderstorms are large enough to impact the entire planning area. The severity of the storm would likely determine the extent of any associated damage. The severity of a hailstorm depends on the size and amount of hail. Hail several inches in diameter can cause severe damage to an urbanized area (broken windows, down trees and power lines, and automobile damage). Hail as small as 0.5 inch diameter can cause damage to crops and other plants.

Warning Time

The National Weather Service has developed effective weather advisories which are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public in advance of the storm. Again, weather prediction capabilities have made significant improvements in the past few years. There are several notifications made by the National Weather Service. These include severe thunderstorm watch, severe thunderstorm warning, tornado watch, tornado warning, flash flood watch, and flash flood warning. Despite these advancements in technology, the potential for a storm to form quickly and without warning still exists.

Duration

The duration of a hailstorm is dependent upon the severity and intensity of the storm. A storm with pea-size hail will have less impact than a storm with ping-pong or larger hail. However, in general hailstorms are finished within an hour or two.

TABLE 35: HISTORICAL HAILSTORMS IN BLACK HAWK COUNTY

Location	Date	Magnitude (inches)	Death	Injuries	Property Damage ($)	Crop Damage ($)
Cedar Falls	5/19/1996	1	0	0	10,000	0
Waterloo	5/19/1996	0.75	0	0	2,000	0
Waterloo	6/24/1997	0.75	0	0	1,000	3,000
Hudson	7/27/1997	0.75	0	0	0	5,000
Hudson	8/23/1997	0.75	0	0	0	10,000
Waterloo	3/30/1998	0.88	0	0	0	0
Waterloo	3/30/1998	0.75	0	0	0	0
Waterloo	4/8/1999	0.75	0	0	2,000	0
Waterloo	5/16/1999	0.75	0	0	1,000	0
Waterloo	5/16/1999	0.75	0	0	1,000	0
Dunkerton	5/16/1999	1	0	0	3,000	0
Finchford	6/8/1999	1	0	0	2,000	5,000
Waterloo	4/19/2000	0.75	0	0	1,000	0
Finchford	4/19/2000	0.75	0	0	1,000	0
Waterloo	4/19/2000	0.75	0	0	1,000	0
La Porte City	4/19/2000	1.5	0	0	20,000	0
La Porte City	4/19/2000	2.5	0	0	40,000	0
Dunkerton	5/11/2000	1.5	0	0	5,000	5,000
Waterloo	5/18/2000	0.75	0	0	1,000	0
Waterloo	5/18/2000	1.75	0	0	20,000	2,000
Waterloo	5/18/2000	0.75	0	0	0	1,000
Waterloo	5/18/2000	0.75	0	0	1,000	1,000
Cedar Falls	5/30/2000	1	0	0	5,000	5,000
Cedar Falls	5/30/2000	1	0	0	5,000	5,000
Cedar Falls	5/30/2000	1.5	0	0	25,000	5,000
Cedar Falls	5/30/2000	1	0	0	5,000	2,000
Dunkerton	5/10/2001	1	0	0	5,000	0
Cedar Falls	5/10/2001	0.88	0	0	3,000	0
Waterloo	7/24/2001	0.88	0	0	3,000	0

TABLE 36: HISTORICAL HAILSTORMS IN BLACK HAWK COUNTY

Location	Date	Magnitude (inches)	Death	Injuries	Property Damage ($)	Crop Damage ($)
Hudson	4/18/2002	0.88	0	0	3,000	0
Waterloo	5/28/2002	1.75	0	0	25,000	0
Gilbertville	5/28/2002	1	0	0	5,000	5,000
Hudson	6/3/2002	0.88	0	0	3,000	5,000
Waterloo	5/8/2003	1	0	0	10,000	0
Waterloo	5/8/2003	0.75	0	0	0	0
Waterloo	5/8/2003	1.75	0	0	25,000	0
Waterloo	5/8/2003	0.75	0	0	0	0
Waterloo	5/8/2003	1	0	0	5,000	0
Dunkerton	5/8/2003	0.75	0	0	0	0
Dunkerton	5/10/2003	1	0	0	3,000	0
Waterloo	7/7/2003	1.5	0	0	5,000	5,000
Dunkerton	7/31/2003	1.75	0	0	25,000	10,000
Waterloo	5/21/2004	1	0	0	5,000	2,000
Waterloo	5/21/2004	1.75	0	0	10,000	2,000
Waterloo	5/21/2004	0.88	0	0	2,000	2,000
Waterloo	5/21/2004	0.88	0	0	1,000	5,000
Raymond	5/21/2004	0.88	0	0	1,000	5,000
Waterloo	5/21/2004	0.75	0	0	0	0
Hudson	6/6/2005	0.01	0	0	1,000	5,000
Hudson	3/8/2006	0.75	0	0	0	0
Waterloo	3/13/2006	0.88	0	0	5,000	0
Waterloo	3/13/2006	1	0	0	10,000	0
Waterloo	3/13/2006	0.88	0	0	5,000	0
Hudson	4/13/2006	0.75	0	0	0	0
Waterloo	4/13/2006	1	0	0	10,000	0
Waterloo	4/13/2006	1	0	0	5,000	0
Waterloo	6/24/2006	1	0	0	5,000	5,000
Waterloo	6/24/2006	0.88	0	0	3,000	0

TABLE 36: HISTORICAL HAILSTORMS IN BLACK HAWK COUNTY

Location	Date	Magnitude (inches)	Death	Injuries	Property Damage ($)	Crop Damage ($)
Waterloo	7/17/2006	1.75	0	0	50,000	0
Waterloo	7/17/2006	3	0	0	1,000,000	0
Waterloo	7/17/2006	1.25	0	0	25,000	0
Evansdale	7/17/2006	1.75	0	0	50,000	0
Evansdale	7/17/2006	1.75	0	0	5,000	5,000
Evansdale	7/17/2006	1.25	0	0	3,000	5,000
Evansdale	7/17/2006	2.75	0	0	10,000	5,000
Evansdale	4/2/2007	0.88	0	0	1,000	0
Orange	4/2/2007	1.75	0	0	15,000	0
Cedar Falls	4/2/2007	0.75	0	0	0	0
Washburn	6/21/2007	0.75	0	0	0	5,000
Cedar Falls	6/21/2007	0.88	0	0	2,000	5,000
Washburn	7/3/2007	0.88	0	0	2,000	5,000
Finchford	7/16/2007	2	0	0	35,000	10,000
Finchford	7/16/2007	2.75	0	0	50,000	20,000
Cedar Falls	7/16/2007	1	0	0	10,000	2,000
Cedar Falls	7/16/2007	1	0	0	10,000	2,000
Farmer	7/16/2007	4.5	0	0	75,000	10,000
Cedar Falls	7/16/2007	1	0	0	20,000	5,000
Cedar Falls	7/16/2007	1	0	0	20,000	5,000
Cedar Falls	7/16/2007	2.5	0	0	35,000	20,000
Cedar Falls	7/16/2007	2.75	0	0	200,000	5,000
Cedar Falls	7/16/2007	4	0	0	300,000	5,000
Cedar Falls	7/16/2007	1.5	0	0	25,000	5,000
Cedar Falls	7/16/2007	1	0	0	5,000	5,000
Cedar Falls	7/16/2007	1.75	0	0	10,000	10,000
Hudson	7/16/2007	4.25	0	0	50,000	25,000
Cedar Falls	7/16/2007	1.75	0	0	20,000	10,000
La Porte City	7/16/2007	0.88	0	0	3,000	10,000
Finchford	5/25/2008	4.25	0	0	50,000	0
Boies	5/25/2008	1.75	0	0	10,000	0
Boies	5/25/2008	1	0	0	3,000	0
Cedar City	5/25/2008	2.75	0	0	25,000	0

TABLE 36: HISTORICAL HAILSTORMS IN BLACK HAWK COUNTY

Location	Date	Magnitude (inches)	Death	Injuries	Property Damage ($)	Crop Damage ($)
Boies	5/25/2008	4	0	0	50,000	0
Cedar Falls	5/25/2008	1	0	0	3,000	0
Hudson	6/14/2008	1	0	0	3,000	5,000
Waterloo	6/14/2008	1	0	0	5,000	5,000
Waterloo	6/14/2008	1	0	0	5,000	5,000
Waterloo	6/14/2008	1	0	0	5,000	0
Dunkerton	6/14/2008	0.88	0	0	1,000	50,000
Washburn	6/14/2008	0.88	0	0	3,000	5,000
Castle Hill	7/2/2008	1	0	0	5,000	0
Cedar Falls	7/2/2008	0.75	0	0	0	0
Washburn	8/9/2009	1	0	0	2,000	0
Orange	8/9/2009	1	0	0	10,000	10,000
Washburn	8/9/2009	1	0	0	50,000	100,000
Washburn	8/9/2009	1	0	0	10,000	15,000
Cedar Falls	4/6/2010	1	0	0	3,000	0
Cedar Falls	4/6/2010	0.88	0	0	1,000	0
Waterloo	4/6/2010	1	0	0	3,000	0
Cedar Falls	4/6/2010	1	0	0	5,000	0
Cedar Falls	4/6/2010	1	0	0	3,000	0
Cedar Falls	4/6/2010	1.5	0	0	15,000	0
Cedar Falls	4/6/2010	2	0	0	25,000	0
Cedar Falls	4/6/2010	1.75	0	0	15,000	0
Cedar Falls	4/6/2010	2	0	0	50,000	0
Cedar City	4/6/2010	1.5	0	0	10,000	0
Waterloo	4/6/2010	1.75	0	0	15,000	0
Cedar Falls	4/6/2010	2.5	0	0	100,000	0
Waterloo	4/6/2010	1.75	0	0	15,000	0
Cedar Falls	4/6/2010	3.5	0	0	1,000,000	0
Waterloo	4/6/2010	1.75	0	0	25,000	0
Waterloo	4/6/2010	2.5	0	0	50,000	0
Cedar Falls	4/6/2010	1.75	0	0	20,000	0
Washburn	5/12/2010	0.75	0	0	0	0
Waterloo	6/18/2010	0.88	0	0	0	3,000

TABLE 36: HISTORICAL HAILSTORMS IN BLACK HAWK COUNTY

Location	Date	Magnitude (inches)	Death	Injuries	Property Damage ($)	Crop Damage ($)
Waterloo	6/18/2010	1	0	0	0	5,000
Cedar Falls	3/20/2011	0.88	0	0	0	0
Farmer	5/22/2011	0.88	0	0	0	5,000
North Cedar	5/22/2011	1	0	0	3,000	5,000
Dunkerton	5/24/2012	1	0	0	1,000	0
Cedar Falls	4/29/2013	1	0	0	10,000	0
Castle Hill	4/29/2013	1	0	0	10,000	0
Cedar Falls	4/29/2013	1	0	0	5,000	0
Cedar Falls	4/29/2013	1.25	0	0	10,000	0
Cedar Falls	4/29/2013	1.25	0	0	10,000	0
Waterloo	4/29/2013	2	0	0	25,000	0
Waterloo	4/29/2013	1	0	0	5,000	0
Waterloo	4/29/2013	1	0	0	25,000	0
Waterloo	4/29/2013	1	0	0	5,000	0
Waterloo	4/29/2013	1.25	0	0	3,000	0
Waterloo	4/29/2013	1	0	0	5,000	0
Waterloo	5/29/2013	1	0	0	1,000	5,000
Cedar Falls	5/29/2013	0.88	0	0	0	0
Waterloo	5/29/2013	0.75	0	0	0	0
Black Hawk Co.	6/25/2013	1	0	0	0	5,000
Cedar Falls	7/25/2013	0.75	0	0	0	10,000
Cedar Falls	4/12/2014	1.5	0	0	5,000	0
Cedar Falls	4/12/2014	1	0	0	1,000	0
Cedar Falls	4/12/2014	0.75	0	0	0	0
Cedar Falls	4/12/2014	0.88	0	0	0	0
Washburn	4/27/2014	0.88	0	0	0	0
Evansdale	4/27/2014	0.88	0	0	0	0
Eagle Center	4/15/2017	1	0	0	0	0
La Porte City	4/15/2017	2.75	0	0	10,000	0
Washburn	4/15/2017	0.88	0	0	0	0
Gilbertville	4/15/2017	1	0	0	0	0
Waterloo	5/17/2017	1	0	0	0	0

TABLE 36: HISTORICAL HAILSTORMS IN BLACK HAWK COUNTY

Location	Date	Magnitude (inches)	Death	Injuries	Property Damage ($)	Crop Damage ($)
Cedar Falls	6/15/2017	1.75	0	0	0	0
Cedar Falls	6/15/2017	1	0	0	0	0
Cedar Falls	6/15/2017	1	0	0	0	0
Castle Hill	6/15/2017	1.5	0	0	0	0
Waterloo	6/15/2017	2.5	0	0	0	0
Castle Hill	6/15/2017	1.5	0	0	0	0
Casebeer Heights	6/15/2017	1	0	0	0	0
Cedar Falls	6/15/2017	1.25	0	0	0	0
Cedar Falls	6/15/2017	1.25	0	0	0	0
Cedar Falls	6/15/2017	1.75	0	0	0	0
Waterloo	6/15/2017	1.75	0	0	0	0
Waterloo	6/15/2017	1	0	0	0	0
Evansdale	6/15/2017	1.5	0	0	0	0
Waterloo	6/15/2017	1.5	0	0	0	0
Casebeer Heights	6/15/2017	1	0	0	0	0
Boies	6/15/2017	1.25	0	0	0	0
Boies	6/15/2017	1.5	0	0	0	0
La Porte City	6/28/2017	1	0	0	0	0
TOTALS	**N/A**	**N/A**	**0**	**0**	**4,079,000**	**512,000**

Source: *National Centers for Environmental Information 2019*

Severe Winter Storms

Definition and Description

Severe winter storms are weather conditions that affect day-to-day activities. The various types of severe winter storms are described in Table 37. Winter storms are common during the winter months of October through April. The various types of extreme winter weather cause considerable damage. Heavy snows cause immobilized transportation systems, downed trees and power lines, collapsed buildings, and loss of livestock and wildlife. Loose snow begins to drift when the wind speed reaches 9 to 10 mph under freezing conditions.

The potential for some drifting is substantially higher in open country than in urban areas where buildings, trees, and other features obstruct the wind. Frigid temperatures and wind chills are dangerous to people, particularly the elderly and the very young. Dangers include frostbite or hypothermia. Water pipes, livestock, fish and wildlife, and pets are also at risk from extreme cold and severe winter weather.

TABLE 37: SEVERE WINTER STORM TERMS

Heavy Snow Storm	Four inches or more of snow in a six-hour period, or six inches or more in a 12-hour period causing hazardous conditions in the community that can slow or stop the flow of vital supplies as well as disrupting emergency and medical services.
Sleet Storm	Significant accumulation of solid ice pellets causing slippery surfaces.
Ice Storm	Significant accumulation of rain freezing on trees, power lines, causing slippery and hazard road surfaces and damage to communication and utilities.
Blizzard	Sustained 35-44 mph winds, 32-11 degrees Fahrenheit temperatures, blowing snow, frequent one-quarter-mile visibility, and white-out conditions over an extended period of time.
Severe Blizzard	44+ mph winds, temperatures of 10 degrees Fahrenheit or lower, a high density of blowing snow with visibility generally measured in feet for an extended period of time.
Wind Chill	The felt air temperature on exposed skin due to wind. The colder the air temperature is on warmer objects the faster heat loss results on said warmer object, resulting in frostbite, hypothermia, and even death
Frigid	Very cold outside temperatures below freezing.

Source: National Climactic Data Center & National Weather Service 2019

Historical Occurrence

Since 1996, Black Hawk County has experienced 85 different severe winter weather events. The National Centers for Environmental Information. The breakdown of these events in Black Hawk County goes as follows: 14 blizzard events, seven cold/wind chill events, eight frost/freeze events, 18 heavy snow events, 12 ice storm events, 25 winter storm events, and one winter weather event. These events have caused a combined total of $3,654,775 in property damage and $4,294,118 in crop damage.

Table 38 outlines the details of these events.

TABLE 38: HISTORICAL SEVERE WINTER STORMS IN BLACK HAWK COUNTY						
Location	Date	Type	Dth.	Inj.	Property Damage ($)	Crop Damage ($)
Black Hawk Co.	1/18/1996	Cold/Wind Chill	0	0	0	0
Black Hawk Co.	1/18/1996	Blizzard	0	0	0	0
Black Hawk Co.	1/18/1996	Heavy Snow	0	0	0	0
Black Hawk Co.	1/26/1996	Heavy Snow	0	0	0	0
Black Hawk Co.	1/26/1996	Blizzard	0	0	0	0
Black Hawk Co.	1/28/1996	Blizzard	0	0	0	0
Black Hawk Co.	2/1/1996	Cold/Wind Chill	0	0	0	0
Black Hawk Co.	3/24/1996	Blizzard	0	0	0	0
Black Hawk Co.	5/1/1996	Cold/Wind Chill	0	0	0	0
Black Hawk Co.	9/14/1996	Frost/Freeze	0	0	0	0
Black Hawk Co.	11/14/1996	Ice Storm	0	0	0	0
Black Hawk Co.	12/25/1996	Heavy Snow	0	0	0	0
Black Hawk Co.	1/9/1997	Cold/Wind Chill	0	0	0	0
Black Hawk Co.	1/15/1997	Cold/Wind Chill	0	0	0	0
Black Hawk Co.	2/3/1997	Heavy Snow	0	0	0	0
Black Hawk Co.	5/13/1997	Frost/Freeze	0	0	0	0
Black Hawk Co.	11/14/1997	Heavy Snow	0	0	4,545	0
Black Hawk Co.	12/21/1997	Ice Storm	0	0	2,050	0
Black Hawk Co.	1/4/1998	Ice Storm	0	0	20,400	0
Black Hawk Co.	3/7/1998	Heavy Snow	0	0	50,000	0
Black Hawk Co.	3/17/1998	Ice Storm	0	0	5,880	0
Black Hawk Co.	1/1/1999	Winter Storm	0	0	10,000	0
Black Hawk Co.	2/11/1999	Ice Storm	0	0	5,000	0
Black Hawk Co.	9/21/1999	Cold/Wind Chill	0	0	0	294,118
Black Hawk Co.	1/19/2000	Winter Storm	0	0	1,000	0
Black Hawk Co.	2/17/2000	Winter Storm	0	0	10,000	0
Black Hawk Co.	12/10/2000	Winter Storm	0	0	24,900	0
Black Hawk Co.	12/18/2000	Blizzard	0	0	25,000	0
Black Hawk Co.	12/21/2000	Blizzard	0	0	20,000	0
Black Hawk Co.	12/28/2000	Heavy Snow	0	0	5,000	0
Black Hawk Co.	2/8/2001	Ice Storm	0	0	75,000	0
Black Hawk Co.	2/8/2001	Winter Storm	0	0	50,000	0
Black Hawk Co.	3/1/2002	Heavy Snow	0	0	5,000	0
Black Hawk Co.	1/28/2003	Winter Weather	0	0	0	0

TABLE 38 (CONT): HISTORICAL SEVERE WINTER STORMS IN BLACK HAWK COUNTY						
Location	Date	Type	Dth.	Inj.	Property Damage ($)	Crop Damage ($)
Black Hawk Co.	3/4/2003	Heavy Snow	0	0	1,000	0
Black Hawk Co.	4/4/2003	Ice Storm	0	0	5,000	0
Black Hawk Co.	4/6/2003	Winter Storm	0	0	5,000	0
Black Hawk Co.	1/1/2005	Ice Storm	0	0	5,000	0
Black Hawk Co.	1/4/2005	Heavy Snow	0	0	10,000	0
Black Hawk Co.	1/22/2005	Blizzard	0	0	5,000	0
Black Hawk Co.	2/24/2007	Winter Storm	0	0	2,500,000	0
Black Hawk Co.	12/1/2007	Winter Storm	0	0	10,000	0
Black Hawk Co.	12/11/2007	Ice Storm	0	0	75,000	0
Black Hawk Co.	2/10/2008	Cold/Wind Chill	0	0	0	0
Black Hawk Co.	12/8/2008	Winter Storm	0	0	25,000	0
Black Hawk Co.	12/18/2008	Winter Storm	0	0	5,000	0
Black Hawk Co.	12/20/2008	Blizzard	0	0	0	0
Black Hawk Co.	12/27/2008	Ice Storm	0	0	10,000	0
Black Hawk Co.	1/13/2009	Heavy Snow	0	0	0	0
Black Hawk Co.	4/5/2009	Winter Storm	0	0	10,000	0
Black Hawk Co.	10/10/2009	Frost/Freeze	0	0	0	2,500,000
Black Hawk Co.	12/8/2009	Heavy Snow	0	0	10,000	0
Black Hawk Co.	12/9/2009	Blizzard	0	0	50,000	0
Black Hawk Co.	1/6/2010	Winter Storm	0	0	25,000	0
Black Hawk Co.	1/25/2010	Blizzard	0	0	75,000	0
Black Hawk Co.	12/11/2010	Blizzard	0	0	75,000	0
Black Hawk Co.	12/23/2010	Heavy Snow	0	0	0	0
Black Hawk Co.	2/1/2011	Blizzard	0	0	25,000	0
Black Hawk Co.	1/20/2012	Heavy Snow	0	0	0	0
Black Hawk Co.	4/11/2012	Frost/Freeze	0	0	0	1,500,000
Black Hawk Co.	12/19/2012	Winter Storm	0	0	25,000	0
Black Hawk Co.	12/20/2012	Blizzard	0	0	250,000	0
Black Hawk Co.	1/27/2013	Ice Storm	0	0	50,000	0
Black Hawk Co.	1/30/2013	Winter Storm	0	0	25,000	0
Black Hawk Co.	2/21/2013	Heavy Snow	0	0	0	0
Black Hawk Co.	2/26/2013	Heavy Snow	0	0	5,000	0
Black Hawk Co.	01/26/2014	Blizzard	0	0	10,000	0
Black Hawk Co.	01/05/2015	Heavy Snow	0	0	0	0

Probability

The probability of a winter storm affecting Black Hawk County is highly likely given the historical data and the geographic location of the county (see Table 14 for a definition of this probability).

Magnitude / Severity

Although the developments in technology have been very beneficial in reducing the long-term negative effects of winter storms, certain dangers still exist. The maximum threat of winter conditions would be realized if it was accompanied by power outages and elimination of travel due to hampered road conditions. This could result in the inability for some of the population to maintain temperatures necessary for the human body. In addition, long winter events that eliminate communication could result in the reduction of adequate medical response time.

Depending on the type, duration, and the size of the event, the entire population could feel the effect of a winter storm. Generally, due to existing snow removal services and other community services, the effects of winter storms on Black Hawk County are short term. For most storms, travel and communication is usually an option in less than 24 hours after a given event.

TABLE 38 (CONT.) HISTORICAL SEVERE WINTER STORMS IN BLACK HAWK COUNTY

Location	Date	Type	Dth.	Inj.	Property Damage ($)	Crop Damage ($)
Black Hawk Co	2/1/2015	Winter Storm	0	0	0	0
Black Hawk Co	2/25/2015	Heavy Snow	0	0	0	0
Black Hawk Co	11/20/2015	Winter Storm	0	0	0	0
Black Hawk Co	12/28/2015	Winter Storm	0	0	0	0
Black Hawk Co	2/2/2016	Winter Storm	0	0	0	0
Black Hawk Co	10/13/2016	Frost/Freeze	0	0	0	0
Black Hawk Co	1/15/2017	Ice Storm	0	0	0	0
Black Hawk Co	3/12/2017	Winter Storm	0	0	0	0
Black Hawk Co	10/28/2017	Frost/Freeze	0	0	0	0
Black Hawk Co	2/8/2018	Winter Storm	0	0	0	0
Black Hawk Co	3/23/2018	Winter Storm	0	0	0	0
Black Hawk Co	10/15/2018	Frost/Freeze	0	0	0	0
Black Hawk Co	1/27/2019	Winter Storm	0	0	0	0
Black Hawk Co	2/11/2019	Winter Storm	0	0	0	0
Black Hawk Co	2/16/2019	Winter Storm	0	0	0	0
Black Hawk Co	2/19/2019	Winter Storm	0	0	0	0
Black Hawk Co	4/28/2019	Frost/Freeze	0	0	0	0
TOTALS	**N/A**	**N/A**	**0**	**0**	**3,654,775**	**4,294,118**

Source: National Centers for Environmental Information

Warning Time

The National Weather Service has developed effective weather advisories, which are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public up to days in advance. Again, weather prediction capabilities have made significant improvements in the past few years. There are several notifications made by the National Weather Service. These include winter storm watch, winter storm warning, blizzard warning, winter weather advisory, and a frost/freeze advisory.

Duration

Depending on the size of a severe winter storm, it can stay in the planning area for hours up to days. Recovery from large severe winter storms can last days or even weeks in very rural potions of the county.

Extreme Heat

Definition and Description

Extreme Heat happens when summertime weather is substantially hotter and/or more humid than average for a given location at that time of the year. This includes temperatures (including heat index) in excess of 100 degrees Fahrenheit or at least three successive days of 90+ degrees Fahrenheit.

A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees. When these extreme heat events occur, and even more so when they are prolonged, people, livestock, pets, wild animals and plant life are all affected to some degree.

In humans, extreme heat events make individuals much more susceptible to such heat related illnesses as heat cramps, heat exhaustion, heat rash, and heat stroke. Several factors affect the body's ability to cool itself during extremely hot weather. When the humidity is high, sweat will not evaporate as quickly, preventing the body from releasing heat quickly. Other conditions related to risk include age (the elderly and young children), obesity, fever, dehydration, heart disease, mental illness, poor circulation, sunburn, and prescription drug use and alcohol use.

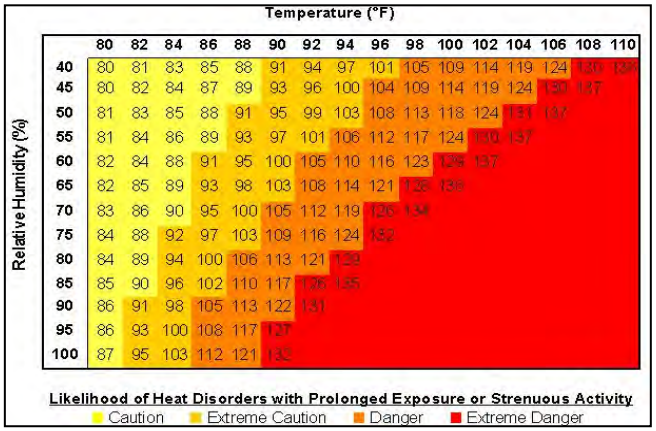


FIGURE 6: HEAT INDEX CHART
Source: National Weather Service

Many similar physical reactions occur in animals during extreme heat events, but can go unnoticed by an unobservant caretaker. The susceptibility to heat varies on the type of animal and whether or not they have access to water to avoid dehydration.

Plant life can also suffer substantially during prolonged heat waves, especially if they occur in conjunction with moderately dry conditions or even drought. This is of substantial concern to the community as the area is surrounded by primarily agricultural uses. Any negative effects on the surrounding farm economy would undoubtedly have some impact on the communities' well-being.

Perhaps a more accurate measure of heat and how it can impact animal and plant life is the heat index. Sometimes referred to as the "apparent temperature" the heat index, given in degrees Fahrenheit, is an accurate measure of how hot it really feels when the relative humidity (RH) is added to the actual air temperature. For an example of how the heat index is determined a Heat Index Chart has been included for your review in Figure 6.

Historical Occurrence

According to the National Centers for Environmental Information, there have been two reported "excessive heat" events and one "heat" event in Black Hawk County since 1996. The excessive heat event took place on July 15, 2011 and caused $135,000 in property damage. The second event occurred on July 18, 2019 and caused no damage.

Probability

Based on historical occurrences of heat and excessive heat events, the probability of another heat or excessive heat event is unlikely for Black Hawk County (see Table 14 for a definition of this probability).

Magnitude / Severity

The impacts of extreme heat events have historically been known to cause death. This possibility remains today. The severity of a heat wave event would likely be multiplied if it occurred in conjunction with other events such as a drought or a power failure. If the air were extremely dry this would increase the rate of dehydration among plants and animals. If a power failure were to occur, air conditioners, fans, freezers, and refrigerators would cease to operate. As these are items used to alleviate the stresses of heat waves, their loss would contribute to the severity of the disaster.

Within the planning area, it is anticipated that the actual impacts of a heat or excessive heat event would be less severe than what could potentially happen. More likely, a heat wave would likely result in increased energy consumption as a result of more air conditioning units operating. Increased numbers of people at public places such as malls, movie theaters, and swimming pools is also anticipated. Companies and organizations that rely on outdoor labor would likely see a reduction in productivity. Plant life would suffer severe stress possibly stunting growth, hurting crop yields, and thereby affecting the local economy.

Costs to the planning area directly may occur if roads, sidewalks, and foundations expanded enough to cause structural damage.

Warning Time

Heat waves are generally well forecasted; therefore, the onset speed is at least 24 hours. When temperatures or heat indices rise to dangerous levels, the National Weather Service will initiate alert procedures.

Duration

Extreme heat conditions have been known to last days and even weeks with little to no relief.

Drought

Definition and Description

Drought is a period of prolonged lack of precipitation for weeks at a time producing severe dry conditions. There are three types of drought conditions that are relevant to Iowa:

- Meteorlogic drought, which refers to precipitation deficiency;
- Hydrological drought, which refers to declining surface water and groundwater supplies; and
- Agricultural drought, which refers to soil moisture deficiencies.

Droughts can be spotty or widespread and last from weeks to a period of years. A prolonged drought can have serious economic impact on a community. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged or destroyed by a loss of crops or livestock. While droughts are generally associated with extreme heat, droughts can and do occur during cooler months. Table 39 lists the various intensities of droughts and the various means of measuring droughts.

Historical Occurrences

According to National Centers for Environmental Information, there have been four summers with drought events in Black Hawk County since January 1, 1996 causing an estimated total of $96,000,000 in crop damage. These occurred in 2001, 2003, 2012, and 2013. The longest of these drought events was during the summer of 2012 when drought conditions began in late June and continued into October. Using the existing crop prices at that time, the loss total was in excess of $2.6 billion statewide during that summer. There have been no injuries or fatalities associated with drought events in Black Hawk County.

Probability

Based on historical data, a drought event occurred on 22.2% of the years from 1996 to the current date. There have been no recorded drought events from 2013 to the current date. The likelihood of future drought events in Black Hawk County remains likely (see Table 14 for a definition of this probability).

Magnitude / Severity

A drought would likely affect the entire planning area. Due to the dependence of precipitation and water, the agricultural community of Black Hawk County would be impacted the most. Though agricultural areas would be the most adversely impacted, the entire planning area and State of Iowa would likely feel at least some level of impact.

TABLE 39: DROUGHT INTENSITIES							
			Ranges				
Category	**Description**	**Possible Impacts**	**Palmer Drought Index**	**CPC Soil Moisture Model (Percentiles)**	**USGS Weekly Streamflow (Percentiles)**	**Standardized Precipitation Index (SPI)**	**Objective Short & Long-Term Drought Indicator Blends (Percentiles)**
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.	-1.0 to -1.9	21-30	21-30	-0.5 to -0.7	21-30
D1	Moderate Drought	Some damage to crops, pastures, streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested.	-2.0 to -2.9	11-20	11-20	-0.8 to -1.2	11-20
D2	Severe Drought	Crop or pastures losses likely; water shortages common; water restrictions imposed.	-3.0 to -3.9	6-10	6-10	-1.3 to -1.5	6-10
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	-4.0 to -4.9	3.-5	3.5	-1.6 to -1.9	3-5
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies.	-5.0 or less	0-2	0-2	-2.0 or less	0-2
Source: Weather or Not (http://www.weatherornot.com/newsbolts/index.php/exceptional-drought-how-do-they-decide/)							

The maximum threat would likely extend far outside the borders of the planning area. Droughts generally affect a large region, as opposed to a small area. Because the planning area is located in a primarily agricultural region the maximum threat would come to those who work directly with agriculture who rely on rainfall for their livelihood. As a result of the negative effects of drought on the farmers in the area, those who supply goods and services to the agricultural community would also stand to suffer substantial financial losses. Services provided to the planning area could also be disrupted if the drought resulted in a lower water table, rendering wells inefficient or not allowing enough water for adequate firefighting purposes.

Droughts rarely result in loss of human life. In addition, property damage is not a direct impact of droughts, but drought conditions that may increase the fire hazard could be an indirect impact. The committee considered the fire risk in their estimate of potential damages to crops.

Warning Time

Although many efforts are made to anticipate droughts it is nearly impossible to be accurate with these predictions due to unlimited variable that factor in to such a prediction. Warning time is not a concern with a drought as the onset of drought can take weeks, months, and sometimes even years to feel the effects.

Duration

The duration of a drought can affect the planning area for days and weeks, sometimes months.

Expansive Soils

Definition and Description

Expansive soils are soils and soft rock that tend to swell or shrink excessively due to changes in moisture content. The effects of expansive soils are most prevalent in regions of moderate to high precipitation, where prolonged periods of drought are followed by long periods of rainfall. The hazard occurs in many parts of the Southern Central, and Western United States. Recent estimates put the annual damage from expansive soils as high as $7 billion. However, because the hazard develops gradually and seldom presents a threat to life, expansive soils have received limited attention, despite their costly effects.

Historical Occurrences

Historical records of damage due to expansive soils are not kept on a county-wide scale due to the timeframe of such events. Likewise, there are no historical records for the planning area for expansive soils.

Probability

Black Hawk County, along with most of the Cedar River watershed, is situated in an area underlain by soils with little to no clays with swelling potential. As such, the probability of future expansive soils events is unlikely (see Table 14 for a definition of this probability).

Magnitude / Severity

The availability of data on expansive soils varies greatly. Little information is reported other than field observations of the physical characteristics of clay. Thus, the maximum threat of expansive soils would be limited to a specific location. The most extensive damage from expansive soils occurs to highways and streets. Houses and one-story commercial buildings are more apt to be damaged by the expansion of swelling than are multi-story buildings, which usually are heavy

enough to counter swelling pressures. The most obvious manifestations of damage to buildings are sticking doors, uneven floors, and cracked foundations, floors, walls, ceilings, and windows.

Warning Time

The speed of onset is very slow, and is consistent with other geological hazards that occur over time. However, there are few warning signs of expansive soils until after structural damage becomes apparent, and that structural damage may occur slowly or extremely quickly.

Duration

The duration of an expansive soil event can be over within hours, days, or weeks depending up on the severity and location of the occurrence. Recovery is also depending upon the impact area.

Sinkholes

Definition and Description

Sinkholes are naturally occurring, roughly circular depression in the land surface, formed most commonly in areas of limestone bedrock. There are two types of sinkhole: cover collapse sinkhole and cover subsidence sinkhole. A cover collapse sinkhole happens when the limestone bedrock is covered by a variable thickness of sand, silt, and clay. This overburden may bridge subsurface cavities for long periods of time. Eventually a catastrophic collapse of the overburden into the subsurface cavity may occur, and a sinkhole is formed. A cover subsidence sinkhole is formed where overburden is relatively thin (a few feet to tens of feet). In this setting, as subsurface solution occurs, the land surface gradually subsides into the void below, since it lacks the cohesiveness to form a significant "bridge" across the void. Cover-subsidence sinkholes are often mistaken for other land subsidence features, since they do not form in as spectacular a manner as the cover-collapse sinkhole. One common indicator of a cover subsidence sinkhole is the formation of cracks in nearby buildings or in roads. Under natural conditions, sinkholes usually form rather slowly, over the course of many years. However, some human activities can trigger abrupt sinkhole formation, or accelerate processes that have been going on for a long time. Activities such as dredging, diversion of surface drainage systems, or pumping of ground water can accelerate the natural growth of sinkholes.

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by ground water circulating through them. As the rock dissolves, spaces and caverns develop underground. Sinkholes are dramatic because the land usually stays intact for a while until the underground spaces just get too big. If there is not enough support for the land above the spaces then a sudden collapse of the land surface can occur. New sinkholes have been correlated to land-use practices, especially from ground-water pumping and from construction and development practices. Sinkholes can also form when natural water-drainage patterns are changed and new water-diversion systems are developed. Some sinkholes form when the land surface is changed, such as when industrial and runoff-storage ponds are created. The substantial weight of the new material can trigger an underground

collapse of supporting material, thus causing a sinkhole.

The overburden sediments that cover buried cavities in the aquifer systems are delicately balanced by ground-water fluid pressure. The water below ground is actually helping to keep the surface soil in place. Ground-water pumping for urban water supply and for irrigation can produce new sinkholes in sinkhole-prone areas. If pumping results in a lowering of ground-water levels, then underground structural failure, and thus, sinkholes, can occur.

Historical Occurrences

Sinkholes have occurred in Black Hawk County in the past. Most recently, the Waterloo-Cedar Falls Courier announced the existence of a sinkhole on Schrock Road in Waterloo on May 21, 2011. Also, after the flood of 2008, the Cedar Valley Nature Trail experienced major flood damage including trail washouts, damage to bridges, and sinkholes.

Probability

With many different soil types, a high prevalence of precipitation, and current agricultural practices which focus on re-directing natural water flow, the probability of sink holes is occasional (see Table 14 for a definition of this probability). The Iowa Department of Natural Resources (DNR) hosts the online Natural Resources Geographic Information Systems Library which features shapefiles for several geological occurrences including sinkholes. Notwithstanding hundreds of sinkholes in northeast Iowa identified by both the Iowa DNR and the National Resources Conservation Service (including several in neighboring Bremer and Butler Counties), no sinkholes have been identified by these organizations in Black Hawk County. It should be noted, however, that shallow carbonite bedrock does exist in numerous areas throughout the county and has been known to cause sinkholes. Therefore, while there is only one known historical occurrence of sinkholes in the county, described above, the risk of further sinkholes certainly remains.

Magnitude / Severity

The maximum threat of a sinkhole would be limited to the precise location of said event. Unknown sinkholes on property located near and around a structure could have a significant impact on the structure(s) in the immediate area. Personal property located near the sinkhole would also be consumed in the event of a collapse.

Warning Time

Sinkholes development tends to be a slow yet gradual process. Land use practices in the area, soil type in addition to a number of other factors will impact the speed of onset. By identifying these areas, property owners will be able to implement the necessary precautions to slow and potentially eliminate the development of a sinkhole.

Duration

A sinkhole can affect the location in which it occurred for weeks.

Landslide

Definition and Description

A landslide is a downward and outward movement of slope-forming materials reacting under the force of gravity. Landslides occur when masses of rock, earth, or debris move down a slope. Although gravity acting on an over-steepened slope is the primary reason for a landslide, there are other contributing factors:

- Erosion by rivers, glaciers, or ocean waves create over-steepened slopes
- Rock and soil slopes are weakened through saturation by snowmelt or heavy rains
- Earthquakes create stresses that make weak slopes fail
- Earthquakes of magnitude 4.0 and greater have been known to trigger landslides
- Volcanic eruptions produce loose ash deposits, heavy rain, and debris flows
- Excess weight from accumulation of rain or snow, stockpiling of rock or ore, from waste piles, or from man-made structures may stress weak slopes to failure and other structures

Slope material that becomes saturated with water may develop a debris flow or mud flow. The resulting slurry of rock and mud may pick up trees, houses, and cars, thus blocking bridges and tributaries causing flooding along its path (USGS). Landslides commonly occur in connection with other major natural disasters such as earthquakes, volcanoes, wildfires, and floods. (USGS)

Historical Occurrences

According to the National Centers for Environmental Information, there have been no reported landslide events in Black Hawk County between 1996 and 2019. It is possible that landslides have occurred before 1996, however there is no data available to determine whether this is true.

Probability

Based on lack of reported landslides in the past, the probability of a landslide occurring in Black Hawk County is unlikely (see Table 14 for definition of this probability). If a landslide were to occur, it would most likely take place on a steep sloping area along one of the county's rivers. Probability is increased significantly in areas with sloping land cleared of timber and shrubbery.

Magnitude / Severity

Maximum threat exists to those property owners located at the top or bottom of steep sloping areas without trees or shrubbery to absorb excessive amount of moisture. For structures located at the top or bottom of a landslide the severity of impact could be devastating. Earth giving way from underneath a structure could result in the structure giving way also. All ground that does give way will then topple onto the anything located below.

Warning Time

Great amounts of precipitation and moisture over time will greatly increase the warning time of a landslide event; however, there is no official warning system in place, thus the warning time would be short.

Duration

Landslides are typically over within hours of occurring.

Earthquakes

Definition and Description

An earthquake is a shaking or trembling of the earth that is volcanic or tectonic in origin. Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger flash floods and fires. Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. Earthquakes are generally associated with plate tectonics or volcanic activity, but a third type includes artificial earthquakes. In other words, a large explosion can cause the earth to quake resulting in substantial damage (see Table 40).

TABLE 40: EARTHQUAKE INTENSITY SCALE		
Magnitude	**Typical Maximum Modified Mercalli Intensity**	**Intensity Scale Description**
1.0 – 3.0	**I**	**I.** Not felt except by a very few under especially favorable conditions.
3.0 – 3.9	**II – III**	**II.** Felt only by a few persons at rest, especially on upper floors of buildings. **III.** Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
4.0 – 4.9	**IV – V**	**IV.** Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably. **V.** Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
5.0 – 5.9	**VI – VII**	**VI.** Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. **VII.** Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
6.0 – 6.9	**VII – IX**	**VIII.** Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. **IX.** Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
7.0 and higher	**X or Higher**	**X.** Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent. **XI.** Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly. **XII.** Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Historical Occurrences

Iowa as a whole has experienced the effects of only a few earthquakes in the past 175 years. The epicenters of 12 earthquakes have been located in the state. The first known occurrence was in 1867 near Sidney in southwest Iowa; the most recent occurrence was in 1948 near Oxford in east-central Iowa. The largest Iowa earthquake (Mercalli magnitude VI) occurred near Davenport in southeast Iowa in 1934. None of these events were instrumentally recorded.

On January 26, 1925 an earthquake occurred with a reported epicenter near Waterloo, Iowa. The event registered a magnitude of II (2) on the Mercalli Scale. Modified Mercalli Intensity Scale is commonly used in the United States by seismologists seeking information on the severity of earthquake effects. Intensity ratings are expressed as Roman numerals between I, at the low end, and XII at the high end. According to FEMA a Mercalli magnitude II earthquake is described as follows: "II. A few people might notice movement if they are at rest and/or on the upper floors of tall buildings."

While no other earthquakes with epicenters in Iowa have noticeably impacted the community, epicenters far way can have minor effects on the region. For example, in 2002 an earthquake with an epicenter in Alaska caused temporary "black water" to occur in local wells.

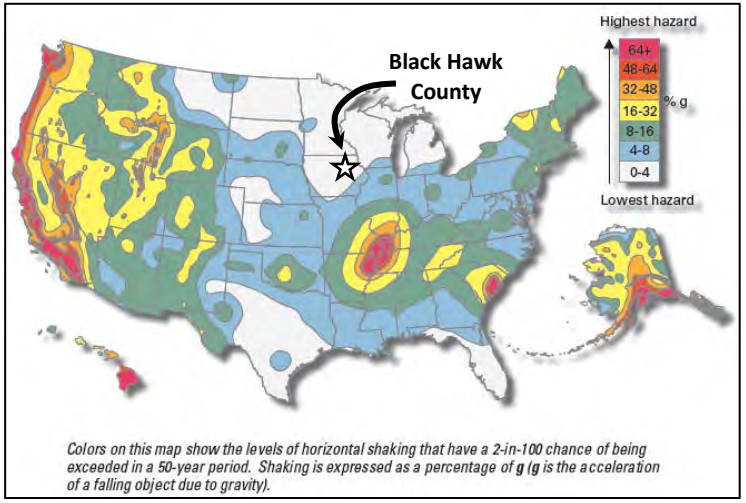


FIGURE 7: EARTHQUAKE PROBABILITY MAP
Source: USGS

Probability

Historic seismicity in the upper Midwest in relation to the regional structural geology from 1800 to present has been slight. Though Iowa has experienced a small number of minor earthquake events, only one of these was reported in Black Hawk County. Assuming historic trends remain unchanged, the probability of an earthquake occurring in the planning area is unlikely (see Table 14 for a definition of this probability).

Magnitude / Severity

Although the likelihood of occurrence is small, if an earthquake did occur it would affect the entire proximity of the planning area. The damages associated with an earthquake would likely be relatively low. However, when considering a worst-case scenario, a larger earthquake would have catastrophic effects on the planning area should it occur.

Warning Time

Earthquake prediction is an inexact science. Even in areas that are well monitored with instruments, such as California's San Andreas Fault Zone, scientists only very rarely predict earthquakes.

Duration

The duration of an earthquake would be minutes; however, if the earthquake was large enough, the planning area would feel aftershocks for hours – even days later.

Infrastructure Failure

Definition and Description

This hazard includes communication failure, energy failure, structural failure, and structural fire.

Energy Failure or disruption is the loss of power as a result of a natural, man-made, or technological disaster or failure. Energy, for purposes of this plan, can also be described as a loss of power. For example, electricity is lost because a power line was accidentally cut; there was a malfunction at the power plant, etc. Another scenario would include the loss of natural gas, a fuel used by most in the community for purposes of heating and occasionally cooking.

Communication failure is the widespread breakdown or disruption of normal communication capabilities. This could include major telephone outages, loss of local government radio facilities, and long-term interruption of electronic broadcast services, language barriers, and unfamiliarity with common emergency response terminology. Emergency 911, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Businesses and industry also rely heavily on various communication media. Mechanical failure, traffic accidents, power failure, line severance, and weather can affect communication systems and disrupt service. Disruptions and failure can range from localized and temporary to widespread and long-term. If switching stations are affected, outage could be more widespread. Communications failure can also be realized when individuals who speak different languages try to communicate, or when people use unfamiliar terminology. These types of communications failure are exacerbated during times of disaster.

Structural Failure is the collapse (part or all) of any public or private structure including roads, bridges, towers, and buildings. A road, bridge, or building may collapse due to the failure of the structural components or because the structure was overloaded. Natural events such as heavy snow may cause a roof of a building to collapse under the weight of the snow. Heavy rains and flooding can undercut and washout a road or bridge. The age of the structure is sometimes independent of the cause of the failure.

Enforcement of building codes can better guarantee that structures are designed to hold up under normal conditions. Routine inspection of older structures may alert inspectors to “weak” points. The level of damage and severity of the failure is dependent on factors such as the size of the building or bridge, the number of occupants of the building, the time of day, day of week, amount of traffic on the road or bridge, and the type and amount of products stored in the structure.

For this profile, fire is an uncontrolled fire in populated area that threatens life and property and is beyond normal day-to-day response capabilities. Structural fires present a far greater threat to life and property and the potential for much larger economic losses. Modern fire codes and fire suppression requirements in new construction and building renovations, coupled with improved firefighting equipment, training, and techniques, lessen the chance and impact of a major urban fire. Most structural fire occur in residential structures, but the occurrence of a fire in a commercial or industrial facility could affect more people and pose a greater threat to those near the fire or fighting the fire because the volume or type of the material involved.

According to the National Fire Protection Association (NFPA), eighty-five percent of fire deaths occur in the home (one-or two-family dwellings, apartments or manufactured housing). 72% of all fire deaths result from fires in one- and two-family dwellings, including manufactured homes.Most fires occur as a result of natural causes (i.e. lightning), accidents (i.e. gas leaks), carelessness (i.e. smoking in close proximity to combustibles), or criminal (i.e. arson) reasons.

Cooking is the leading cause of home fires in the U.S. It is also the leading cause of home fire injuries. Cooking fires often result from unattended cooking and human error, rather than mechanical failure of stoves or ovens. Careless smoking is the leading cause of fire deaths. Smoke alarms and smolder-resistant bedding and upholstered furniture are significant fire deterrents. Arson is both the second leading cause of residential fires and residential fire deaths. In commercial properties, arson is the major cause of deaths, injuries and dollar loss. Heating is the third leading cause of residential fires. Heating fires are a larger problem in single-family homes than in apartments. Unlike apartments, the heating systems in single-family homes are often not professionally maintained.

Historical Occurrences

On numerous occasions there has been localized loss of telephone service, generally due to some type of weather phenomenon (e.g. high winds, ice). There have also been short-term instances of power failure, most commonly occurring during thunderstorm and high wind events. In addition, winter ice events have caused power failures in the community in the past.

There are no recorded instances of structural failure in Black Hawk County, nor are there any known instances of energy shortages. However, there have been a number of structural fire events in the county, typically house fires.

Probability

Every city in the planning area has rated the probability of an infrastructure failure either unlikely or occasional (see Table 14 for a definition of this probability). However, because infrastructure failure is such a broad category, it is likely the county will experience some kind of power outage, communication failure, or structural fire sometime in the future.

Magnitude / Severity

The magnitude and severity of an infrastructure failure ranges from trivial to catastrophic. Regarding events that are most likely to take place, such as a brief power outage caused by a thunderstorm, the effects would be relatively insignificant. However, if a major structural failure event occurred, such as a building or bridge collapse, the magnitude of such an event would be unprecedented considering the scope of the property damage, personal injury, and likely fatalities that would ensue.

Warning Time

The warning time for the conditions that bring about infrastructure failures, such as a severe thunderstorm which could potentially cause a power outage, is relatively long and could be longer than a day. However, the warning time for the event itself, rather than the conditions that could cause an event, is very little to nonexistent. For example, structural engineers might know that a structure is in critical condition for months. However, it's impossible to predict at what time that structure would ultimately fail.

Duration

Just as the magnitude of an infrastructure failure can vary from trivial to catastrophic, the duration of such an event can also vary tremendously depending on the type of event.

Hazardous Materials

Definition and Description

This hazard includes fixed hazardous materials, pipeline transportation, and transportation of hazardous materials. A HAZMAT or Radiological Transportation Incident is the accidental release of chemical substances or mixtures that presents danger to the public health or safety during transportation. A hazardous substance is one that may cause damage to persons, property, or the environment when released to soil, water, or air. Chemicals are manufactured and used in ever increasing types and quantities. As many as 500,000 products pose physical or health hazards and can be defined as "hazardous chemicals." Each year, over 1,000 new synthetic chemicals are introduced and transported across the county via semi-truck and train. Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous materials incidents generally affect a localized area, and the use of planning and zoning can minimize the area of impact.

Historical Occurrences

According to the Iowa Department of Natural Resources, there were 307 incidences of hazardous materials spills in Black Hawk County since January 1, 1995. Petroleum spills made up the greatest number of spill types. Inorganic chemicals used for agriculture, i.e. anhydrous ammonia, also made up a large number of spill events. There are no known occurrences of transportation incidents involving radiological material.

Probability

Large quantities of hazardous materials are transported daily on neighboring U.S. Highway 218 and railways. Roadways are a common site for the release of hazardous materials. Railways are another source for hazardous materials releases. The Department of Transportation regulates routes and speed limits used by carriers and monitor the types of hazardous materials crossing state lines. Despite increasing safeguards, more and more potentially hazardous materials are being used in commercial, agricultural, and domestic uses and are being transported on neighboring roads, highway and railways. Based on this information, as well as historical data, the likelihood of future hazardous material spills is highly likely (see Table 14 for a definition of this probability).

Magnitude / Severity

Most of the hazardous materials incidents are localized and are quickly contained or stabilized by the highly trained fire departments and hazardous materials teams. Depending on the characteristic of the hazardous material or the volume of product involved, the affected area can be as small as a room in a building or as large as 5 square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the product contaminates the municipal water supply or water system such as a river, lake, or aquifer.

Immediate dangers from hazardous materials include fires and explosions. The release of some toxic gases may cause immediate death, disablement, or sickness if absorbed through the skin, injected, ingested, or inhaled. Contaminated water resources may be unsafe and unusable, depending on the amount of contaminant. Some chemicals cause painful and damaging burns if they come in direct contact with skin. Contamination of air, ground, or water may result in harm to fish, wildlife, livestock, and crops. The release of hazardous materials into the environment may cause debilitation, disease, or birth defects over a long period of time. Loss of livestock and crops may lead to economic hardships within the community. The occurrence of a hazmat incident often shuts down transportation corridors for hours at a time while the scene is stabilized, the product is off-loaded, and reloaded on a replacement container.

Warning Time

When managed properly under current regulations, hazardous materials pose little risk. However, when handled improperly or in the event of an accident, hazardous materials can pose a significant risk to the population. Hazardous materials incidents usually occur very rapidly with little or no warning. Even if reported immediately, people in the area of the release have very little time to be warned and evacuated. During some events, sheltering in-place is the best alternative to evacuation because the material has already affected the area and there is no time to evacuate safely. Public address systems, television, radio, and the NOAA Weather Alert Radios are used to disseminate emergency messages about hazardous materials incidents.

Duration

The duration of a hazardous materials event is dependent upon the amount of a hazardous materials released and location of the release. A small release of gasoline or agricultural chemical on a roadway would close the road for hours for cleanup. However, a large spill in an urban community or near a body of water would impact that area and possibly the area down streams for days or weeks – depending upon the type of release.

Transportation Incident

Definition and Description

This hazard includes all forms of transportation. A hazard to the community resulting from an incident related to or caused by any vehicle used to transport persons or items, such as cars, trucks, airplanes, trains, boats, etc. Transportation hazards can occur in any community at any time and may result in injury, loss of life, property damage, and hazardous chemical spills. The number of major transportation routes near the community increases the possibility of such a hazard. There are several locations where transportation hazards exist in the planning area. Major thoroughfares include:

- Interstate 380
- US Highway 20
- US Highway 63
- US Highway 218
- Iowa Highway 21
- Iowa Highway 57
- Iowa Highway 58
- Iowa Highway 175
- Iowa Highway 281
- University Avenue

In addition to the State and Federal Highway systems, the County maintains 526 miles of gravel roads and 246 miles of hard surface roadways. The County also owns and maintains 311 bridges.

Although there are several private runways, the largest and only commercial airport in Black Hawk County is the Waterloo Municipal Airport. The airport provides service to private and commercial aircraft.

Historical Occurrences

Traffic accidents are common occurrences in the planning area. Rural and metropolitan areas bring different sets of driving conditions and hazards. According to the Iowa Department of Transportation, thousands of vehicle crashes occur each year in the state. Between 2015 and 2019, there were 11,454 crashes in Black Hawk County resulting in 46 fatalities, 236 major injuries, and 1,254 minor injuries. Of these crashes, 159 were related to high speeds; 2,040 were related to icy, snowy, slushy conditions; 2,863 were related to younger drivers; 823 were related to wild animals; 1,972 were related to older drivers; 476 were alcohol or drug related; and 70 were related to inattentive or distracted driving (www.icat.iowadot.gov).

According to the Airport Master Records and Reports website, a flight from Detroit to Los Angeles landed at the Waterloo Regional Airport on June 2, 2009 as a precaution after reporting a "smoky odor" in the cabin. The flight landed without incident and no injuries were reported.

Aside from hazardous materials spills, there are no known railroad transportation incidents.

Probability

Given the amount of traffic that travels on the major thoroughfares in Black Hawk County (listed above), the probability of future traffic accidents is highly likely.

Magnitude / Severity

The maximum threat of these types of accidents is not likely to directly impact a large percentage of the area of the jurisdiction. The exact area that will be affected by a traffic event will likely be small and have a minimal impact on the residents as a whole, unless a large or extremely dangerous hazardous material spill should result from the event. The same can be said for a rail disaster.

Warning Time

Due to their nature, there is little or no way to predict when or where a traffic accident will occur. The same can be said for rail disasters and air disasters. However, during times of inclement weather, road conditions with driving and traffic updates are made available through an interactive online map.

Duration

The duration of time a transportation incident would impact the planning area is dependent upon type of incident. For instance, a multiple-car incident could impact the surrounding community for a few hours, whereas a derailment blocking numerous crossings could impact the immediate area for a few days.

Radiological

Definition and Description

Radiological incident results in a release of radiological material at a fixed facility to include power plants, hospitals, laboratories and the like. Although the term "nuclear accident" has no strict technical definition, it generally refers to events involving the release of significant levels of radiation. Most commercial nuclear facilities in the United States were developed in the mid-1960s and are designed to withstand aircraft attack. Therefore, they should withstand most hazards even though they may not have been designed for those forces.

Historical Occurrences

Emergency classifications are divided into four categories. Each calls for a certain level of response from plant and government personnel. From least to most severe, the classifications are: Unusual Event, Alert, Site Area Emergency, and General Emergency. Since 1990, the Duane Arnold Energy Center, which is located in Palo, is closest nuclear site to the community, has had five Unusual Events, no Alerts, and no Site Area Emergencies or General Emergencies.

Probability

Operators of facilities that use radioactive materials and transporters of radioactive waste are circumspect in the packaging, handling, and shipment of the radioactive waste. Since they are closely regulated by a variety of federal, state, and local organizations, the probability of an incident is unlikely.

No known radiological waste is transported in close proximity to the community; therefore, the probability of a radiological incident while in transport is unlikely. The Duane Arnold Energy Center in Palo is in relatively close proximity (about 20 miles from the border of Black Hawk County or 40 miles from downtown Waterloo), but it is still considered far enough away from the community to avoid dangerous levels of radiological fallout in the event of a disaster; it is slated to shut down in 2020.

Magnitude / Severity

Although the Committee determined that the probability of a nuclear accident event was limited, they recognized that if an event were to occur in, or in close proximity, to the community that the entire area would be vulnerable to radiation.

Time, distance, and shielding minimize radiation exposure to the body. Nuclear radiation above normal levels could be a health and safety consideration because of its ability to damage human cells biologically as well as its long-lasting effect on the environment. Depending on the level of exposure, radiation can cause loss of life, long- and short-term health effects, and property damage from contamination, as well as disruption of business because of potential

evacuations. Therefore, multiple deaths could occur, thereby affecting the operation of essential facilities throughout the community and/or planning area, at least temporarily.

Warning Time

Ionizing radiation cannot be seen, smelled, heard, or detected with human senses. Detection instruments are needed to indicate the existence of dangerous radiation. Distance from the incident would dictate the amount of time needed to avoid exposure from damaging radiation. Protective actions directed by state and county officials, will depend upon weather conditions and developments at the power plant. In an actual emergency, the public can turn to their local Emergency Alert System Station or NOAA Weather Radio.

Duration

Depending upon the severity of a radiological event, the planning area would be impacted from a few hours to possibly a day or two. In a worst-case scenario event, the duration of the ensuing fallout could last decades.

Dam Failure

Definition and Description

Dam failure is a break in, or imposed threat from, any water retention fixture which may endanger population downstream of the containment area. Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation, and recreation. Flooding, operating error, poor construction, lack of maintenance, damage due to burrowing animals, vandalism, terrorism, and earthquakes can cause dam failure. Dams are classified in the National Inventory of Dams into three categories based on the potential risk to people and property should a failure occur:

1.) High Hazard - If the dam were to fail, lives would be lost and extensive property damage could result;
2.) Significant Hazard - Failure could result in loss of life and significant property damage; and
3.) Low Hazard - Failure results in minimal property damage only.

The classification may change over time because of development downstream from the dam since its construction. Older dams may not have been built to the standards of its new classification. Dam hazard potential classifications have nothing to do with the material condition of a dam, only the potential for human fatalities and/or property damage due to the size of the dam, the size of the impoundment, and the characteristics of the area downstream of the dam. The Iowa Department of Natural Resources tracks all dams in the state of Iowa with a height of at least 25 feet or a total storage of at least 50-acre feet of water. The inventory excludes all dams less than six feet high regardless of storage capacity and dams less than 15-acre feet of storage regardless of height.

Historical Occurrences

The National Performance of Dams Program (NPDP) maintained by Stanford University indicates an "Inflow Flood – Hydrological Event" incident on July 17, 1968 at the original Virden Creek Dam in Waterloo. That dam was later replaced in 1979.

Probability

Though there have been a number of flood and flash flood events in recent years, there have been no known dam failures in Black Hawk County in over 40 years. As such, the probability of a dam failure in future years remains unlikely.

Magnitude / Severity

The magnitude and severity of a dam failure in Black Hawk County would depend on the dam that fails. There are 10 dams in Black Hawk County identified in the U.S. Army Corps of Engineers (USACE) National Inventory of Dams (NID). The dam locations are shown in Figure 8 as well as Map 51.

The magnitude/severity of a dam failure event is measured by each dam's hazard potential, outlined on the previous page. According to the USACE NID, there are a total of 3,927 dams in the state of Iowa. Of these, 91.5 percent are categorized as having a low hazard potential, 5.9 percent a significant hazard potential, and 2.6 percent a high hazard potential. Because significant and high hazard potential dams are relatively uncommon in the state, it is especially important to identify their locations and consider options to minimize the impact of a dam failure event.

All of the dams in Black Hawk County are situated in or near Waterloo and Cedar Falls. The following pages provide additional information about each dam. On each map, the red triangle represents the dam location, the pink lines represent levee locations, and the arrows indicate the direction of the river or stream flow.

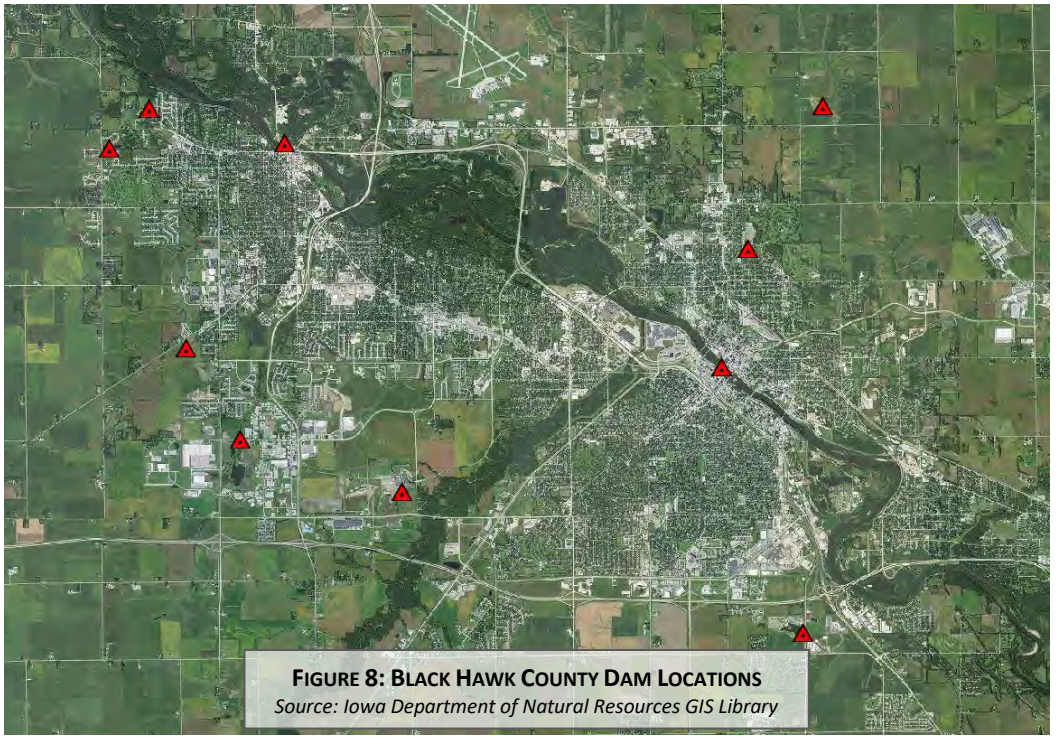
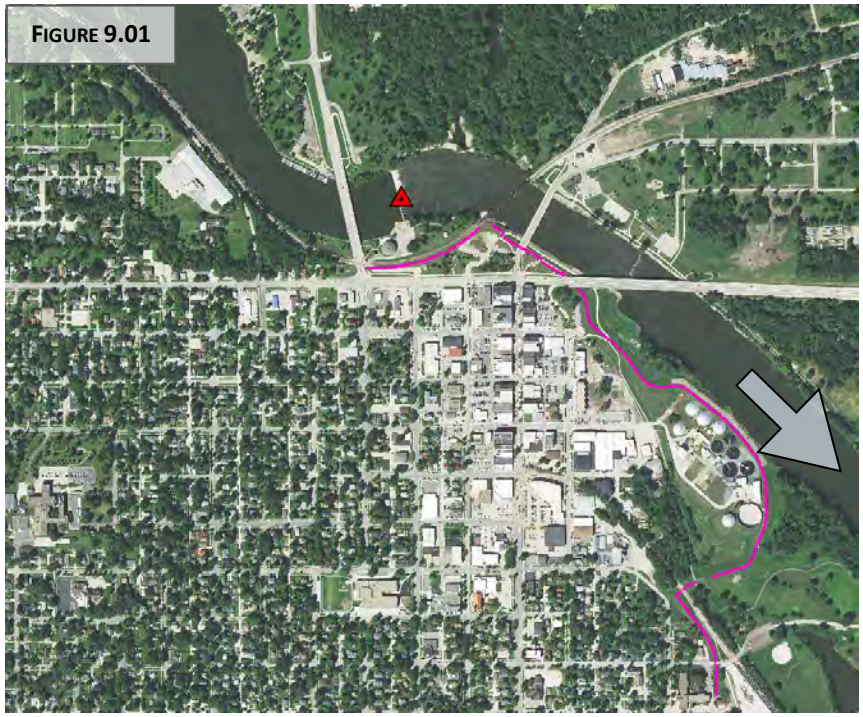


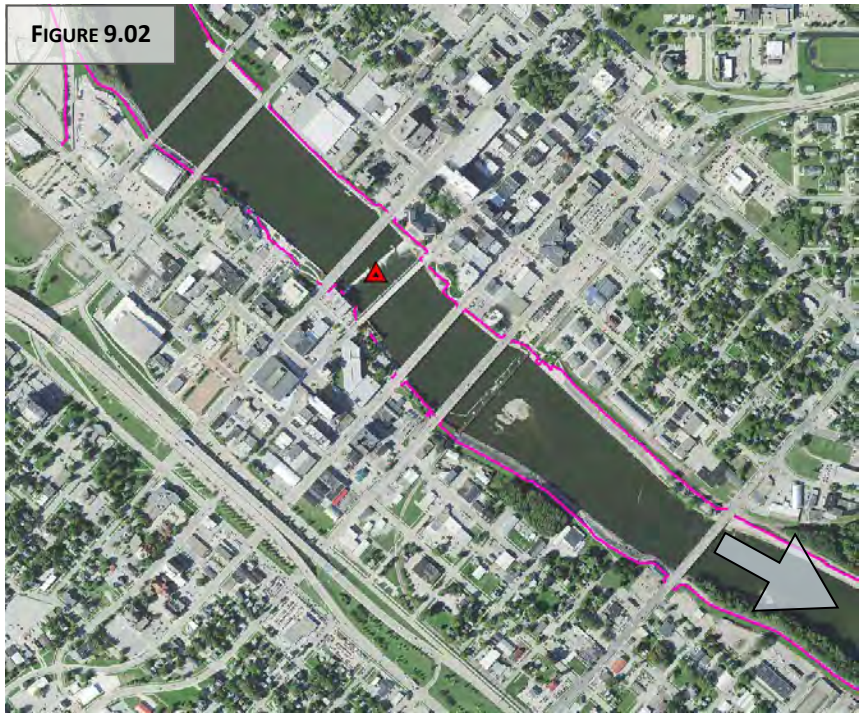
FIGURE 8: BLACK HAWK COUNTY DAM LOCATIONS
Source: Iowa Department of Natural Resources GIS Library

FIGURE 9.01



Name:	**Cedar Falls Mill Dam**	Hazard Potential:	Low
River:	Cedar River	NID Height:	12 feet
NID ID:	IA01213	NID Storage:	1394 acre-feet
FFP Number:	510004	Normal Storage:	1394 acre-feet
		Surface Area:	230 acres
Owner Name:	City of Cedar Falls	Drainage Area:	4787 square miles
Owner Type:	Local Government	Dam Length:	350 feet
Designer:	City of Cedar Falls	Year Constructed:	1939
Type:	Gravity Dam		
Purpose:	Recreation		

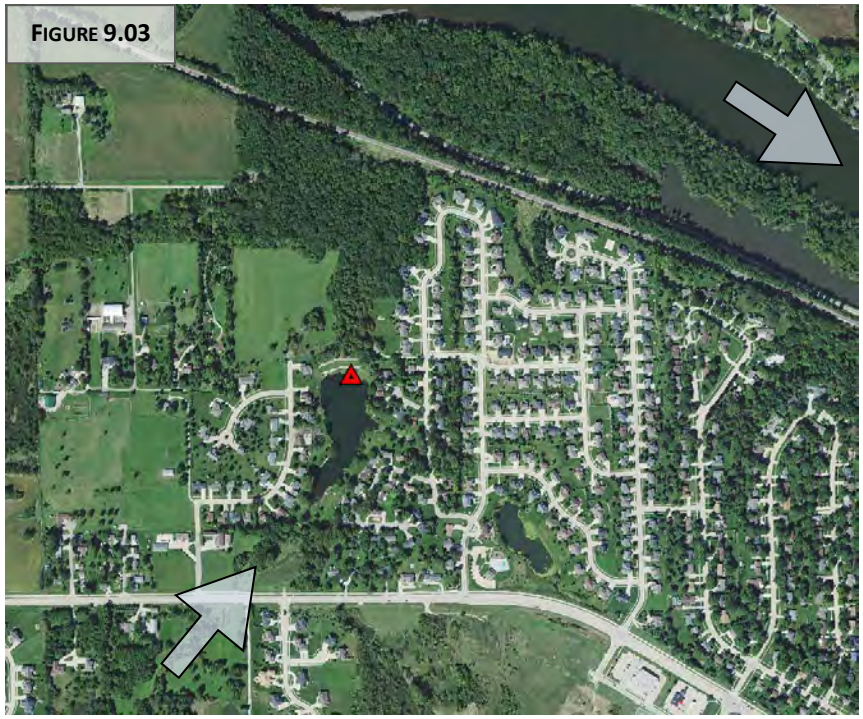
FIGURE 9.02



Name:	**Waterloo Mill Dam**	Hazard Potential:	Low
River:	Cedar River	NID Height:	7 feet
NID ID:	IA01320	NID Storage:	882 acre-feet
FFP Number:	510001	Normal Storage:	882 acre-feet
		Surface Area:	250 acres
Owner Name:	City of Waterloo	Drainage Area:	5146 square miles
Owner Type:	Local Government	Dam Length:	546 feet
Designer:	AECOM**	Year Constructed:	1915*
Type:	Gravity Dam*		
Purpose:	Recreation**		

* - Dam rehabbed in 2007-2012 with rubber bladder and steel gate extension
** - Information obtained from local sources, not USACE NID data

FIGURE 9.03



Name:	**Lakewood Hills Dam**	Hazard Potential:	**Significant**
River:	Trib. to Cedar River	NID Height:	18 feet
NID ID:	IA02079	NID Storage:	74 acre-feet
FFP Number:	800165	Normal Storage:	32 acre-feet
		Surface Area:	5 acres
Owner Name:	Jerry and Tamie Stahl	Drainage Area:	1.11 square miles
Owner Type:	Private	Dam Length:	520 feet
Designer:	None	Year Constructed:	1967
Type:	Earth Dam		
Purpose:	Recreation		

FIGURE 9.04

Name:	**Fieldstone Addition Dam**	**Hazard Potential:**	**HIGH**
River:	Trib. to Cedar River	NID Height:	19 feet
NID ID:	IA03436	NID Storage:	47 acre-feet
FFP Number:	20020105	Normal Storage:	16 acre-feet
		Surface Area:	3.6 acres
Owner Name:	Fieldstone Addition Homeowners Assoc.	Drainage Area:	0.44 square miles
		Dam Length:	380 feet
Owner Type:	Private	Year Constructed:	1998
Designer:	Lyle TeKippe		
Type:	Earth Dam		
Purpose:	Recreation		

FIGURE 9.05

Name:	**Virden Creek Dam**
River:	Virden Creek
NID ID:	IA01972
FFP Number:	710061
Owner Name:	City of Waterloo
Owner Type:	Local Government
Designer:	DAEN NCR
Type:	Earth Dam
Purpose:	Flood Control

Hazard Potential:	**HIGH**
NID Height:	39 feet
NID Storage:	8300 acre-feet
Normal Storage:	0 acre-feet
Surface Area:	0 acres
Drainage Area:	8.53 square miles
Dam Length:	3040 feet
Year Constructed:	1979

FIGURE 9.06

Name:	**Gates Park Control Structure**
River:	Virden Creek
NID ID:	IA01971
FFP Number:	710061
Owner Name:	City of Waterloo
Owner Type:	Local Government
Designer:	DAEN NCR
Type:	Earth Dam
Purpose:	Flood Control

Hazard Potential:	**Significant**
NID Height:	16 feet
NID Storage:	195 acre-feet
Normal Storage:	0 acre-feet
Surface Area:	0 acres
Drainage Area:	13.2 square miles
Dam Length:	970 feet
Year Constructed:	1979

FIGURE 9.07

Name:	**SW Branch Dry Run Creek Stormwater Detention Dam**	Hazard Potential:	**HIGH**
River:	SW Branch Dry Run Creek	NID Height:	17 feet
NID ID:	IA03547	NID Storage:	218 acre-feet
FFP Number:	20010360	Normal Storage:	0 acre-feet
		Surface Area:	0 acres
Owner Name:	City of Cedar Falls	Drainage Area:	5.3 square miles
Owner Type:	Local Government	Dam Length:	1070 feet
Designer:	Earth Tech	Year Constructed:	2003
Type:	Earth Dam		
Purpose:	Flood Control		

FIGURE 9.08

Name:	**Viking Road Detention Dam**	**Hazard Potential:**	**HIGH**
River:	Dry Run Creek	NID Height:	22 feet
NID ID:	IA03104	NID Storage:	1000 acre-feet
FFP Number:	880071	Normal Storage:	0 acre-feet
		Surface Area:	0 acres
Owner Name:	City of Cedar Falls	Drainage Area:	6 square miles
Owner Type:	Local Government	Dam Length:	1000 feet
Designer:	Rust Environment & Infrastructure	Year Constructed:	1994
Type:	Earth Dam		
Purpose:	Flood Control		

FIGURE 9.09

Name:	**Deere & Co. Dam**	Hazard Potential:	Low
River:	Trib. to Black Hawk Creek	NID Height:	10 feet
		NID Storage:	62 acre-feet
NID ID:	IA02197	Normal Storage:	45 acre-feet
FFP Number:	790152	Surface Area:	4.5 acres
		Drainage Area:	0.02 square miles
Owner Name:	Deere and Company	Dam Length:	800 feet
Owner Type:	Private	Year Constructed:	1981
Designer:	SCS		
Type:	Earth Dam		
Purpose:	Fire Protection		

FIGURE 9.10

Name:	**Bamboo Ridge Lake**	**Hazard Potential:**	**HIGH**
River:	Trib. to Sink Creek	NID Height:	20 feet
NID ID:	IA04139	NID Storage:	285 acre-feet
FFP Number:	20110146	Normal Storage:	93.6 acre-feet
		Surface Area:	15.3 acres
Owner Name:	Lost Island Real Estate	Drainage Area:	0.62 square miles
Owner Type:	Private	Dam Length:	1030 feet
Designer:	HR Green	Year Constructed:	2012
Type:	Earth Dam		
Purpose:	Recreation		

As previously mentioned, the magnitude of damage incurred during a dam failure event can vary dramatically depending on the nature of the event. For the purposes of this plan, it can be concluded that such damage would be limited to the Cities of Cedar Falls and Waterloo. None of the seven dams with a significant or high hazard potential is situated directly on the Cedar River or Black Hawk Creek – the two largest rivers in Black Hawk County. Rather, these dams are all situated along tributaries to the Cedar River and Black Hawk Creek. Accordingly, the majority of the damage caused by a failure of any of these dams would likely occur immediately downstream of the dam, between the dam itself and the Cedar River or Black Hawk Creek.

Regarding the Cedar Falls School District, the failure of the SW Dry Run Creek Stormwater Detention Dam or the Viking Road Detention Dam could potentially impact Peet Middle School which is situated near Dry Run Creek further downstream. However, the exact magnitude of such an event depends on the nature of the event. All of the other schools are situated outside of areas likely to be affected by a dam failure in the city.

The University of Northern Iowa would almost certainly experience some damage if the SW Dry Run Creek Stormwater Detention Dam failed. The University is situated immediately downstream from this dam, as shown in Figure 9.07. Low-lying areas near Dry Run Creek, south of University Avenue, would almost certainly experience a greater magnitude of damage than areas of campus situated in higher elevation areas north of University Avenue. Buildings in said low-lying areas include the following: Hillside Courts, Jennings Courts, ROTH, the Center for Energy and Environmental Education, Business and Community Services, the Industrial Technology Center, and the Biology Research Complex.

Warning Time

The conditions that bring about dam failures, i.e. heavy rains and river flooding, can be forecasted days in advance. However, there is no real way to predict at which point a dam will fail until just before the event occurs.

Duration

The length of time that a dam would impact the surrounding area depends largely on the amount of water the specific dam held back. The duration of a dam failure's impact could feasibly range from hours to months.

Terrorism

Definition and Description

Terrorism is the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives *(Federal Bureau of Investigation).* The Federal Bureau of Investigation (FBI) categorizes terrorism in the United States as one of two types--domestic terrorism or international terrorism. Domestic terrorism involves groups or individuals whose terrorist activities are directed at elements of our government or population without foreign direction.

International terrorism involves groups or individuals whose terrorist activities are foreign-based and/or directed by countries or groups outside the United States or whose activities transcend national boundaries. A terrorist attack can take several forms, depending on the technological means available to the terrorist, the nature of the political issue motivating the attack, and the points of weakness of the terrorist's target. Bombings have been the most frequently used terrorist method in the United States. Other possibilities include an attack at transportation facilities, an attack against utilities or other public services or an incident involving chemical or biological agents.

Historical Occurrences

To date, there have been no known or reported instances of any terrorist attacks having been perpetrated in or near the planning area.

Probability

The probability of any type of terrorism occurring in the planning area is unlikely.

Magnitude / Severity

The maximum threat appears to be in the three categories listed in the previous section; danger to the water supply, bio-terrorism, and an attack on a nearby nuclear facility. The severity of impact would largely depend on how quickly the planning area became aware that an event had occurred. The worst-case scenario would occur if the public had no knowledge until all or most of the population had been contaminated or poisoned before a proper response could be made. This could result in widespread sickness and potentially death.

Warning Time

Depending on the type of event to occur the speed of onset could vary from immediate (no time) to days, weeks, even years (poisoned water, poisoned food, financial impacts).

Duration

The duration of an incident on the planning area would be dependent upon the type and size of the event. A small, remote/isolated incident would have a smaller duration than a large, urban-centered incident which could last for days or even weeks.

Human Disease / Pandemic

Definition and Description

Disease is any impairment of normal physiological function affecting all or part of an organism, esp. a specific pathological change caused by infection, stress, etc., producing characteristic symptoms; illness or sickness in general *(Collins).* Also it is any medical, health, or sanitation threat to humans, plants, wildlife, domestic animals. For purposes of this discussion the topic will be contained to only communicable diseases and will largely with generalities.

Communicable diseases can have devastating effects on a health of the population of a community, the health of wild and domestic animals, and on the wide variety of plant life that is present in and around the community. Some of these diseases are considered to be a greater risk to the community than others.

According to the Iowa Department of Public Health website there are fourteen "Emergency Reportable Diseases or Conditions" that are to be reported by telephone immediately should they be detected. These diseases include Anthrax, Botulism, Cholera, Diphtheria, Haemophilus influenza type b invasive disease, Measles, Meningococcal invasive disease, Plague, Polimyelitis, Rabies (human), Severe acute respiratory syndrome, Small Pox, Viral hemorrhagic fever and Yellow Fever. Other events that should be immediately reported by telephone include outbreaks of any kind, unusual syndromes, uncommon diseases, or agents of terrorism such as anthrax, mustard gas, sarin gas, ricin, tularemia, and smallpox.

Other diseases of recent concern include Covid-19, Monkey pox, and West Nile Virus. Also, there are a variety of sexually transmitted diseases that are monitored and treated by the medical community. These diseases include chlamydia, syphilis, gonorrhea, and HIV/AIDS.

Historical Occurrences

The World Health Organization declared COVID-19 a pandemic on March 11, 2020 – with over 118,000 cases of the coronavirus illness documented in more than 110 countries and territories around the world at that time. As of March 28, 2020 there were 298 cases throughout the state of Iowa, with 6 reported in Black Hawk County. As a response to the Pandemic, BHC activated its Emergency Operations Center on March 17, 2020. The Black Hawk County Health Department also created a new website at blackhawkcovid19.com to streamline data and information.

Other relatively recent occurrences include the West Nile Virus has been known to occur within the county. Historically, Pseudorabies has been a concern in hog confinement operations in the state. Small Pox and Influenza have occurred in the past on relatively large scales. Influenza is the most commonly recognized

communicable disease and has been known to occur on a regular basis. Also known as influenza, the flu is spread, or transmitted, when a person who has the flu coughs, sneezes, or speaks and sends flu virus into the air, and other people inhale the virus. The virus enters the nose, throat, or lungs of a person and begins to multiply, causing symptoms of influenza. Influenza may, less often, be spread when a person touches a surface that has flu viruses on it – a door handle, for instance – and then touches his or her nose or mouth.

Probability

Black Hawk County is one of the largest, most diverse counties in the State of Iowa. Furthermore, the area is a crossroads for several transportation routes, including federal highways and a commercial airport. This scenario makes the probability of some type of human disease likely in the near future. The probability is compounded when considering that the severity of many viruses is increasing as they develop more resistance to the antibiotics and medications that are currently available. While many safeguards are in place to mollify the occurrence of these disease epidemics before they occur, the probability still remains likely that an event will occur within the next year.

Magnitude / Severity

The severity of a human disease outbreak depends entirely on the disease itself. There are numerous safeguards that have been put into place to help deter an event before it begins, respond to an event once it does occur, and recover from an event as quickly as possible. Examples of such precautions include measures by service agencies (i.e. American Red Cross), government agencies (i.e. Black Hawk County EMA, Black Hawk County Health Department, State Veterinarian, USDA, etc.), and private medical facilities (i.e. hospitals and clinics) to detect and respond to an event before it becomes an epidemic.

Warning Time

Warning time for a human disease event ranges from just a few days to no time at all. This is due to the nature of human diseases in our globalized society. Because of air travel, a disease that spawns in another part of the world could feasibly reach Black Hawk County in a matter of days.

Duration

The duration of a human disease incident in the planning area would be dependent on the type of disease, notification and containment of said disease, and treatment.

Grass or Wildland Fire

Definition and Description

A grass or wildlife is an uncontrolled fire that threatens life and property in either a rural or wooded area and is beyond normal day-to-day response capabilities. Grass and wild land fires can occur when conditions are favorable such as during periods of drought when natural vegetation would be drier and subject to combustibility.

Historical Occurrences

Grassfires and wild land fires have historically occurred in late fall and early spring when citizens have engaged in ditch burning. Cornfield fires have been more prevalent in the fall when corn saturation and precipitation is low. Two recent instances of grassfires in Black Hawk County include one in March 2011 in Cedar Falls and another in July 2012 in Janesville.

Probability

The probability of a grassfire or wild land fire is occasional. The vast amount of ditch burnings that occur, the abundance of cornfields, and the lack of precipitation in spring and fall increase chances greatly.

Magnitude / Severity

With modern training, equipment, fire detection devices, and building regulations and inspections, most fires can be quickly contained and limited to the immediate area involved. Certain circumstances, such as the involvement of highly combustible materials or high winds, can threaten a larger area. The age and density of a particular neighborhood can also make it more vulnerable to fire due to the spreading of fire from neighboring structures.

The maximum threat of fire damage in the rural areas of Black Hawk County increases with distance from a fire station. This is simply a reflection of the increased time it takes for area fire departments to respond to an event. However, even if a fire of unprecedented magnitudes for this area were to occur, it would still not impact a very large percentage of the county.

Warning Time

Though fire crews may know of dry conditions well in advance, grass and wild land fires provide little warning before their onset. In addition, fire spreads very rapidly especially in dry, hot, and windy conditions. The planning area has volunteer fire departments that provide fire protection for the communities and they all have mutual aid agreements with surrounding communities to assist if the need arises.

Duration

The area immediate impacted by a grass or wild land fire will be impacted during the duration of the fire – either hours or depending on the size it could be days.

Levee Failure

Definition and Description

A levee failure is the loss of structural integrity of a wall, dike, berm, or elevated soil by erosion, piping, saturation, or under seepage causing water to inundate normally dry areas. Levees constructed of compacted clay with a high plasticity tend to crack during cycles of long dry spells. During heavy rainfalls that follow the dry spells, water fills the cracks and fissures. In addition to increasing the hydrostatics forces, the water is slowly absorbed by the clay. The effect of the absorbed water is an increase in the unit weight of the clay as well as a decrease in its shear strength. This results in a simultaneous increase of the slide (driving) forces and a decrease of the resisting (shear strength) forces. Furthermore, the cyclic shrink / swell behavior of the cracked clay zone results in a progressive reduction of the shear strength of the clay, perhaps approaching its residual strength. It also results in deepening of the cracked clay zone, which may eventually reach a depth of 9 ft. or more, especially for clays with a plasticity index greater than 40. The end result may be a sloughing failure following a heavy rainfall. It is believed that fast removal of the runoff water from the interconnected network of cracks could alleviate this surface instability problem.

In Black Hawk County, there are 12 levee systems, 25 miles of levees, and 286 levee structures, identified in the National Inventory of Levees. Table 41 identifies the levee systems. The average age of the reported Levees is 37 years. There are two additional levees identified in the levee centerline data available from the Iowa DNR GIS Library: one in the unincorporated area of Black Hawk County and the other in La Porte City. These two levees are shown in Figure 10 on the next page.

TABLE 41: BLACK HAWK COUNTY LEVEE SYSTEMS						
System Name	**System ID**	**System Authorization (USACE or Locally Constructed)**	**Risk Characteristic**	**Risk Characteristics**	**Latest Inspection**	**Acres Leveed**
Cedar Falls, IA	5105520001	USACE Federally constructed, turned over to public sponsor	Low	742 People 90 Structures $114M Property	11/06/2017	71.38
WATERLOO & EVANSDALE, IA - LDB CEDAR RIVER	5105920003	USACE Federally constructed, turned over to public sponsor	Not Screened / In progress	16,614 People 6,995 Structures	11/09/2017	3,485.06
WATERLOO, IA - RDB CEDAR RIVER / LDB BLACK HAWK CK. (NORTH WEST)	5105920001	USACE Federally constructed, turned over to public sponsor	Not Screened / In Progress	2,531 People 1,206 Structures $1.56B Property	11/09/2017	899.3
WATERLOO, IA - RDB CEDAR RIVER / RDB BLACK HAWK CK. (SOUTH WEST)	5105920002	USACE Federally constructed, turned over to public sponsor	Not Screened / In Progress	6,203 People 1,390 Structures $1.07B Property	11/09/2017	53.28
WATERLOO, IA - VIRDEN CREEK DRY RESERVIOR	5105920005	USACE Federally constructed, turned over to public sponsor	N/A	147 People 57 Structures $18.4M	Unavailable	485.67
WATERLOO, IA - WASTE WATER TREATMENT PLANT (SOUTH)	5105920004	USACE Federally constructed, turned over to public sponsor	Low	19 People 4 Structures $100M	11/09/2017	53.28
CEDAR RIVER	1705990657	Locally Constructed & Maintained				
CEDAR RIVER/DRY RUN CREEK AT CEDAR FALLS 1	1705990649	Locally Constructed & Maintained				
VIRDEN CREEK 2	1705200168	Locally Constructed & Maintained				
WATERLOO FLOOD CONTROL PROJECT LEVEE 1	1705000168	Locally Constructed & Maintained				
WATERLOO FLOOD CONTROL PROJECT LEVEE 2	1705100168	Locally Constructed & Maintained				
WATERLOO FLOOD CONTROL PROJECT LEVEE 3	1705000172	Locally Constructed & Maintained				
Source: Army Corp of Engineers, National Levee Database 2019						

FIGURE 10: BLACK HAWK COUNTY LEVEE LOCATIONS
Source: Iowa Department of Natural Resources GIS Library

Historical Occurrence

There have been no occurrences of a levee failure as described above in the planning area. However, during the floods of 2008, the newly constructed levee in Cedar Falls nearly failed but was reinforced with sandbags in several locations and fortunately held.

Probability

It is possible that a levee failure could occur in the future, based simply on the fact that levees exist. Chances increase significantly with long snow and ice filled winters followed by rainy springs. Earthen levees reaching a certain point of saturation during a flood event will eventually result in a breach or overtopping.

Magnitude / Severity

Any structures behind the levee are susceptible to property damage if the levee were to fail. The map on the left, Figure 10, shows the locations of all levees in Black Hawk County.

The map on the next page, Figure 11, shows a 31-foot stage flood scenario for the Waterloo Cedar Falls area. This is based on the Downtown Waterloo river gauge as shown in Figure 4.

A 0.2 percent annual chance flood would be an event where the river reaches a 30.7 foot stage at the same river gauge. Accordingly, the map on Figure 11 shows a flood event slightly worse than a 0.2 percent annual

chance (i.e. 500-year) flood.

As shown in Figure 11, the RDB Cedar River / RDB Black Hawk Creek levee as well as the Waste Water Treatment Plant levee are both built to withstand a 0.2 percent annual chance flood event. All other levees included in this analysis would be overtopped during such a flood event.

The levee near downtown Cedar Falls was raised by an additional two feet, making it high enough to withstand a 0.2 percent annual chance flood event. This additional height protects most structures in downtown Cedar Falls including the nearby water treatment plant (shown in Map 52). Even upon completion of the levee project, these areas would still remain vulnerable during a levee failure event.

In 2014, the U.S. Army Corps of Engineers conducted a levee breach analysis to support risk communication and evacuation planning for the City of Cedar Falls. This included the analysis of a possible breach at three locations along the levee. At maximum breach,

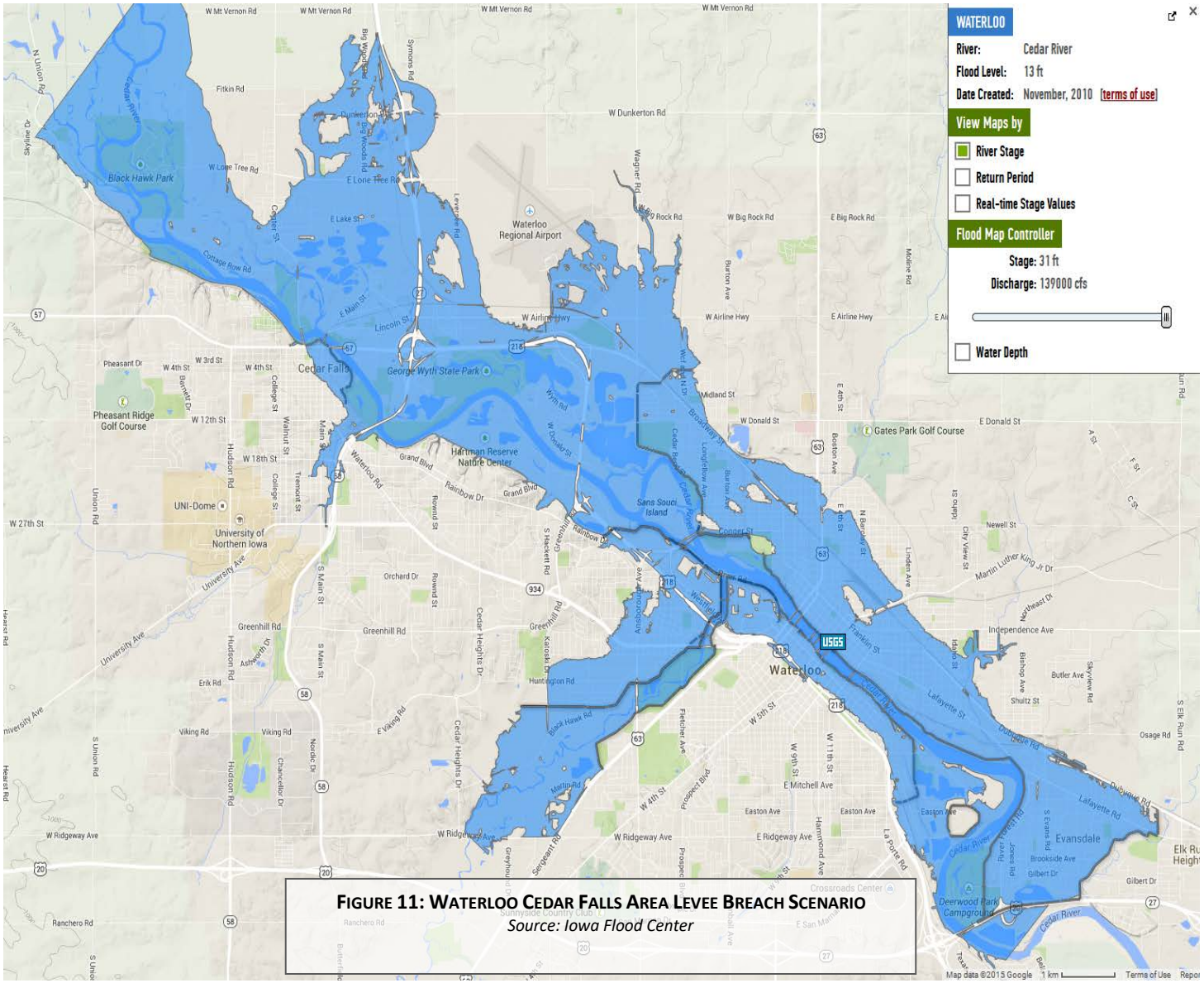


FIGURE 11: WATERLOO CEDAR FALLS AREA LEVEE BREACH SCENARIO
Source: Iowa Flood Center

the adjacent leveed area would be fully inundated within five to six hours. This evaluation will be used by the City for emergency preparedness planning and public
communications.

A very substantial area along the Cedar River in Waterloo is also susceptible to property damage in the event of a levee failure, as shown in Figure 12.1. About three blocks inland from the river on the southwest side and several blocks on the northeast side of the Cedar River are currently protected by the levees in Waterloo. This includes all of downtown Waterloo.

The Waterloo Sanitation Department and treatment facilities are protected by a separate levee which, if breached, could compromise those facilities as well. Furthermore, predominantly residential areas to the north of Black Hawk Creek in Waterloo and most of the City of Evansdale are also susceptible to property damage in the event of a levee failure. The magnitude of such an event could range from trivial to catastrophic, depending on the event itself. The total population residing in areas protected by all levees is easily in the thousands.

Figure 12.1 shows the approximate leveed areas in Waterloo and Evansdale, as identified in the National Levee Database. The total number of acres protected by each levee is also shown.

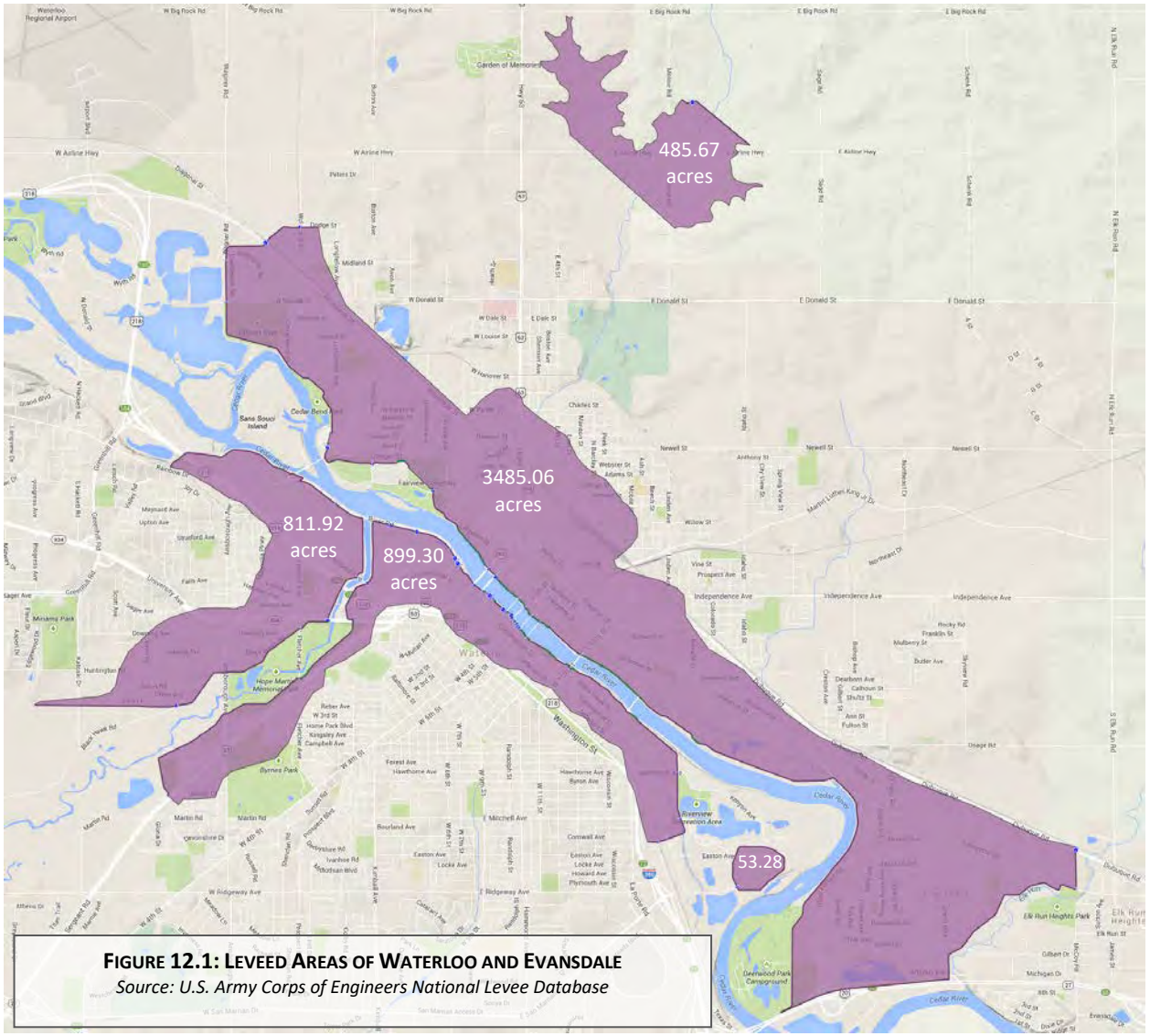


FIGURE 12.1: LEVEED AREAS OF WATERLOO AND EVANSDALE
Source: U.S. Army Corps of Engineers National Levee Database

Figure 12.2 shows the area of Cedar Falls protected by levee. Though vulnerable by river flooding, facilities in the Cedar Falls School District and the University of Northern Iowa would not likely be affected by a levee failure. This is because all of these facilities are located outside of identified leveed areas.

Warning Time

The county would have at least a few hours to respond to rising water levels along the Cedar River and take necessary actions, e.g. sandbagging, to minimize the chance of levee failure. However, it is impossible to pinpoint at exactly what point in time a levee would fail during a flood event.

Duration

A complete levee failure would impact the immediate area for several days or even weeks.

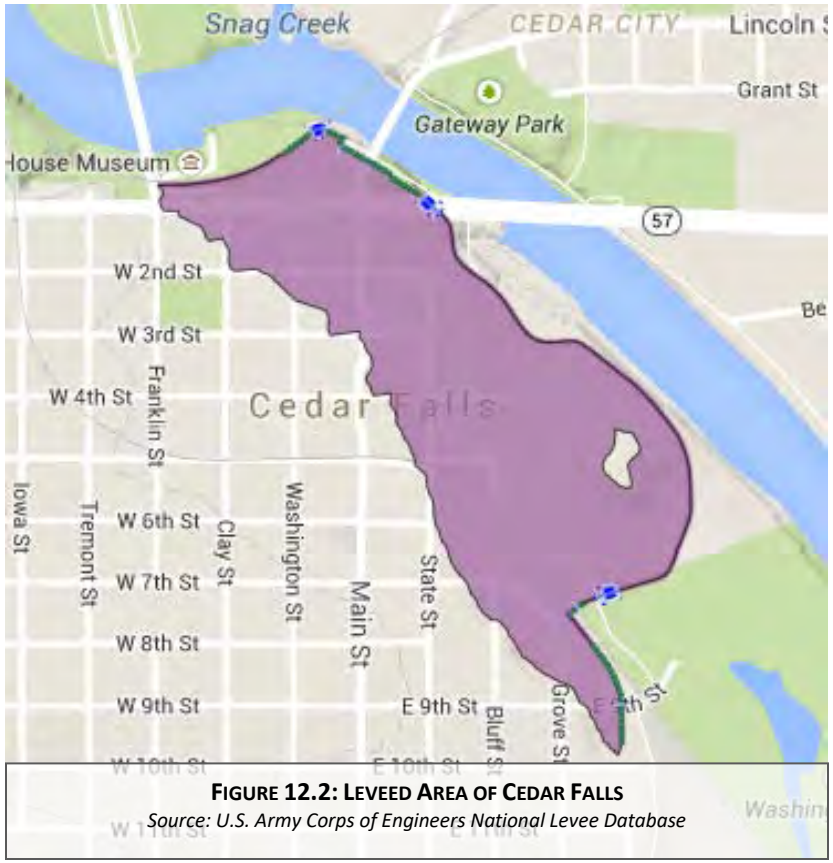


FIGURE 12.2: LEVEED AREA OF CEDAR FALLS
Source: U.S. Army Corps of Engineers National Levee Database

Animal / Plant / Crop Disease

Definition and Description

Disease is any impairment of normal physiological function affecting all or part of an organism, esp. a specific pathological change caused by infection, stress, etc., producing characteristic symptoms; illness or sickness in general *(Collins).* Also it is any medical, health, or sanitation threat to plants, wildlife, domestic animals. For purposes of this discussion the topic will be contained to only communicable diseases. Communicable diseases can have devastating effects on a health of the population of a community, the health of wild and domestic animals, and on the wide variety of plant life that is present in and around the community. Some of these diseases are considered to be a greater risk to the community than others. Some diseases that affect livestock may include (but not limited to) West Nile Virus, Equine Infectious Anemia, Johne's Disease, Foot Rot, Coccidiosis, Pinkeye, Anaplasmosis, Anthrax, Bluetongue, Brucellosis, Trichomoniasis, Tuberculosis, Pseudorabies, Brucellosis, Porcine Reproductive Respiratory Syndrome, Brucella ovis, Ovine Progressive Pneumonia, Scrapie, Micoplasma, Newcastle, Vesicular Stomatitis, Chronic Wasting Disease (CWD), Exotic Newcastle Disease and Rabit calicivirus disease. Some common plant diseases include cedar-apple and related rusts, anthracnose, oak wilt, Verticillium wilt, ash decline, Sphaeropsis blight of pine, Rhizosphaera of spruce, Cytospora of spruce, black knot of plum, and environmental or abiotic disease, and Dutch Elm disease among others.

Historical Occurrence

According to available data, there has been limited occurrence of plant, crop, or animal diseases in the planning area. The Emerald Ash Borer was identified as a significant threat to ash trees throughout the County. The emerald ash borer is a highly destructive wood-boring inspect. The ash trees make up 6% of woodland trees and up to 70% of urban trees are ash species (Iowa State University Extension 1/2011). Ash trees are no longer recommended for planting in the Midwest.

Probability

Black Hawk County is a crossroads for several transportation routes, increasing the likelihood of a plant, animal, or crop disease being spread into the county. However, due to the lack of widespread diseases in the past, it is unlikely that a major animal, plant, or crop disease will develop in the future. That being the case, there is a much greater likelihood of complications, such as foodborne illness in humans, resulting from bacteria and viruses originating in livestock and crops. In addition, the presence of pests, weeds, and fungi poses another threat because organisms have the potential to develop resistances against chemical sprays (e.g. pesticides, herbicides, fungicides) which, in turn, could result in widespread crop damage. Lastly, though not technically a disease, the threat from the Emerald Ash Borer poses an ever-increasing threat to ash trees in the Black Hawk County. The damage caused by this invasive species is comparable to diseases such as Dutch elm disease.

Magnitude / Severity

The severity of a plant, crop, or animal disease depends largely on the disease itself. Effects from a widespread crop disease in Black Hawk County could result in unprecedented crop damage. The same is true for livestock. In a worst-case scenario, a widespread outbreak of a zoonosis or foodborne illness could result in widespread illness in humans with consequences ranging from mild health issues to widespread hospitalizations and even death.

Warning Time

It is unlikely that there would be any warning before a plant, crop, or animal disease develops. However, it is possible that a small, localized discovery of a new disease could prevent the spread of that disease if properly contained and managed.

Duration

The duration of a plant, crop, or animal disease is likely to last weeks, months, or even years. This is because of the time required to first discover the disease and then develop methods to treat the disease and prevent it from spreading.

VULNERABILITY ASSESSMENT

Vulnerability – Identifying Assets (Critical Facilities)

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area or risk areas (i.e., affecting an entire planning area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the planning area's historical occurrences of tornados, this hazard was added to the assessment. An assessment was conducted for each municipality, and can be found in their respective appendix.

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas…

Under the auspices of the County Emergency Management office, Black Hawk County has compiled a list of shelters within the county and planning area. More details (heating source, water source, overall capacity, sleeping capacity, and feeding capacity) can be found in the County's Emergency Management Plan. The list consists of those structures that meet the specific requirements of a shelter. In addition to the provided shelter list, a number of other areas in the planning area could be designated emergency shelters in the case of an emergency. This determination would be made, taking into account the type of disaster and the proximity of the shelter to that disaster. Also, while shelter locations have been identified for use if deemed necessary, there may be occasions, such as during a radiological or HAZMAT incident, where the situation dictates sheltering "in place." Therefore, any location could potentially become a makeshift shelter for purposes of disaster response.

Identifying the location of critical facilities in the planning are is important in order to assess their vulnerability to hazards, in addition to, them being important to the operation of a community and the economic sector. For instance, high-density residential or commercial development, schools, police stations, government buildings, hospitals and care facilities, airports, gas stations, hardware stores, grocery stores, and water supply systems. It is important to know the threats each hazard poses to these facilities. *Black Hawk County Critical Sites Maps* illustrate the location of identified critical facilities.

Vulnerability – Social Assets Populations

The social vulnerability assessment identified how the hazards affect the population of the planning area and it assumes that the identified populations are more likely to require assistance during times of disaster. Therefore, the identified ppulations are generally considered more "at-risk" than the remaining population.

Table 42 shows the "at-risk" population for the entire planning area.

According to 2010 Census data, Iowa has an aging population and the age group of those 80 and over is increasing more rapidly than any other age group. The Iowa Department of Elder Affairs, the Area Agencies on Aging, and Iowa State University recently studied the elderly in Iowa. According to their findings, most elderly Iowans own their own homes and few live-in group living facilities such as nursing homes, assisted living, or independent living facilities. The study found that over 50 percent of the elderly lived alone. There are housing alternatives available for the elderly and low-income households in Black Hawk County.

Another age group that may be unaware of the proper response to a hazard event or may be physically unable to respond as needed, is youth. Black Hawk County has 28,764 residents under the age of 18, or 21.6% of the entire population.

TABLE 42: "AT-RISK" POPULATION FOR PLANNING AREA

Total population, 2017	132,960
Elderly (65 yrs and older), 2017	20,128
Youth (18 yrs and under), 2017	28,764
Householder living alone, 2010	15,120
Population living in poverty, 2017	20,248
Population in multi-family structures*, 2017 (11,046 units)	26,620
Population in mobile homes, 2017 (units x avg household size)	4,248
Group quarters population, 2010	4,297
Persons with disabilities, 2017	15,024

SOURCE: 2010 U.S. Census, 2017 American Community Survey
** - Structures With 3 Housing Units Or More*

Persons living in multi-family units can also be considered an "at-risk" group. These persons are often living in apartment complexes without a tornado shelter available. In 2017 there were a total of 11,046 housing units in structures with at least 3 housing units altogether. An estimated 26,620 people in Black Hawk County may be living in multi-family units lacking a proper tornado shelter.

Based on data from the 2017 American Community Survey, there are 2009 mobile homes located throughout Black Hawk County, housing an estimated 4,841 persons. This figure includes both incorporated and unincorporated areas of the county. This accounts for approximately 3.6% of the entire population.

Finally, persons living in homes located in the 100-year and 500-year floodplains are also at risk from flash flooding and river flooding. An estimated 20,061 parcels or 30 percent of all parcels in the county, are either partly or entirely within the floodplain as determined by the official Flood Insurance Rate maps (FIRMs). Throughout previous years, the planning area has participated in buy-out programs in efforts to remove houses from the floodplain. This will continue to be a priority for the planning area as opportunities for purchasing homes in the flood zones comes forward in the future.

Vulnerability – Estimating Potential Property Losses

Property valuation is an important component of hazard mitigation planning as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster.

Table 43 identifies the values of structures in the Black Hawk County unincorporated area, all of which could be impacted in a hazard event. This data was used in the Vulnerability discussion in each of the Hazard Profiles.

Requirement §201.6(c)(2)(ii)(B):[The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerability structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

TABLE 43: ASSET INVENTORY BY CLASS – BLACK HAWK COUNTY UNINCORPORATED

Class	Land Value	Building Value	Dwelling Value	MR Land	Building Count
Agricultural	$ 382,191,030	$ 20,505,920	$ 203,226,070	$ 0	1,307
Cities	$ 581,230	$ 808,540	$ 0	$ 0	4
Commercial/Dual Class	$ 6,581,875	$ 29,510,425	$ 110,335	$ 62,745	222
County	$ 6,207,714	$ 1,657,250	$ 342,280	$ 37,046	11
Industrial	$ 249,850	$ 1,125,290	$ 0	$ 0	1
Multi-residential	$ 0	$ 0	$ 3,139,960	$ 327,900	4
Religious/Non-Profit	$ 3,235,890	$ 2,173,660	$ 822,780	$ 0	29
Residential	$ 110,850,340	$ 0	$ 455,436,830	$ 0	2,906
Schools	$ 59,130	$ 8,030	$ 0	$ 0	0
State	$ 1,712,090	$ 11,590	$ 0	$ 0	1
Utilities	$ 248,200	$ 96,940	$ 0	$ 0	1
Total*	**$ 511,917,349**	**$ 55,897,645**	**$ 663,078,255**	**$ 427,691**	**$ 4,486**

Source: Black Hawk County Assessor 2019 Values

*- Please note that the assessed value for tax-exempt structures may not adequately reflect their fair market rate value, which may be significantly higher than the assessed value. Accordingly, the values listed above should not be regarded as accurate for any purpose.

The valuations for each jurisdiction in the planning area are available in each jurisdiction's respective Appendix. This information was made available from the Black Hawk County Assessors and Auditors offices.

Table 44 identifies the estimated potential property losses resulting from flooding in Black Hawk County. These values are broken down by the incorporated areas collectively as well as the unincorporated area in the County.

TABLE 44: ASSET INVENTORY - ESTIMATED POTENTIAL PROPERTY LOSSES RESULTING FROM FLOODING IN BLACK HAWK COUNTY

ENTIRE COUNTY ALL PROPERTY VALUES	# of Parcels	Area in Acres	Total Land Value	Total Building Value	Total Dwelling Value	Multi-Residential Land	Total Value	Percent
ALL Property	67,668	366,362	$2,110,660,657	$2,268,502,281	$5,203,790,249	$41,546,003	$9,624,499,190	100%
INCORPORATED	53,995	72,244	$1,416,433,258	$2,209,355,726	$4,575,104,044	$41,118,312	$8,242,011,340	85.64%
UNINCORPORATED	13,673	294,118	$694,227,399	$59,146,555	$628,686,205	$427,691	$1,382,487,850	14.36%
FLOODPLAIN PARCELS - INCORPORATED	**# of Parcels**	**Area in Acres**	**Total Land Value**	**Total Building Value**	**Total Dwelling Value**	**Multi-Residential Land**	**Total Value**	**Percent Damaged**
1.0% FLOODWAY	2,239	8,567	$87,370,468	$283,202,005	$76,747,325	$3,809,392	$451,129,190	4.69%
1.0% Annual Chance Floodplain	3,422	8,440	$101,871,717	$142,619,532	$187,741,888	$1,648,433	$433,881,570	4.51%
1.0% Protected by Levee	7,966	3,921	$118,034,685	$325,469,753	$314,696,507	$1,397,505	$759,598,450	7.89%
0.2% Annual Chance Floodplain	1,055	1,748	$35,923,749	$61,675,973	$61,183,827	$77,341	$158,860,890	1.65%
Total	***14,682***	***22,677***	***$ 343,200,619***	***$ 812,967,263***	***$ 640,369,547***	***$ 6,932,671***	***$ 1,803,470,100***	
FLOODPLAIN PARCELS - UNINCORPORATED	**# of Parcels**	**Area in Acres**	**Total Land Value**	**Total Building Value**	**Total Dwelling Value**	**Multi-Residential Land**	**Total Value**	**Percent Damaged**
1.0% FLOODWAY	1,092	13,848	$24,913,710	$3,110,590	$21,264,460	$0	$49,288,760	0.51%
1.0% Annual Chance Floodplain	4,167	41,750	$224,770,904	$24,478,380	$125,540,300	$37,046	$374,826,630	3.89%
1.0% Protected by Levee	10	63	$358,910	$12,310	$793,390	$0	$1,164,610	0.01%
0.2% Annual Chance Floodplain	110	1,590	$4,052,770	$283,270	$5,735,250	$0	$10,071,290	0.10%
Total	***5,379***	***57,251***	***$ 254,096,294***	***$ 27,884,550***	***$ 153,333,400***	***$ 37,046***	***$ 435,351,290***	

*Source: *Parcel Information current as of 9/25/2018. Black Hawk County MIS Department & INRCOG. Flood overlay is 2011 floodplain designations in Black Hawk County. Incorporated boundaries current as of 5/5/19.*

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks,

utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development. Fortunately, the planning area has not experienced a significant change in development since the area is rural and the amount of development – residential, commercial, and industrial – has not changed in the past five years.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced two losses in a 10-year period in which each loss is $1,000 or more. River flooding is the most common cause of repetitive loss in the planning area. This HMP attempts to reduce loss by identifying potential natural and manmade hazards. As a result of many natural and manmade hazards, repairs and reconstruction area often completed in a way that returns the structure to pre-disaster condition yet does little to prevent a reoccurrence of damage. Replication of the pre-disaster conditions allows for the repetitive cycle of property damage, reconstruction, and re-damage. Hazard mitigation is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction are analyzed, and sound, less vulnerable conditions are produced. Additionally, other mitigation strategies may be considered, such as voluntary property buy-outs.

Table 45 identifies the communities participating in the National Flood Insurance Program and the total number of Repetitive Loss properties in each community.

TABLE 45: NFIP & REPETITIVE LOSS PROPERTIES FOR BLACK HAWK COUNTY

Community	CID #	# of NFIP Policies	NFIP Insurance in Force	Total Paid Losses	Total Payments Made	Repetitive Loss Payment	Total RL Properties 2019
City of Cedar Falls	190017	280	60,534,000	766	17,600.002	$5,476,270	62
City of Dunkerton	190018	40	4,321,000	59	607,171	$181,602	6
City of Evansdale	190020	28	5,261,000	27	115,943	$60,555	3
City of Hudson	190022	6	1,325,000	4	19,532	$0	0
City of La Porte City	190309	41	4,427,000	120	1,323,309	$299,572	11
City of Waterloo	190025	276	$64,602,000	310	4,377,477	$2,013,098	27
Unincorp. Area	190535	107	$17,985,000	174	$3,112,085	$1,844,448	27
TOTAL	-	**778**	**158,455,000**	**1460**	**9,573,117**	**$ 138,2215**	**136**

Source: Federal Emergency Management Agency (FEMA), NFIP Policy and Loss Data by Geography 7-31-2019 / Repetitive Loss from FEMA database by Iowa DNR as of 09/30/2019

SECTION 4 – MITIGATION STRATEGY

HAZARD MITIGATION PLAN GOALS FOR PLANNING AREA

Broad-based goals were developed to address a multitude of hazards and encompass a variety of mitigation activities. The updated multi-jurisdictional hazard mitigation plan goals for Black Hawk County are as follows. These goals were adopted by each community and jurisdiction.

- **PROTECT**: Protect the health and safety of residents, visitors, staff and emergency personnel during and after hazard events.
- **PREVENT**: Prevent avoidable disasters.
- **MINIMIZE**: Minimize losses to existing and future structures in hazard areas, especially critical facilities.
- **MAINTAIN**: Maintain local services and infrastructure in order to reduce community, economic and environmental disruption during and after hazard events.
- **RESTORE**: Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
- **EDUCATE**: Educate the public about hazards and resources available.
- **ACCOUNTABILITY**: Use public funds in an efficient, cost effective and fair manner.
- **COLLABORATE**: Incorporate each jurisdiction into the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan.

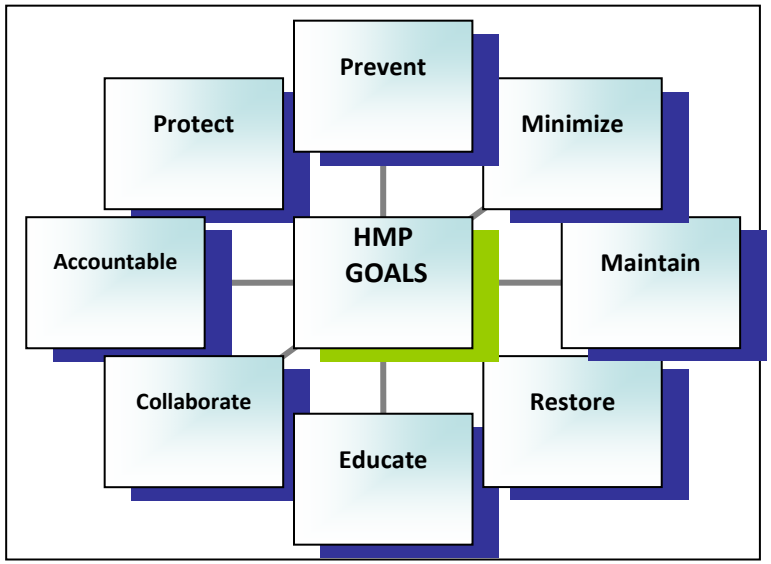


FIGURE 13: BLACK HAWK COUNTY HAZARD MITIGATION GOALS

CURRENT HAZARD MITIGATION ACTIONS

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Requirement §201.6(c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

There were no changes to the current mitigation actions, which are grouped under six broad categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. Detailed information for each incorporated jurisdiction can be found in their respective appendix.

Prevention Mitigation Actions

Black Hawk County has a Comprehensive Land Use Plan, a Subdivision Ordinance, and an Agricultural Preservation Zoning Ordinance. The Agricultural Preservation Zoning Ordinance includes the Soil Survey of Black Hawk County (published by the United States Department of Agriculture Soil Conservation Service in December 1978), the Flood Insurance Study (dated November 17, 1982), and the current flood insurance rate maps. The county's initial flood insurance rate maps were identified in 1982, and the current effective maps are dated 2011. The administration of the zoning ordinance is vested in the following four offices of the Black Hawk County Government: County Board of Supervisors, Planning and Zoning Commission, Board of Adjustment, and the Zoning Administrator.

Property Protection Mitigation Actions

Numerous flood studies have been conducted within the planning area, and each participating community is a member of the National Flood Insurance Program. Following the 1999 flood events in Black Hawk County and other portions of the state, Presidential Declarations 1282 and 1277 allocated funding for residential housing buyout projects. Houses are purchased from the floodplain are then either demolished or relocated in order to not only remove people and property from harm's way, but to allow for unrestricted flow of water in the floodplain. After the 2008 flood events, 14 houses and one barn in the floodplain were acquired and demolished.

It is important to note that there are several structures throughout the county that have experienced, and likely will again experience damaging water levels. According to information provided by the National Flood Insurance Program, there are reported to be 136 repetitive loss properties in Black Hawk County (see Table 45). These properties remain high priorities for each jurisdiction to have removed from the floodplain, but accomplishing this would require willingness on the part of the property owners.

Each jurisdiction affected by flood damage has been involved in working with the Iowa Department of Natural Resources to purchase thousands of acres of land for preservation purposes. This has resulted in numerous public park areas and the preservation of belts along rivers and streams. Black Hawk County now

controls over 8,000 acres of green space. These efforts allow floodwaters to spread out, causing less damage. Furthermore, the development of these preservation areas provides necessary habitat for diverse wildlife in the region. From a hazard mitigation standpoint, this program has kept structures from encroaching on identified flood hazard areas throughout the county. This is an ongoing mitigation effort that also diversifies recreation activities in the county by providing additional recreational opportunities including running, bicycling, canoeing, kayaking, hiking, fishing, hunting, and environmental education.

Public Education and Awareness Mitigation Actions

Various public education and awareness activities occur within the planning area. Major communication devices are Alert Iowa, E911 and Black Hawk Alert. Other communications include the Emergency Alert System, the Commercial Mobile Alert System, radio and television stations, newspapers, warning sirens, internet, and NOAA Radio Services. Online resources including Facebook, city and county websites, and message board systems are also used to education and inform the public.

Emergency Services Mitigation Actions

Black Hawk County Emergency Management

All jurisdictions within the planning area work with the Black Hawk County Emergency Management Coordinator, based out of Waterloo. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency actions in the community. The communities also work with the American Red Cross Hawkeye Chapter in order to set up and operate local shelters during and/or/following a disaster. There is one American Red Cross Hawkeye Chapter office in Waterloo and two additional offices outside the planning area, one in Cedar Rapids and one in Mason City.

A past and continuing mitigation effort is the Black Hawk County Contingency (Emergency) Plan that is on file with the Emergency Management Office. This plan outlines steps to be taken in the case of a large-scale emergency in Black Hawk County. This plan identifies and gives standard operating procedures that are to be followed for any number of disasters, including those disasters not covered in depth in this plan. The plan is considered to be multi-hazard and multi-jurisdictional and encompasses 15 Emergency Support Functions (ESF's):

• ESF 1 – Transportation	• ESF 6 – Mass Care, Housing, and Human Services	• ESF 11 – Agriculture and Natural Resources
• ESF 2 – Communications	• ESF 7 – Resource Support	• ESF 12 – Energy and Utilities
• ESF 3 – Public Works and Engineering	• ESF 8 – Health and Medical	• ESF 13 – Law Enforcement (Public Safety and Security)
• ESF 4 – Firefighting	• ESF 9 – Search and Rescue	• ESF 14 – Community Recovery
• ESF 5 – Emergency Management	• ESF 10 – Hazardous Materials	• ESF 15 – Public Information and External Communications

A list of shelters for the county can be found in ESF 6 – Mass Care. Mutual Aid agreements between all Black Hawk County Fire Departments are present. ESF 10

– Hazardous Materials includes a list of companies within the county that store extremely hazardous chemicals including critical sites at major intersections of highways, railroads, and pipelines. This multi-hazard plan is considered a separate document that coordinates and enhances the multi-hazard plan for Black Hawk County.

The Hazardous Materials Regional Training Center provides training to fire departments and companies from around the state and country. The Hazardous Material Team, also known as the Northeast Iowa Response Group, is a division of Waterloo Fire Rescue. The training center location services as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten country region.

Law Enforcement

The Black Hawk County Sheriff's Department is the primary law enforcement agency in rural Black Hawk County. The jurisdiction for this agency includes the entire county. According to the Black Hawk County Sherriff's Office website, they have approximately 140 employees working in administrative, special services, field services and jail. In addition to the unincorporated parts of the county, the department provides police service for Elk Run Heights and Raymond under contract. All jurisdictions in the planning areas share dispatch services through the Joint Communication Center. Furthermore, the unincorporated communities of Dewar, Finchford, Voorhies, and Washburn are included in the service area of the Black Hawk County Sheriff's Office.

Police protection is provided to the City of Waterloo by the Waterloo Police Department. According to the Department's website the Police Department employs 125 sworn officers and 9 civilians for a total of 134 employees. The Police Department also has the Waterloo Police Bomb Unit, the only Bomb Unit in Black Hawk County. It is responsible for handling explosive devices and hazardous materials within the City of Waterloo and, when necessary or requested, surrounding jurisdictions.

Police protection is provided to the City of Cedar Falls by the Cedar Falls Public Safety Department. According to the City of Cedar Falls, there are a total of 52 Public Safety Officers, 7 Police Officers, 12 Reserve Police Officers and eight Community Service Officers.

Other police departments operating in the planning area include the Dunkerton Police Department (2 Officers), the Hudson Police Department (4 Officers), the Evansdale Police Department (7 full time Officers, 8 part-time Officers, 7 reserve Officers) the La Porte City Police Department, the Gilbertville Police Department (5 Officers), and the Iowa State Patrol. In addition, the City of Jesup, which is situated on the border of Black Hawk County and neighboring Buchanan County, has its own Police Department which operates within city boundaries.

Fire Protection

There are ten independent fire departments in the county. Each department is responsible for fire protection services to a particular area within the county.

Medical Facilities

Black Hawk County is presently a regional health care center. In addition to numerous private clinics and practicing physicians, Black Hawk County has four major medical facilities, all of which are located in either Waterloo or Cedar Falls. Three of these facilities are considered Regional Hospitals, otherwise referred to as Level II. Mercy One and Unity Point Hospital are located in Waterloo. Mercy One (formerly Sartori Memorial Hospital) is also located in Cedar Falls. In addition to the Regional Hospitals, there are several clinics throughout Black Hawk County.

In addition to the medical health field, Black Hawk County has services available to deal with those who require mental health assistance. Black Hawk-Grundy Mental Health Center provides psychiatric and counseling services to citizens who are in need of support.

Black Hawk County currently has eight (8) ambulance services providing coverage throughout the County. Of these eight services, one is an Emergency Medical Technician - Intermediate (EMT-I) or Advanced Emergency Medical Technician (AEMT) level service, and the other seven services operate at Paramedic or above with one operating as an Air Ambulance. These services can be activated by dialing the E-911 Emergency Response System. There are approximately 17 medical hospitals located outside of, but within forty miles of Black Hawk County.

HAZMAT

The Hazardous Materials Regional Training Center provides training to fire departments and companies from around the state and country. The Hazardous Material Team, also known as the Northeast Iowa Response Group, is a division of Waterloo Fire Rescue. The training center location services as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten country region.

The Waterloo Police Department has the only Bomb Unit in Black Hawk County. It is responsible for handling explosive devices and hazardous materials within the City of Waterloo and, when necessary or requested, surrounding jurisdictions.

Warning Systems

As of 2019, there are approximately 48 warning sirens throughout the planning area. Black Hawk County Emergency Management operates two sirens in unincorporated Black Hawk County. These sirens are located in Finchford and Washburn. The City of Waterloo currently has in place approximately 20 sirens; Cedar Falls, 13 sirens; Hudson, one siren; Evansdale, three sirens; Elk Run Heights, no sirens; Raymond, one siren; Gilbertville, one siren; Dunkerton, two sirens; and La Porte City, two sirens. Siren tests are conducted on the first Wednesday of every month throughout Black Hawk County unless the temperature is below the freezing point, the first Wednesday of the month falls on a national holiday, or unless the siren could be interpreted as a real warning due to inclement weather at the time. See Appendix J, Critical Sites Maps for siren locations.

In addition to these traditional warning systems, river gages are located throughout the county that can provide early warning for citizens of Black Hawk County as well as communities downstream of the county. Three digital gages remain in operation in Black Hawk County. These gages are located along the Cedar River

in Cedar Falls, along the West Fork Cedar River near Finchford, and on the Cedar River in Waterloo. In addition to these real time gages there is also a more traditional sight gage in Gilbertville. Just to the north of the Black Hawk – Bremer County line, near Janesville is another gage on the Cedar River.

Historically, there has been a gage near Hudson that monitored Black Hawk Creek. Currently, this gage is inactive. There has been discussion of reinitiating the operation of this gage as it can act as an effective warning device for those residents living near Black Hawk Creek downstream from Hudson. The City of Waterloo, in order to have some indication of the flow level along Black Hawk Creek operates its own gage along its southern border.

NOAA Radio service is available in Black Hawk County that can provide warning if used. These radios are available to the public at large but are not provided by the public sector. Radio station KWLO is the designated Emergency Alert System contact for Black Hawk County Emergency Management. They provide weather alerts via broadcast to the public.

Alert Iowa is a statewide mass notification and emergency messaging system. The system can be used by state and local authorities to quickly disseminate emergency information to residents in counties that utilize the system. Up until July 2012, Black Hawk County was served by the CodeRED Emergency Notification System – a high-speed telephone communication service for emergency notifications. The Alert Iowa system be activated in the event of an emergency/hazard, essentially contacting each citizen residing within harm's way with an automated message warning them of potential danger. All citizens' home telephone numbers listed in the County's phone directory are automatically entered into the system. Citizens also have the ability to "opt in" to receive weather alerts and enter a cell phone, work phone, and other additional alternative phone numbers.

Natural Resource Protection Mitigation Actions

Section VIII of the Black Hawk County Agricultural Land Preservation and Zoning Ordinance addresses natural resource protection and preservation. It states that land identified as sensitive or significant shall be subject to regulations and provisions of the "E-S" Environmentally Sensitive Overly District.

Structural Projects Mitigation Actions

Hazard mitigation practices take shape in many forms. One of the most prevalent forms of hazard mitigation is practiced by Black Hawk County in the form of road improvement. Black Hawk County maintains approximately 791 miles of roadway (552 miles of gravel and 239 miles of paved roads), according to the Engineer Department. Ongoing and continuing efforts are being made toward hazard mitigation. These efforts first include an ongoing shouldering program. This program widens the shoulders of roads allowing for safer travel.

The county is continuously involved in road improvement. Specifically, bridge improvements work toward the goal of hazard mitigation. The Iowa Department of Transportation has specific standards that must be adhered to when accepting funding for road improvement. Therefore, usually when a bridge is improved the flow capacity of the bridge is also increased. This goes directly toward the alleviation of flooding caused by water backed up behind bridges and roadways.

A very costly mitigation and recovery effort engaged by the county is the removal of silt from road ditches. When flooding or heavy rainfall occurs there is a substantial amount of sedimentation that settles in the drainage ditches. This sedimentation results in the plugging of culverts and the reduced water capacity of the drainage ditches. Reduced water capacity in these ditches allow for the water too more easily top roadways causing treacherous driving conditions and damage to roadways.

Efforts to reduce the accumulation of silt and rubbish in culvert and bridge span areas are being made by encouraging the use of filter strips near these facilities. The idea of a filter strip is to develop a tall grass waterway that would essentially “filter” surface water flow during a heavy rainfall. This filtering process reduces the amount of such items as corn stalks from plugging culverts and helps to prevent massive quantities of topsoil being lost to erosion. This filter strip program is a cooperative effort between private landowners, Black Hawk County, and the NRCS.

Damage to roadways is a recovery effort that Black Hawk County has had to deal with numerous times as a result of past flood events. The county has demonstrated continual efforts to curb these types of events from causing damage. They have done this with numerous repair, placement, and replacement of bridges and culverts throughout the county.

As flooding events occur, problem areas are more easily identified. One area of the county that has had significant trouble is the North Cedar/Big Woods Drainage Area, located north of the Waterloo/Cedar Falls metropolitan area along Highway 218. Identification of these problems has led to several short-term steps to help control flooding in this area. Some alternative solutions that have been arrived at as a result of studies in the area are discussed in the Mitigation Alternatives section of this plan.

Future Hazard Mitigation Activities

While the existing mitigation activities discussed above detail the comprehensive efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit community residents. Thus, the Committee developed an updated list (Action Plan) of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The action plan may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public. Table 47 identifies the action plan for Black Hawk County Unincorporated area. Action Plans for each participating jurisdiction can be found in their respective appendix.

TABLE 46: STAPLEE ELEMENTS

S – Social	• Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the populations, • Actions do not cause relocation of lower income people, • Actions are compatible with the community's social and cultural values.
T- Technical	• Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	• Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	• Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	• It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	• Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E - Environmental	• Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, • Are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

Action Plan – Black Hawk County Unincorporated

The Committee analyzed the identified mitigation activities that are either new or carried over from previous/current plans. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental (see Table 46 for definitions).

The Committee was asked to discuss the STAPLEE elements and determine each element's ranking (i.e. high, medium, low) for each identified future mitigation activity. Afterward, the average priority for each mitigation activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each of the proposed mitigation activity will occur. For instance, if the activity happens regularly (either daily, weekly, monthly, or annually) it was identified as Active; if it will occur within the next 1-5 years it was identified as Short-Term; if the activity would take 5-10 years to occur it was labeled as Mid-Term; and all activities that would take 10 or more years to occur were identified as Long-Term.

Requirement §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The local community will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities. In addition, private property owner expenses will be necessary to implement some activities.
The estimated cost(s) for each mitigation action, program, or project is identified as minimal, low, moderate, or high depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate : Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High : Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

TABLE 47: FUTURE HAZARD MITIGATION ACTIVITIES - BLACK HAWK COUNTY UNINCORPORATED AREA						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals(s)**
H	Educate the Public.	All	Black Hawk County EMA*, American Red Cross	Active	Minimal	Protect, Prevent, Minimize, Restore, Educate
H	Maintain a viable secondary roads department in order to facilitate the timely and effective clearing of roads in the wake of a winter storm.	Winter Storm	Black Hawk County Department of Engineering and Secondary Roads*, Board of Supervisors	Active	High	Protect, Prevent, Maintain
M	Encourage utilities and developers to place utilities (power, telephone, cable) underground.	Winter Storm, Thunderstorm/Lightning	Black Hawk County Planning and Zoning Commission*	Active	High	Educate, Protect, Prevent, Minimize, Maintain
M	Enhance public awareness of closed and open roads through public announcements (i.e. radio, media releases.)	Winter Storm	Black Hawk County EMA*, Board of Supervisors, County Engineer	Active	N/A	Educate, Protect, Prevent
H	Maintain and periodically evaluate outdoor warning sirens in the community for effectiveness and operability.	Tornado/Windstorm, Infrastructure Failure	Black Hawk County EMA*	Active	Minimal to Low	Protect, Prevent, Maintain
M	Systematically review and make necessary updates to building code requirements.	Tornado/Windstorm, Infrastructure Failure,	City of Waterloo Bldg Dept, Black Hawk County Planning and Zoning Commission*, Board of Supervisors	Active	Low	Protect, Prevent, Minimize, Maintain
H	Periodically review system established for identifying all rural water sources to be utilized in the event of an emergency.	Infrastructure Failure	Fire Departments*	Active	Minimal	Protect, Prevent, Minimize, Maintain, Restore, Educate
H	Ensure emergency responders are properly trained and equipped.	Infrastructure Failure, Grassfire/Wildfire, Terrorism, Radiological	Board of Supervisors, Department Heads*	Active	Low	Protect, Maintain, Educate, Collaborate
H	Coordinate efforts with applicable response agencies.	Infrastructure Failure	Black Hawk County EMA*, Board of Supervisors	Active	N/A	Protect, Educate, Collaborate

TABLE 47: FUTURE HAZARD MITIGATION ACTIVITIES - BLACK HAWK COUNTY UNINCORPORATED AREA						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals(s)**
H	Encourage residents to subscribe to Emergency Alerts services.	Infrastructure Failure	Black Hawk County EMA*, local governments	Active	Minimal	Educate, Protect
H	Continue to ensure that all applicable personnel are trained in the Incident Command System in order to enhance any potential emergency response.	Infrastructure Failure	Department Heads*, Black Hawk County Sheriff's Department	Active	Minimal to Low	Protect, Minimize, Educate
M	Coordinate with message boards to communicate disaster related messages (i.e. DMS, Banks, etc.).	Infrastructure Failure	Black Hawk County EMA, County Sheriff*	Active	N/A	Educate, Protect, Collaborate
M	Coordinate with Regional HAZMAT Training Center to identify personnel who should receive HAZMAT training.	HAZMAT	Department heads*, Black Hawk County Sherriff's Department, Human Resources	Active	Minimal to Low	Educate, Protect, Collaborate
M	Continue to support Tier II HAZMAT reporting requirements.	HAZMAT	Black Hawk County EMA	Active, required by Title III of the U.S. SARA of 1986	Minimal	Prevent, Minimize
M	Coordinate response efforts with the Northeast Iowa Emergency Response Group (NIRG).	HAZMAT, Radiological	Black Hawk County EMA*, Board of Supervisors	Active	N/A	Collaborate.
M	Identify certified and qualified clean-up companies.	HAZMAT	Board of Supervisors*	Long Term	Minimal	Protect, Restore
M	Cooperate with Health Department to maintain programs for the testing and inspections of existing wells and septic systems throughout the county.	HAZMAT	Black Hawk County Health Department*, Private property owners	Active	N/A, property owners would incur cost	Protect, Prevent, Collaborate
H	Seek and secure funding to help in the establishment of several GIS layers to be used to project potential areas of pollution throughout the county.	HAZMAT	Black Hawk County Health Department*	Active	Low	Protect, Prevent, Accountability

TABLE 47: FUTURE HAZARD MITIGATION ACTIVITIES - BLACK HAWK COUNTY UNINCORPORATED AREA						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals(s)**
H	Develop and strengthen Storm Water Management Programs.	HAZMAT	Black Hawk County Engineer*, Iowa Department of Natural Resources, EPA	Long Term	Medium	Protect, Prevent, Minimize, Maintain
H	Research grant opportunities through the Iowa Department of Natural Resources (IDNR) and the Iowa Department of Public Health.	HAZMAT	Black Hawk County Conservation*, Board of Supervisors	Active	N/A	Protect, Prevent, Minimize, Maintain, Educate
H	Maintain and enhance a storm spotter network made up of volunteers cooperating the National Weather Service, and train volunteer storm spotters through NWS severe weather trainings.	Thunderstorm/Lightning	Black Hawk County EMA*, Board of Supervisors	Active	Minimal	Protect, Educate, Collaborate
H	Ensure that all county roadways have proper signage in order to promote the smooth, orderly, and safe flow of traffic.	Transportation Incident	Engineering and Secondary Roads Department*, Iowa Department of Transportation, Incorporated Cities, Railroads	Active	Minimal	Protect, Prevent, Maintain, Educate
H	Continue to enhance the Trail Emergency Access System (TEAS) so that location can be established for proper and timely response in the event of an on trail incident.	Transportation Incident	Black Hawk County Conservation Board*, 911 board	Active	Minimal	Protect, Minimize, Educate.
M	Place crossbucks at certain railroad crossing sites.	Transportation Incident	Black Hawk County Department of Engineering and Secondary Roads*, Incorporated Cities	Active	Minimal to Low	Protect, Prevent, Educate
M	Maintain and update as necessary the County Snow Policy.	Transportation Incident	Engineering and Secondary Roads Department*	Active	Medium	Educate, Protect
M	Continue history of cooperation between emergency response personnel and snow removal units.	Transportation Incident	County Engineer*, Local first responder groups	Active	N/A	Collaborate, Protect
M	Research and acquire grant dollars for various transportation related projects.	Transportation Incident	Board of Supervisors*, County Engineer, Metropolitan Planning Organization, Regional Planning Agency	Active	Minimal	Educate, Collaborate, Protect, Prevent, Maintain

TABLE 47: FUTURE HAZARD MITIGATION ACTIVITIES - BLACK HAWK COUNTY UNINCORPORATED AREA						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals(s)**
H	Examine and potentially implement alternative intersection design for existing, problematic intersections.	Transportation Incident	Board of Supervisors*, County Engineer, Iowa DOT, Metropolitan Planning Organization, Regional Planning Agency	Active	High	Educate, Collaborate, Protect, Prevent, Maintain
H	Implement Dynamic Message Signs (DMS) on primary roadways in applicable situations.	Transportation Incident	Iowa DOT, Board of Supervisors*, Metropolitan Planning Organization, Regional Planning Agency	Active	High	Educate, Protect, Prevent
H	Implement Changeable Message Signs (CMS) on primary roadways in applicable situations.	Transportation Incident	Iowa DOT, Board of Supervisors*, Metropolitan Planning Organization, Regional Planning Agency	Active	Low to Medium	Educate, Protect, Prevent
H	Continue membership with the National Flood Insurance Program (NFIP).	Flash Flood, River Flood	Board of Supervisors*	Active	Low	Protect, Maintain, Restore
M	Research and pursue all available grant dollars designated for flood mitigation efforts.	Flash Flood, River Flood	Board of Supervisors*, Black Hawk County EMA, County Engineer	Active	Minimal	Protect, Maintain, Restore
M	Continue to identify, purchase, and remove structures from flood hazard areas.	Flash Flood, River Flood	FEMA, INRCOG, Board of Supervisors*, Private property owners	Active, as funding and interested property owners come forward	N/A	Educate, Prevent, Minimize
H	Continue efforts to complete the FEMA flood map updates.	Flash Flood, River Flood	Engineering Department*, FEMA, and Incorporated Cities	Active	High	Protect, Educate, Prevent, Minimize
M	Continue to enforce Floodplain Ordinance, Zoning ordinance, and Subdivision Ordinance and update these documents as necessary.	Flash Flood, River Flood	Planning and Zoning Commission* and Board of Supervisors	Active	Low	Protect, Educate, Prevent, Minimize
M	Elevation, Retrofitting or removal of structures in flood hazard areas.	Flash Flood, River Flood	Planning and Zoning Commission*, Board of Supervisors, Engineering Department	Long Term	Low	Protect, Prevent, Minimize

TABLE 47: FUTURE HAZARD MITIGATION ACTIVITIES - BLACK HAWK COUNTY UNINCORPORATED AREA						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals(s)**
M	Construct new and enhance existing detention basins, also increase the amount of wetland area and preserve areas already established in the County.	Flash Flood, River Flood	Private property owners, Black Hawk County Conservation Board*, NRCS	Long Term	N/A	Prevent, Protect, Minimize
M	Consider the establishment of a drainage district for storm water utilities in areas generally located along Highway 218, north of the City of Cedar Falls.	Flash Flood, River Flood	Board of Supervisors*, Engineering Department, Private property owners	Long Term	N/A	Prevent, Protect, Minimize
M	Continue bridge improvement programs incorporating County standards into any reconstruction effort.	Flash Flood, River Flood	Engineering Department*	Active	Medium	Protect, Prevent, Minimize, Maintain
M	Encourage the use of back flow valves in any new or existing developments.	Flash Flood, River Flood	Building Department*	Active	Minimal	Protect, Prevent, Minimize
M	Map alternative routes for flood prone areas and identify susceptible routes to avoid in the event of a flood.	Flash Flood, River Flood	Black Hawk County EMA*, Board of Supervisors, FEMA, Iowa Homeland Security	Long Term	Minimal to Low	Educate, Protect, Prevent
H	Establish and/or maintain Continuity of Government plans to handle post disaster operations (i.e. animal disposal, clean-up, demolition).	Flash Flood, River Flood, Infrastructure Failure	Board of Supervisors	Active	Minimal	Educate, Collaborate, Protect, Minimize
M	Work with designated authorities to ensure that dead animals are properly disposed of.	Extreme Heat	Black Hawk County Solid Waste Management*, Black Hawk County Health Department, Rendering Works, Humane Society	Active	Minimal	Collaborate, Protect
M	Encourage local organizations to continue community assistance efforts (i.e. Operation Threshold has, in the past, conducted fan sharing programs in the county).	Extreme Heat	United Way and member organizations	Active	N/A	Protect, educate, Collaborate
H	Assess and meet the needs of the county's vulnerable populations.	Extreme Heat	COAD*, Board of Supervisors	Active	Minimal	Educate, Protect, Minimize, Collaborate

TABLE 47: FUTURE HAZARD MITIGATION ACTIVITIES - BLACK HAWK COUNTY UNINCORPORATED AREA						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals(s)**
H	Implement and enforce burn bans.	Grassfire/Wildfire, Drought	Black Hawk County Fire*, County Sheriff, Board of Supervisors	Active	Minimal	Protect, Prevent, Minimize, Educate
M	Create a controlled burning ordinance.	Grassfire/Wildfire	Board of Supervisors*, Fire Association	Long Term	Minimal	Protect, Prevent, Minimize, Educate
M	Regularly update firewall software on all county computer systems to prevent cyber terrorism.	Terrorism	Information Technology (IT) Department*	Active	Low	Protect, Prevent, Minimize, Educate
H	Cooperate with all local, State, and Federal law enforcement and first responder agencies in order to provide the most appropriate response to any terrorism event (i.e. Law Enforcement Intelligent Network (LEIN) Region II).	Terrorism	Black Hawk County Sheriff's Department*	Active	N/A	Collaborate, Educate, Protect, Minimize
H	Ensure that local law enforcement is aware of local groups and individuals who may be considered a high risk to perform an act of terrorism.	Terrorism	Black Hawk County Sheriff's Department*	Active	Minimal	Collaborate, Educate, Protect, Minimize
H	Continue cooperation with the Local Emergency Planning Committee (LEPC).	Terrorism, Radiological	Black Hawk County EMA*, LEPC	Active	Minimal	Collaborate, Educate, Protect, Minimize
H	Consider steps to increase security and reduce accessibility to vulnerable and attractive targets in the county.	Terrorism	LEPC, Hazard Mitigation Planning Agency (INRCOG), Black Hawk County Board of Supervisors	Active	N/A	Prevent, Protect
M	Implement precautionary mechanisms or 'hardened targets' into public spaces and events which are highly vulnerable to a terrorist attack (i.e. Installing cameras at public events & areas with low visibility, 'hardened target' could be a concrete flower bed in front of the court house).	Terrorism	Board of Supervisors*, County Heads, County Engineer	Long Term	Minimal to Low	Prevent, Protect
H	Coordinate with utility companies to automatically shut-off gas supplies.	Earthquake	Black Hawk County EMA*, Board of Supervisors	Active, as needed	N/A	Prevent, Protect Collaborate
M	Develop plans for establishing an intake area for earthquake victims.	Earthquake	Black Hawk County EMA*, Board of Supervisors, County Sheriff	Active, as needed	Minimal	Minimize, Restore

TABLE 47: FUTURE HAZARD MITIGATION ACTIVITIES - BLACK HAWK COUNTY UNINCORPORATED AREA						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals(s)**
H	Work with the Black Hawk County Board of Health/Health Department and the State Health Department to determine which diseases are most likely to have an impact in the County and develop strategies to prevent their occurrence.	Human Disease, Animal/Plant/Crop Disease	Health Department*, State Veterinarian, Department of Natural Resources	Active	Minimal	Collaborate, Educate, Prevent, Protect.
H	Conduct mock disasters and tabletop exercises in order to help prepare first responders for proper response to an outbreak of disease.	Human Disease, Animal/Plant/Crop Disease	Black Hawk County Health Department*, Black Hawk County EMA	Active	Low	Educate, Prevent, Protect, Minimize
M	Comply with the 2014 Animal Plan and make updates as necessary.	Human Disease, Animal/Plant/Crop Disease	Black Hawk County Health Department*	Active	N/A	Protect, Prevent, Minimize
H	Work with responsible parties to ensure that levees and dams are properly maintained and evaluated for proper mitigation efforts.	Dam Failure, Levee Failure	Engineering*, Army Corps of Engineers, municipalities, private property owners	Active	N/A	Protect, Prevent, Minimize
H	Continue to evaluate potential flood control measures to alleviate stress on major water retention structures.	Dam Failure, Levee Failure	Engineering*, Army Corps of Engineers, private property owners	Active	N/A	Protect, Prevent, Minimize
H	Ensure any water retention structures to be built are constructed within the requirements of the National Flood Plain Ordinance.	Dam Failure, Levee Failure	Building Department*, Planning Dept.	Active	N/A	Protect, Prevent, Minimize
H	Strengthen ordinances and building codes for building behind a levee through planning and zoning.	Dam Failure, Levee Failure	Building Department*, Board of Supervisors, Planning Dept	Long Term	N/A	Protect, Prevent, Minimize
H	Ensure that all applicable response and recovery plans are in place and that authorities are aware of these plans.	Radiological	Black Hawk County EMA*, Iowa Department Emergency Management, FEMA	Active	Minimal	Educate
M	Maintain county roads to reduce/eliminate damage to vehicles caused by poorly maintained roads.	Expansive Soils	Board of Supervisors*, County Engineer, Building Department	Active	High	Maintain, Protect, Minimize
M	Encourage building practices conducive to prolonging the lifespan of roads and other county infrastructure.	Expansive Soils	Board of Supervisors*, County Engineer, Building Department	Active	N/A	Educate, Maintain
M	Identify and map all known locations and areas vulnerable to sinkholes.	Sinkholes	Board of Supervisors*, County Engineer, County Conservation	Long Term	N/A	Educate, Prevent, Protect

TABLE 47: FUTURE HAZARD MITIGATION ACTIVITIES - BLACK HAWK COUNTY UNINCORPORATED AREA						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals(s)**
M	Develop and implement program to use GPS receiver technology in the recording and reporting of damage in the wake of a disaster.	All	Black Hawk County EMA*, UNI, HCC, BHC Engineer, BHC IT, and other local responder organizations	Long Term	Low	Educate, Protect, Minimize
H	Regularly conduct small scale, and large scale emergency exercises in order to ensure that personnel are trained and able to respond properly to any type of emergency that occurs.	All	Board of Supervisors*, Black Hawk County EMA, County Department Heads	Active, EMPG Funded personnel must conduct three exercises annually	N/A	Educate, Protect, Minimize
H	Activate the Operations Center as needed.	All	Board of Supervisors*, Black Hawk County EMA, County Department Heads	Active	N/A	Protect, Restore, Minimize
M	Continually update and maintain an adequate Geographic Information System.	All	Board of Supervisors*, Black Hawk County EMA, County Department Heads	Active	N/A	Protect, Minimize, Restore
M	Periodically review and continue to implement all mitigation activities included in the plan.	All	Board of Supervisors*, Black Hawk County EMA, County Department Heads	Active	N/A	Accountability
H	Encourage intergovernmental cooperation with local, state, and federal agencies.	All	Board of Supervisors*, Black Hawk County EMA, County Department Heads	Active	N/A	Collaborate, Accountability
H	Maintain and upgrade the Emergency Operation Center to proficiently meet the demands of the public and county officials/agencies.	All	Board of Supervisors*, Black Hawk County EMA	Active	N/A	All
M	Designate and maintain a clear list of Public Information Officers (PIO's) with a body of three persons ready to be activated at all times.	All	Board of Supervisors*, Black Hawk County EMA	Active	N/A	Educate
H	Ensure all public and private agencies contracted with the county adhere to all applicable Occupational Health and Safety (OSHA) regulations.	All	Board of Supervisors*, County Department Heads	Active	N/A	Educate, Protect, Prevent, Minimize

SECTION 5 – PLAN MAINTENANCE

MONITORING, EVALUATING, AND UPDATING THE PLAN

Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive plans or capital improvement plans, when appropriate.

Requirement §201.6(c)(4)(ii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Amendment

This is an updated five-year hazard mitigation plan, commencing upon FEMA Certification, and any future amendments to the plan shall occur only after an official Public Notice has been posted in a local publication announcing a Public Hearing on the matter.

After the public has had the opportunity to review the proposed amendments the City Council and/or Board of Supervisors may, by resolution, choose to accept any amendment to the plan. Once the City Council and/or Board of Supervisors has adopted the amendment, the remaining elected board of each participating municipality shall hold a public hearing to receive public input on the amendment prior to local adoption.

Any and all amendments made to this plan should be shared with each participating jurisdiction, the Black Hawk County Emergency Management Agency and the Iowa Department of Homeland Security and Emergency Management Division. At a minimum, this Plan will be evaluated for consistency with FEMA and IHSEMD requirements and formally updated every five (5) years. However, it is strongly encouraged the mitigation strategies for each community be reviewed and revised (if necessary) following disasters to determine if the recommended actions are still appropriate given the impacts of an event.

Phasing & Funding

Phasing is a process by which the completion of a project occurs over several budget cycles. It is recommended that this updated hazard mitigation plan be incorporated into the city's or county's annual Capital Improvements Program update procedure. For projects that require a local match commitment, the Council or Board of Supervisors should begin setting aside appropriate resources to meet their match liability. In addition, the projects defined herein may be prioritized for funding through the jurisdictions' budgeting process. Finally, the information presented in the Plan may be used as documentation for grant and/or loan programs, including the Hazard Mitigation Grant Program (HMGP).

As evident in the planning process, numerous mitigation actions were delayed, but carried over from previous plans, due to lack of funds to complete them in the past five years (see Appendix L). Therefore, each jurisdiction needs to identify, earmark, and seek funding opportunities for these actions in a timely manner.

Evaluation & Review Process

Ultimately, the Black Hawk County Emergency Management Coordinator and City Councils from all jurisdictions are responsible for the Hazard Mitigation Plan and implementation of the goals and actions contained herein, and they may seek assistance from other city or county staff, Councils of Governments, and consultants in order to accomplish mitigation projects. To assist in the review process, the Hazard Mitigation Committee (as mentioned in Section 1) may reconvene annually upon the request of the Black Hawk County Emergency Management Coordinator. As referenced in Section 1, said Committee will be comprised of representatives from each participating jurisdiction as well as from neighboring communities, schools, businesses, nonprofits, agencies, academia, and other interested parties and together they will be charged with reviewing and evaluating implementation progress of the mitigation plan. In addition, a public notice will be posted at all city and county government buildings, on jurisdictional websites, and in the local newspapers inviting the general public to participate as members of the Committee and/or to review the Plan and provide comments. Copies of the Plan and the Committee's review will be available online and at all government offices (city halls and courthouse). Following the Committee's completion of the annual review process, the findings of the review and recommended changes, if applicable, will be presented during a City Council and Board of Supervisors meeting, which is a public meeting to assist in the review, evaluation, and updating process. Evaluation forms can be found in Appendix N.

Appendix L details the progress each jurisdiction has made since the adoption of their previous plans. Since many activities fall under the normal duties of most city governments (e.g. funding and maintaining emergency services), not many activities were deleted.

Incorporation into Other Planning Mechanisms

Each of the jurisdictions with previous and current hazard mitigation plans has incorporated their plans into their comprehensive land use plans where applicable. These plans are old and pre-date the Hazard Mitigation Act of 2000. The land use plans state the jurisdiction will protect the general health, safety and welfare of the community, avoid development in the floodplain, and work with neighboring jurisdictions on planning issues of common interest. INRCOG develops transportation plans for the entire planning region and many jurisdictions include projects in the plan that will make the roadways safer and reduce accidents. The County Emergency Management Office works on disaster response and preparedness plans and regularly holds meetings with the jurisdictions.

Also, each jurisdiction will consider the findings from this document when updating other planning documents in the future. At least the following should be integrated into existing and new planning mechanisms: current mitigation strategies, goals and, future mitigation actions. Examples of planning documents that would benefit from information provided in this Plan include, but are not limited to: Comprehensive Land-Use Plans and Urban Renewal Plans, existing and future Zoning and Subdivision Ordinances as well as Building Codes should consider the goals, guidelines, and actions presented in this Plan.

CONTINUED PUBLIC PARTICIPATION

Black Hawk County is fortunate to have a proactive emergency management coordinator. Because of this, the cities typically do not initiate meetings with the public to discuss hazard mitigation issues; the Emergency Management Office conducts meetings, whereby the cities and public are invited to cover disaster response and recovery issues. The most common issues discussed include, tornado sirens, safe rooms, generators, storm spotter training and other training issues. The coordinator also ensures each jurisdiction regularly refers to their HMP; participate in any HMP development meetings; and to monitor the plan expiration dates. In addition, the coordinator sends each jurisdiction updates in the mail and email, regularly updates the county website.

In order to ensure that the public remains involved in the future implementation of this Plan, it shall remain on hand at all participating city halls and the county courthouse. This Plan shall be made available to any party who requests to see it. If a jurisdiction intends to make or discuss amendments to the plan, a meeting with corresponding agenda shall be developed and posted; a newspaper notice shall be submitted and if necessary a legal notice will be published; and the Hazard Mitigation Committee members will be notified of the meeting via email, telephone, or regular mail. Also, the amendments shall also be made available prior to a City Council or Board of Supervisors action so that the public may be made aware. Consistent with the Iowa Open Meeting and Records Laws (Iowa Code Chapters 21 and 22), said meetings will be open to the public and all records shall be available for inspection. The coordinator will continue to work with each participating jurisdiction in ensuring the plan goals are followed and that these jurisdictions are properly prepared for any disaster that may come.

APPENDIX A: CEDAR FALLS, UNI, AND CEDAR FALLS COMMUNITY SCHOOL DISTRICT

COMMUNITY PROFILE

Location

The City of Cedar Falls is located in the northwestern quadrant of Black Hawk County. The elevation of the community is approximately 880 feet above sea level. The Cedar River runs through the community from northwest to southeast. In addition to being located on the Cedar River, the City of Cedar Falls is located on U.S. Highway 20 and Iowa Highways 57 and 58. The city is bordered to the east by the City of Waterloo and George Wyth Memorial State Park, to the south by the City of Hudson, and to the north and west by the unincorporated area of Black Hawk County.

Natural Environment

The major river present in the City of Cedar Falls is the Cedar River. It is joined by Beaver Creek and Shell Rock River to the north. The Cedar River flows generally from northwest to southeast within the Cedar Falls city limits. The city is located in the Middle Cedar Watershed. The watershed is but a segment of the larger Cedar River Watershed, which eventually acts as a tributary to the Iowa River.

The climate, vegetation, and soils for the City of Cedar Falls are consistent with the rest of Black Hawk County. Due to its location in the central portion of North America, the climate is of continental character, i.e. hot, humid summers and cold winters. Average temperatures throughout the year vary widely from 14 degrees Fahrenheit in January to 73 degrees Fahrenheit in July. Extreme temperatures range from about -35 to 112 degrees Fahrenheit. The distribution of precipitation throughout the year is very favorable for agriculture, with an average of 72 percent of the annual total precipitation falling in the April to September crop season. Cedar Falls averages approximately 194 sunny days. Precipitation in the area averages around 33 inches of rain and 33 inches of snowfall annually.

Vegetation in the area is typically comprised of grass, pasture, row crop, trees, and shrubs. Today, much of the original tree cover has been eliminated for purposes of development and row crop farming. Nevertheless, some timber has been retained in parks and waterways, on the University of Northern Iowa campus, and in residential districts – particularly the older neighborhoods along the Cedar River.

The soils in the community are typically productive and able to support development. The primary soils classifications include Dinsdale, Klinger, Maxfield, Kenyon, Clyde, Floyd, Loamy Alluvial Land, Channeled, Saude, and Flagler soil series. It should be noted that much of Black Hawk County, including Cedar Falls, contains valuable agricultural soils that are capable of sustaining development.

Transportation

The city has defined four classifications of streets based on their traffic purpose or function. In addition, the unclassified streets are to be considered "local" streets. The following list provides descriptions and examples for each classification in descending order of their capacities:

- **Freeway/Expressway** – Includes U.S. Highways 218, 58, and 20.
- **Major Arterials** – U.S. Highway 57 (1st Street), Hudson Rd, 18th Street, University Ave, Greenhill Rd, Ridgeway Ave
- **Minor Arterials** – Center St, Lone Tree Rd, Lincoln St, 12th St, Waterloo Rd, Union Rd, 27th St, Main St, and Viking Rd
- **Collector Streets** – Leversee Rd, 4th St, 8th St, State St, Washington St, Franklin St, Seerley Blvd, Grand Blvd, Orchard Dr, Rownd St, and Chancellor Drive

In total the city has approximately 451 lane miles of streets throughout the community. The majority of this street system is hard surfaced. The City Public Works Department is charged with the maintenance of all city owned roadways, snow removal efforts, seal coating efforts, and maintenance of ditches adjacent to the roadways. According to the City's website, Cedar Falls has over 80 miles of recreational trails for non-motorized and non-equestrian activities such as biking, hiking, cross-country skiing, and skating. The City's trail system is connected to the wider metropolitan area trail network as well as the American Discovery Trail.

The City of Cedar Falls does not have a city-owned airport. Nevertheless, due to its relative location to the Waterloo Regional Airport, air service is in very close proximity. In fact, the City of Cedar Falls northeastern boundary directly abuts the Waterloo Regional Airport property line.

There are three railroad lines known to currently operate within Cedar Falls. Three different companies operate these lines: The Canadian National Railroad, Illinois Central Railroad, and Northern Railroad. According to information obtained from the Federal Railroad Administration, there are approximately 39 known railroad-crossing sites in the City of Cedar Falls. As of January 2005, there have been a total of 72 railroad related accidents/incidents in Black Hawk County; this includes 17 train accidents, 31 highway-rail incidents, and 24 other accidents/incidents. Community specific data were not available.

The major water body in the City of Cedar Falls is the Cedar River. While there is some limited recreational boating that does regularly occur at several points along the Cedar River, the river is not conducive to any commercial or industrial traffic.

Community Services

The water utility in the City of Cedar Falls is provided and operated by Cedar Falls Utilities (CFU). The supply of water to the community is one of four services provided to the community by CFU, the other three being electric, gas, and communications services. According to the CFU website (ww.cfunet.net) the City of Cedar Falls attains its water from a large underground aquifer known as the Cedar Valley Aquifer. The quality of the water is reported to be very high; therefore, chlorine and fluoride are the only two treatments required before public use.

The City of Cedar Falls owns and operates a municipal water reclamation system. The vast majority of residential, commercial, and industrial developments are connected to this system. There are approximately 11,000 accounts that are billed for service. It is estimated that there are also in excess of 300 private septic tank systems located throughout the City of Cedar Falls.

TABLE A1: UTILITY PROVIDERS – CEDAR FALLS

Utility	Provider
Electric	Cedar Falls Utilities
Gas	Cedar Falls Utilities
Water/Sewer	Cedar Falls Utilities (water), City (sewer)
Telephone/Internet	Cedar Falls Utilities, Century Link, Mediacom
Cable TV	Cedar Falls Utilities, Mediacom
Sanitation	City

The Cedar Falls Water Reclamation Facility handles an average daily load of about 4.5 million gallons. The design capacity of the facility is intended to handle up to 7.68 million gallons per day in dry conditions and 8.8 million gallons per day during wet conditions. For short times, known as peaks, the facility is able to handle flows at a rate of 21.6 million gallons per day.

There have been substantial improvements to the treatment facility over the last thirty years. In 1985 the city spent $5.5 million on two settling tanks, a five-million-gallon detention basin, a new operations building, and parking lot. Enhancements to some existing structures were added in the mid-nineties. In 1999, a third stage filter, referred to as a bio-tower, was added to the system to remove ammonia from the wastewater. That particular project was funded at a cost of nearly $2 million. Additional, less expensive enhancements were added in the decade following. Following the 2008 flood, $7.2 million in improvements were made to the 17th Street lift station in an effort to move water away from homes, businesses and other public areas during times of flooding. The Park Drive lift station was updated in 2014 to keep up with high water inflows in the Lookout Park area for a cost of $1.1 million. In 2013, an ultraviolet disinfection system, biosolids handling facility, and other improvements to enhance performance were added at a cost of approximately $19 million. This treatment facility is one of the most valuable pieces of critical infrastructure in the community. It is estimated that its replacement value would exceed $50 million.

After completing a needs assessment and response time study in 2015, the City constructed a new Public Safety building. The building is located at 4600 South Main Street and houses both fire and police service operations. The building features advanced safety technology and offers improved training space. The co-located police/fire services also enhance coordination and response times.

Between 1998 and 2000, the city cooperated with the U.S. Army Corps of Engineers in the construction of a flood control levee under the Corps of Engineers Continuing Authorities Program. The levee is approximately one mile long and protects 63 acres of the city. Prior to the project, no structural flood protection existed between the river and the downtown business district or municipal water treatment plant. The City completed additional levee improvements in 2018, adding another two-feet to the existing levee. This action is further described in the Current Mitigation Actions section of this community profile.

Demographics

TABLE A2: CITY OF CEDAR FALLS DEMOGRAPHICS					
General Population, 2013-2017 ACS	Total Population	41,167	***Economic Characteristics, 2013-2017 ACS 5-Year Estimates***	Population In Labor Force	24,542
	Total Males	19,624		Population in Civilian Labor Force	24,530
	Total Females	21,543		Persons Employed	23,521
	Median Age	26.8		Persons Unemployed	1,009
	At-Risk Population, under 18	7,384		Persons in Armed Forces	12
	At-Risk Population, 65 and over	5,401		Mean Travel Time to Work in Minutes, 16 and over	13.7
	One Race: White	37,950		Persons Employed in Management, Business, Science, and Arts Occupations	9,012
	One Race: Black or African American	1,140		Persons Employed in Service Occupations	4,752
	One Race: American Indian and Alaska Native	119		Persons Employed in Sales and Office Occupations	6,378
	One Race: Asian	1,226		Persons Employed in Natural Resources, Construction, and Maintenance Occupations	997
	One Race: Native Hawaiian and Other Pacific Islander	46		Persons Employed in Production, Transportation, and Material Moving Occupations	2,382
	Two or More Races	479		Median Household Income	58,855
	Hispanic or Latino (of any race)	943		Median Family Income	85,008
				Per Capita Personal Income	30,532
Households by Type, 2010 Census	Total Population in Households	34,686		Families below Poverty Level	10.5%
	Total Population in Group Quarters	4,297		All People below Poverty Level	14.6%
	Total Households	14,608			
	Total Family Households	8,091			
	Total Family Households with own children under 18	3,452	***Social Characteristics, 2013-2017 ACS 5-Year Estimates***		
	Male Householder, no wife present, with own children under 18	197		Total School Enrollment, 3 and over	16,343
	Female Householder, no husband present, with own children under 18	670		Population Enrolled in Nursery School, Preschool	490
	Households with individuals 65 and over	4,092		Population Enrolled in Kindergarten and Elementary School, grades K-8	3,373
	Householder living alone	3,619		Population Enrolled in High School, grades 9-12	1,511
	Average household size	3,289		Population Enrolled in College or Graduate School	10,969
	Average family size / Average Household Size	2.37 / 2.88		Total Population, 25 and over	21,820
				Persons with Less than 9th Grade Education	369
Selected Housing Char, 2013-2017 ACS	Total Housing Units	16,035		Persons with 9th to 12th Grade Education, No Diploma	571
	Occupied Housing Units	14,608		Persons with High School Degree or Equivalency	4,646
	Vacant Housing Units	869		Persons with Some College Education, No Degree	4,036
	Owner-Occupied Housing Units	9,361		Persons with Associate Degree	2,404
	Population in Owner-Occupied Housing Units	23,142		Persons with Bachelor's Degree	5,794
	Rental-Occupied Housing Units	5,247		Persons with Graduate or Higher Degree	4,000
	Population in Rental-Occupied Housing Units	11,544		Total Civilian Noninstitutionalized Population with a Disability	3,452
	Mobile Homes	614			
	3+ Units in Structure	4,143			

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Cedar Falls along with the University of Northern Iowa (UNI) and the Cedar Falls Community School District evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. The vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community, including the school district and the university. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas human-made or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions including: Historical Occurrence, Probability, Magnitude/Severity, Warning Time, and Duration. Due to recent disasters and events that have impacted the planning area, Cedar Falls determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table A3 identifies the analysis scores for the City of Cedar Falls, UNI, and the Cedar Falls Community School District. As seen in Table A3, the top three hazards for Cedar Falls are Severe Winter Storms, River Flooding and Thunderstorm/Lightning/Hail. The Animal/Plant/Crop disease hazard was scored at a higher risk as compared to prior years, due to the presence of the emerald ash borer (EAB). The EAB is considered a caused serious damage to most ash trees in the city. The City is removing all ash trees in public areas and has notified private property owners of hazardous trees that must be removed. In 2017, it was estimated that the cities of Cedar Falls and Waterloo had lost more than 3,500 trees due to the EAB, with another 4,100 targeted for removal.

The tables below identify the scoring criteria utilized by the Committee to evaluate each hazard. Further descriptions are provided in Section 3.

PROBABILITY		
Score	**Description**	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2	Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3	Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33% or the event is likely to occur.
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.

MAGNITUDE / SEVERITY		
Rating	**Description**	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least two weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

DURATION	
Score	**Description**
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

TABLE A3: HAZARD RISK ASSESSMENT FOR CEDAR FALLS					
Hazard	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Total**
Severe Winter Storm	4	1	2	3	2.7
River Flooding	3	2	2	4	2.65
Thunderstorm/Lighting/Hail	3	1	4	3	2.55
Flash Flood	4	1	2	1	2.5
Transportation Incident	3	1	4	1	2.35
Animal/Plant/Crop Disease	3	1	1	4	2.2
Tornado/Windstorm	2	1	4	2	2
Infrastructure Failure	2	1	4	2	2
Extreme Heat	2	1	2	3	1.8
Dam / Levee Failure	1	1	4	4	1.75
Radiological Incident	1	1	4	4	1.75
Terrorism	1	1	4	4	1.75
Sinkholes	1	1	4	4	1.75
Expansive Soils	1	1	3	4	1.6
Grass/Wild Fire	1	1	4	2	1.55
Earthquake	1	1	4	2	1.55
Landslide	1	1	4	1	1.45
Drought	1	1	1	4	1.3
Human Disease	1	1	1	4	1.3
HAZMAT Incident	0	0	0	0	0

Vulnerability – Identifying Assets (Critical Facilities) & Social Asset Populations

This section describes the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the community's historical occurrences of tornados this hazard was added to the assessment. The following discussion only considers the assets in the community of Cedar Falls.

TABLE A4: SHELTERS IN CEDAR FALLS

The UNI-Dome	Cedar Falls High School
Cedar Falls Recreation Center	Holmes Junior High School
Nazareth Lutheran Church	Peet Junior High School
St. John Lutheran Church	Cedar Falls City Hall

Source: Community

Critical Facilities

Identifying the location of critical facilities is important in order to assess their vulnerability to hazards, since these facilities are important to the community's operations, quality of life, and economic sector. These include but are not limited to schools, hospitals, libraries, police and fire stations, water towers, sirens, and lift stations. *Map 52* shows the locations of these critical facilities throughout Cedar Falls.

Table A4 shows the locations identified as shelters in Cedar Falls. While these locations have been identified for use if deemed necessary, there may also be hazard events which require residents to shelter themselves "in place". Therefore, any location could potentially become a makeshift shelter for purposes of disaster response.

In 2013, the Cedar Falls School District constructed a safe room at the Robinson-Dresser Sports Complex which has a capacity of 260 persons. The cost of the project was split between FEMA, the state Homeland Security Emergency Management Division, and the school district, with FEMA paying the largest portion. In addition to the school district, the Black Hawk County Conservation Board has constructed two safe rooms in the county: one at Hickory Hills Park in 2012, and the other at McFarlane Park in 2013.

Homes In Hazardous Areas

The City of Cedar Falls has approximately 4,783 acres of identified floodplain within its city limits. To date, the city has facilitated the purchase and removal of structures from approximately 344 properties at a cost of $21 million. Twelve commercial properties were included; the remaining properties were residences. Over 95% of the costs was covered by state and federal governments. The total number of insurable structures remaining in the floodplain is approximately 412.

A summary of floodplain parcels located within the City appears on Table A5:

TABLE A5: FLOODPLAIN PARCELS WITHIN THE CITY							
	# of Parcels	Total Land Value	Total Building Value	Total Dwelling Value	Multi-Residential Land	Total Value	Percent of City Damaged
City Floodway Property Values	792	$32,944,498	$92,433,792	$49,528,908	$1,575,822	$176,483,020	5.24%
City 1% Annual Chance Floodplain Property Values	1224	$33,918,533	$35,428,840	$97,918,890	$849,187	$168,115,450	4.99%
City 0.2% Annual Chance Floodplain Property Values	258	$7,254,250	$6,751,670	$18,787,660	$0	$32,793,580	0.97%
Source: Flood overlay shows the 2011 floodplain designations in Black Hawk County, Iowa. The digital flood layer was obtained from FEMA's current Digital Flood Insurance Rate Map. The incorporated boundaries were current as of 5/5/19.							

In addition, persons living in mobile homes (also known as manufactured housing) may also be at risk from tornadoes or high winds. According to the 2013-2017 American Community Survey 5-Year Estimates, there are an estimated 614 mobile homes in Cedar Falls. Using the average persons per households of 2.37, there are approximately 1,455 persons living in mobile homes in Cedar Falls.

Finally, persons living in some multi-family units may also be at risk due to the lack of a proper tornado shelter. According to the 2013-2017 American Community Survey 5-Year Estimates, there were an estimated 4143 housing units in buildings with at least three units. Therefore, there are approximately 9,819 persons living in multi-family housing units at risk during a tornado event.

Vulnerability – Identifying Social Asset Populations

The social vulnerability assessment also identified how the hazards affect the population of Cedar Falls, and it is assumed that the identified populations are more likely to require assistance during times of disaster and are therefore, generally speaking, more at-risk than the remaining population. The at-risk population must be identified and targeted in successful mitigation efforts.

According to 2013-2017 ACS data, 13.1% of Cedar Falls residents, or approximately 5,401 persons, are 65 years or older. Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young people often are not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. 17.9% of Cedar Falls residents, or 7,384 persons, are under the age of 18 (2013-2017 ACS).

As mentioned previously, persons living in mobile homes and persons living in multi-family housing units are also considered at risk. There are approximately 1,455 persons living in mobile homes and 9,819 persons living in multi-family housing units in Cedar Falls. This represents 128 fewer persons living in mobile homes, as compared to the prior HMP.

Map 29 and *Map 30* illustrate the impact of a hypothetical tornado event in Cedar Falls. According to data from the Black Hawk County Assessor's Office, there are approximately 14,886 parcels in the community with a total value of $3,365,865,060. Table A5 illustrates the degree of impact that hypothetical tornado scenarios of various strengths would have on Cedar Falls.

TABLE A5 : CEDAR FALLS TORNADO SCENARIO

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	374	$19,281,202	$20,811,191	$48,686,899	$146,758	$69,644,848	$17,411,212	2.07%
EF1	150 Meters	492 Feet	744	$34,914,758	$31,969,904	$96,457,786	$224,382	$128,652,072	$32,163,018	3.82%
EF2	250 Meters	820 Feet	1116	$51,530,798	$49,101,914	$143,620,856	$788,722	$193,511,492	$96,755,746	5.75%
EF3	500 Meters	1640 Feet	1988	$85,104,358	$73,505,164	$257,659,726	$2,414,072	$333,578,962	$166,789,481	9.91%
EF4	900 Meters	2953 Feet	3362	$135,408,358	$124,794,679	$446,242,781	$4,125,392	$575,162,852	$575,162,852	17.09%
EF5	1100 Meters	3609 Feet	3995	$155,669,405	$136,610,161	$526,841,619	$4,637,095	$668,088,875	$668,088,875	19.85%

Parcel value information is current as of 09/25/2018. The source is the Black Hawk County MIS Department.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning as it provides measurable data that can be used to form some type of estimate of the potential losses a community would experience from a disaster event. Table A6 lists all of the structure valuations for the City of Cedar Falls. Since 100% of the city is at risk of some kind of hazard event, the entire city is considered to be in the hazard area. This data was used in the Vulnerability discussion in each of the Hazard Profiles in Section 3.

This information was made available from the Black Hawk County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE A6: ASSET INVENTORY – BUILDING / DWELLING VALUES IN CEDAR FALLS

Class	Land Value	Building Value	Dwelling Value	MR Land	Building Count
Agricultural	6,944,450	402,650	8,544,400	0	50
Cities	28,321,430	34,075,597	346,133	35,090	59
Commercial/Dual Class	127,324,497	505,020,012	10,040,538	1,214,643	795
County	145,825	201,180	206,210	18,945	7
Federal	310,460	881,360	0	0	1
Industrial	6,838,490	53,970,050	0	0	53
Multi-residential	0	0	86,508,370	13,596,580	207
Religious/Non-Profit	19,034,983	101,361,707	52,746,063	864,147	130
Residential	362,294,150	0	2,182,199,640	0	13,237
Schools	5,205,160	36,136,220	129,750	0	26
State	6,070,312	1,958,622	191,068	2,178	6
UNI	9,538,950	53,294,560	1,173,480	0	84
Utilities	1,773,560	1,014,970	0	0	9
Total*	**$573,802,267**	**$788,316,928**	**$2,342,085,652**	**$15,731,583**	**14,664**

Source: Black Hawk County Assessor 2019 Values

*- Please note that the assessed value for tax-exempt structures may not adequately reflect their fair market rate value, which may be significantly higher than the assessed value. Accordingly, the values listed above should not be regarded as accurate for any purpose.

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigate future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced multiple losses in a 10-year period in which each loss is $1,000 or more. According to available FEMA data (as of 5/31/09), the City of Cedar Falls participates in the National Flood Insurance Program and has 62 repetitive loss properties. Table 45 in Section 3 lists data from each city regarding the National Flood Insurance Program.

Community	CID #	# of NFIP Policies	NFIP Insurance in Force	Total Paid Losses	Total Payments Made	Repetitive Loss Payment	Total RL Properties 2019	Total RL Properties 2013	Total RL Properties 2009
City of Cedar Falls	190017	280	60,534,000	766	17,600.002	$5,476,270	62	28	49

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The updated hazard mitigation plan goals for the City of Cedar Falls are listed below.

1. **PROTECT**: Protect the health and safety of residents, visitors, staff and emergency personnel during and after hazard events.
2. **PREVENT**: Prevent avoidable disasters.
3. **MINIMIZE**: Minimize losses to existing and future structures in hazard areas, especially critical facilities.
4. **MAINTAIN**: Maintain local services and infrastructure in order to reduce community, economic and environmental disruption during and after hazard events.

5. **RESTORE**: Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
6. **EDUCATE**: Educate the public about hazards and resources available.
7. **ACCOUNTABILITY**: Use public funds in an efficient, cost effective and fair manner.
8. **COLLABORATE**: Incorporate each jurisdiction into the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan.

Current Mitigation Actions

Prevention Mitigation Actions

The City of Cedar Falls has and enforces a Floodplain Ordinance. Staff of the Community Development Department for the City of Cedar Falls enforces the ordinance. In accordance with NFIP guidelines, the ordinance does not allow for new construction within the floodway without approval from the Department of Natural Resources and the Cedar Falls Board of Adjustment. In addition, it requires those structures within the floodway fringe to be adequately anchored, use construction methods and practices that will minimize flood damage, and use construction materials and utility equipment that are resistant to flood damage. The City's floodplain ordinance was strengthened in 2011 to impose restrictions on building and development in the 100-year and 500-year floodplains. This ordinance is one of the most restrictive in the State. Cedar Falls has a CRS of 5.

The City of Cedar Falls also has a Comprehensive Land Use Plan, a Zoning Ordinance, a Subdivision Ordinance and Stormwater Ordinance. In addition, the City of Cedar Falls has adopted and enforces the following building codes: the International Building Code, the National Electrical Code, the Uniform Plumbing Code, the Uniform Mechanical Code, the Iowa Energy Code - Cedar Falls Utilities, ADA Standards, and the International Fire Code.

Property Protection Mitigation Actions

As a result of flooding from the Cedar River and its tributaries during the floods of 1993, 1999, 2008 and 2016, the city has cooperated with the Federal Emergency Management Agency, Iowa Emergency Management Division, the Iowa Economic Development Agency, and local property owners in order to identify, purchase, and remove people and structures from identified flood hazard areas. To date, the city has facilitated the purchase and removal of structures from approximately 344 properties at a total cost of nearly $21 million. Twelve commercial properties were included; the remaining properties were residences. Over 95 percent of this cost was covered by the state and federal governments. Currently, the City of Cedar Falls is the only jurisdiction in the county participating in the Community Rating System (CRS). The CRS recognizes and encourages floodplain management activities that exceed the minimum NFIP standards.

The City cooperated with the Army Corps of Engineers in the design, construction, and funding for an initial flood control levee that was completed in 1999. The levee protects the downtown business district, surrounding residential areas, and the City's wastewater treatment plant to the approximate level of a 250-year flood event. The levee was nearly overtopped during the 2008 flood. After the flood of 2008, increasing the flood protection level was a top City priority. From

late 2011 to 2014, the city worked closely with a design consultant and the U.S. Army Corps of Engineers to complete a design and obtain permits from the Corps. The final design to increase the levee protection was determined to have a "no rise" condition for properties upstream, downstream or across the river. Approval was issued on June 28, 2017 to increase the levee height to 104.9'. The levee project was completed in 2019. Local funding and funding through Iowa's Flood Mitigation Program supported the effort. In addition to these major projects, the city has historically made efforts to alleviate the risk of flooding by constructing new storm sewers, improving old or undersized storm sewers, constructing water detention basins, and requiring new large development in the community to mitigate storm water runoff with both quantity and quality controls.

The Price Laboratory School, which was situated along the Dry Run Creek floodplain, was demolished in 2013. The University of Northern Iowa has not removed any of its structures for the purposes of flood hazard mitigation.

Prior to the 2008 flood, the City had purchased 165 properties in the 100-year floodplain to be held in publicly owned greenspace. Those properties were purchased with a combination of Federal, State, and local funds. Following the 2008 flood, the City has removed 181 structures from the floodplain. These properties are now held as greenspace. In 2016, more buyouts occurred with an additional thirteen properties acquired. The City intends on continuing property acquisitions in the floodplain as property owners become interested and funding becomes available.

In August 1984, a Flood Insurance Study conducted by FEMA pertaining to the flood hazards in the City of Cedar Falls became official. The resulting Flood Insurance Rate Map (FIRM) became effective on February 1, 1985. In addition to the Flood Insurance Study, there have been a number of other documents published by the U.S. Army Corps of Engineers which studied the Cedar River and/or other tributaries in Black Hawk County which pose potential flood risks to the City of Cedar Falls. In addition to these completed studies, Black & Veatch Special Project Corporation, Kansas City Division and the U.S. Army Corps of Engineers, Rock Island District have completed studies in Black Hawk County for the purposes of updating existing Flood Hazard Boundary Maps and FIRMs throughout the county. Substantial changes resulted from the completion of the downtown levee project, the removal of numerous structures from the flood hazard area, and other lesser mitigation project. New floodplain maps were approved on July 18, 2011 and have been adopted by the city. Revised FIRMS will be available in late 2020.

The University of Northern Iowa has been designated as a qualifying MS4, which requires the University to comply with Phase II storm water regulations. UNI has storm sewer facilities that serve the buildings and property of the University for storm water drainage and runoff management. The stormwater management team meets annually to discuss up-to-date projects, e.g. the construction of parking lots, and how they can be implemented with storm water as a consideration, e.g. permeable surfaces.

UNI also has a designated facilities management department, led by the assistant vice president of facilities planning / campus architect. The facilities planning department is situated under the Administration and Financial Services department, which is situated under the President's Office.

From FY 2019 to FY 2023, the Board of Regents of the State of Iowa is scheduled to allocate funds in its Five-Year State-Funded Capital Plan for Fire and Environmental Safety, Deferred Maintenance, Campus Security, and Regulatory Compliance each year. The amount programmed for this category is $100 million

over the five years. While these values represent the entire State university system, including University of Iowa and Iowa State University which are outside Black Hawk County, some of these funds will be allocated to UNI as well.

The University of Northern Iowa has its own power plant which provides energy to the entire campus community. All of the power supplied by the power plant is transmitted by underground systems. This eliminates the hazard of property damage incurred by downed power lines during severe weather events. The University also cooperates with Cedar Falls Utilities, and can help supply the City's power grid as needed.

UNI has a Red Cross shelter on campus. During the 2008 tornado event in the City of Parkersburg in neighboring Butler County, as well as the flood events that occurred throughout the county the same year, UNI became a central point for contact for FEMA and the Red Cross for assisting local residents affected by these disasters.

Public Education and Awareness Mitigation Actions

Residents of the City of Cedar Falls could previously opt to receive emergency notifications in the event of an impending hazard event. This service was available through CodeRED until July 2012, and then through Everbridge Alerts until May 2014. Alert Iowa now serves as the statewide mass notification and emergency messaging system and is operated by Iowa Homeland Security and Emergency Management. Radio, television, cellular telephones, landline telephones, newspapers, warning sirens, NOAA Radio Service and the internet are available to the public at large. The City has developed a website in order to keep its citizens, and other interested parties, aware of local and government affairs. The website address is www.cedarfalls.com.

The University of Northern Iowa has several public education and awareness resources available on the UNI website. These include: maps of each building on campus showing fire evacuation routes and shelter locations (http://www.vpaf.uni.edu/ehso/evac-diagrams.shtml), shelter locations and instructions for responding to high wind and tornado events (http://www.vpaf.uni.edu/ehso/shelters.shtml), the UNI Hazard Communication Program which outlines procedures for handling hazardous materials (http://www.vpaf.uni.edu/ehso/documents/Hazard_Communications.pdf), the Radiation Safety Manual with instructions for the use and handling of radioactive materials (http://www.vpaf.uni.edu/ehso/documents/Radiation_Safety_Manual.pdf), forms for departments to complete a Continuity of Operations Plan to describe how each department will operate during an influenza pandemic or other emergency (http://www.vpaf.uni.edu/pubsaf/documents/coop.doc), and the Community Response Checklist in the event of an active shooting, i.e. terrorism, event (http://www.vpaf.uni.edu/pubsaf/documents/ActiveShooterChecklist.pdf). All of these resources are available to faculty, staff, and students at UNI, and help provide the education and resources necessary to minimize and mitigate potential harm as a result of such hazards. In addition, on March 26, 2015, UNI along with FEMA held a Ready Campus event aimed to get students thinking about disasters before they happen and "create a culture of preparedness" early on in their lives. UNI is the first Iowa college campus to hold such an event.

The Cedar Falls Community School District has a Safety Committee which researches options for best practices in emergency situations and has recommended adopting a plan that gives teachers and students options to increase survivability. The School District conducts regular drills to practice how to stay safe during a fire, tornado, evacuation, or other hazard event. Students participate in discussions and drills designed to practice options in a dangerous intruder, i.e. terrorism,

situation. A parent guide and a crisis response brochure are both available on the School District's website. School bus safety is also taught to students at the District level to help mitigate transportation incident hazard events such as a rollover. In addition, Iowa State law requires every student have a completed immunization record on file, and all records in the Cedar Falls School District are audited by the Black Hawk County Health Department to ensure that all school age children meet specific immunization requirements in order to mitigate the negative effects of a human disease hazard event.

Emergency Services Mitigation Actions

Black Hawk County Emergency Management Agency

The Black Hawk County Emergency Management Agency is governed by a board of eleven commissioners comprised of the Mayors from each incorporated jurisdiction in the County or their designated delegate, a representative of the Black Hawk County Sheriff's Department, and the Chairperson of the Black Hawk County Board of Supervisors. The Emergency Management Agency works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. Furthermore, the agency is responsible for the monthly testing of all outdoor warning sirens in Black Hawk County.

Public Safety Department

Fire Operations: Cedar Falls Fire Operations provides fire and rescue services to 29.7 square miles inside the city limits. Additionally, Fire Operations provides protection services for approximately 36 square miles for the Union and Washington Townships. Fire protection services are also provided for the University of Northern Iowa, which as a student population of approximately 11,000 students. The total population served is over 42,000. The main department, is housed at the new Public Safety building, located at 4600 South Main Street. The station formerly serving as the main station, located at 18th and Main Street, will now serve as a substation. The following is a general list of available equipment: seven firefighting apparatus vehicles, one rescue unit, three rescue boats, two ice rescue sleds, John Deere gator.

Fire Operations also provides various fire prevention and educational services to the community throughout the year, such as commercial and housing inspections, hazardous material awareness, facility preplanning, and many fire safety education programs. Fire Operations personnel are trained to function safely and effectively in many specialized areas including fire suppression and rescue, confined space rescue, emergency medical, hazardous material response, and disaster situations. The City of Cedar Falls holds a Class-3 ISO rating.

Police Operations: Police protection is provided by the Cedar Falls Police Operations, the Black Hawk County Sheriff's Department, and the Iowa State Patrol. Currently, there are a total of 52 Public Safety Officers, 7 Police Officers, 12 Reserve Police Officers and 8 Community Service Officers. The Police Operations has three main divisions which include patrol, investigations, and training/support services. The division is assigned the following functions:

- The protection of persons and property
- The prevention and deterrence of criminal activity
- The maintenance of public order
- The detection of criminal activity
- The apprehension of offenders
- The enforcement of all state and local laws
- The timely and effective response to unusual occurrences
- The recovery and return of property
- The education of the public
- Providing other services to the citizens of the community that are deemed to be proper functions of the Police

The approach of Police Operations is intended to be proactive rather than reactive, with police managers anticipating events through planning, using personnel and resources effectively, and delivering a range of police services to the community.

Medical Services

Cedar Falls is served primarily by Cedar Falls Medical Center, operated by Mercy One (formerly Sartori), which is located in Cedar Falls. The Medical Center is a a 100-bed, full-service hospital providing acute, subacute, and outpatient care to the people living in and near the community of Cedar Falls. Hospital services include 24-hour emergency room and ambulance transportation, intensive care, general medical care, surgery, ambulatory care, and skilled nursing. Support services include X-ray, mammography, ultrasound, laboratory, pharmacy, respiratory therapy, physical therapy, spiritual care, social services, and nutrition education. In addition to the standard hospital service, Mercy One also provides ambulance service to the community. The ambulance service provided is classified as a paramedic service. The hospital maintains two fully staffed ambulance crews.

There are two other hospitals available in the larger metropolitan area, Unity Point Hospital and Mercy One Medical Center, are both located in Waterloo. In addition to the three major hospitals in the metropolitan area, there are numerous clinics in the area that provide a variety of medical specialties and general family practice.

The Cedar Falls School District has on staff five nurses: one for the four preschools in the District, one for Southdale, Hansen, and Holmes Schools; one for Peet, Cedar Heights, and Orchard Hill Schools, one for North Cedar, Lincoln, and the Senior High School; and one registered nurse who serves as the program manager. In addition, each school has its own Health Assistant on staff.

UNI Department of Public Safety

The UNI Department of Public Safety has two divisions, Police and Parking Services. The department has 18 sworn police officers. Officers are on duty 24-hours a day seven days a week. These officers are supplemented by a Student Patrol comprised of students who assist in providing various non-law enforcement services to the campus community. The Department provides preventative education to students, faculty, and staff including ALICE training; works with the Governor's traffic safety bureau; has a bicycle patrol and foot patrol; assists with athletic events on campus; and works closely with other area law enforcement agencies.

Hazardous Materials

A regional Hazard Materials Team is on hand to assist the community with a Hazard Materials event or catastrophe. The Team is located within a short distance and is operated by Waterloo Fire Rescue Department. The city is also a partner in the Tri-County Drug Task Force. The group works with the City in the event of the discovery of a methamphetamine lab within the community. In addition, the City of Cedar Falls has and enforces a mechanical code that requires mechanical inspectors to work with Cedar Falls Utilities for purposes of gas detection.

Snow Removal

Snow removal and ice prevention techniques are practiced by city and state employees on the corresponding local and state roadways within city limits. In addition to the clearing of over 400 lane miles of roads, sidewalks are required by ordinance to be cleared of snow and ice within a reasonable amount of time. The clearing of sidewalks is considered the responsibility of the property owner. The reasonable length of time is considered to be 24 hours after the ending of a snowfall. If this is not done, the Community Development Department may have the sidewalk(s) cleaned and the property owner or resident billed for this service.

Warning Systems

The City of Cedar Falls is reported to have 13 outdoor warning sirens strategically located throughout the community as of 2020. Eleven of the sirens within City limits are maintained by the Cedar Falls Public Works Department. All sirens are designed to function in the event of a power outage. The Cedar Falls Public Safety Department has the ability to communicate the need to activate the warning sirens via Central Dispatch and/or the Emergency Management Agency.

UNI has its own alert system, UNI Alert, to notify the campus community of emergencies and threats to physical safety in emergency situations. Notification is by cellphone, landline phone, e-mail, and text message. The University also has an outdoor warning system and an indoor warning system in residence halls. The UNI Department of Public Safety works with University Relations to communicate with the campus community and outside entities regarding hazard events.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the comprehensive efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit community residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

TABLE A7: STAPLEE ELEMENTS

S – Social	• Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the populations, • Actions do not cause relocation of lower income people, • Actions are compatible with the community's social and cultural values.
T- Technical	• Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	• Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	• Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	• It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	• Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E - Environmental	• Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, • Are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table A7) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each mitigation activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each of the proposed mitigation activity will occur. For instance, if the activity happens regularly (either daily, weekly, monthly, or annually) it was identified as On-Going activity; if it will occur within the next 1-5 years it was identified as Short-Term; if the activity would take 5-10 years to occur it was labeled as Mid-Term; and all activities that would take 10 or more years to occur were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The city will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate : Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High : Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, identified the responsible party or parties for each activity, and finally related each activity to at least one of the Hazard Mitigation Plan Goals listed above. Table A8 below is the City of Cedar Falls' Implementation Strategy.

TABLE A8 : FUTURE HAZARD MITIGATION ACTIVITIES - CEDAR FALLS						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation * denotes Primary)**	**Timeline**	**Est. Cost**	**Goal(s)**
H	Educate the public.	All	City of Cedar Falls*, Public Safety, Community Development, Schools, UNI, American Red Cross, CFU, Black Hawk County EMA.	Active	Minimal to High	Prevent, Protect, Restore
H	Maintain and improve outdoor warning siren system.	Tornado/Windstorm, Infrastructure Failure	Public Works*, Black Hawk County EMA, Black Hawk County	Active (long term)	Low	Protect, Prevent, Maintain
L	Construct public tornado shelters-safe rooms at vulnerable points in the community.	Tornado/Windstorm	Depends on where shelter is located; could include private property owners, Public Works, and/or Black Hawk County	Active, as funding becomes available (long term)	Low to High	Protect, Minimize
H	Encourage residents to sign up for emergency alerts services on their mobile phones.	Tornado/Windstorm, Infrastructure Failure	Public Safety, UNI	Pending, statewide emergency alerts service expected to be implemented by 2015 (short term)	Medium	Educate
H	Maintain tree-trimming & removal policies to reduce the likelihood of falling branches.	Tornado/Windstorm, Winter Storm, Animal/Plant/Crop	Public Works, CFU, private property owners	Active	Low to Moderate	Protect, Prevent, Maintain, Minimize
M	Bury power and communications lines, as is possible.	Tornado/Windstorm, Thunderstorm/Lightning, Winter Storm	CFU*, UNI, CenturyLink, Mediacom	Active	High	Prevent
M	Maintain a list of potential storm sewer improvement projects to mitigate potential flash flooding associated with a heavy rain event.	Thunderstorm/Lightning, Flash Flood	Public Works	Active	Minimal	Prevent, Protect, Maintain

TABLE A8 : FUTURE HAZARD MITIGATION ACTIVITIES - CEDAR FALLS						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation * denotes Primary)**	**Timeline**	**Est. Cost**	**Goal(s)**
M	Protect critical electronic equipment with surge protection devices, data replication services, and battery backups to allow for controlled shut down during a prolonged power outage.	Thunderstorm/Lightning	Finance & Business Operations	Active	Minimal	Protect, Maintain
L	Purchase and maintain existing backup generators, as is necessary.	Thunderstorm/Lightning, Winter Storm	Public Works	Active (short term)	Low to Moderate	Protect, Minimize, Restore
M	Evaluate designated snow routes on a regular basis to ensure effectiveness.	Winter Storm	Public Works	Active (short term)	Minimal	Protect, Prevent, Minimize
M	Continue to support (equipment, finances, personnel, etc.) the Public Works Department in order to ensure proper street clearing in the event of a winter storm.	Winter Storm	Public Works	Active (short term)	Moderate	Maintain.
L	Maintain a list of sites that could be used as public cooling shelters during extreme heat events.	Extreme Heat	American Red Cross, Library	As necessary (short term)	Minimal	Protect, Maintain
M	Construct detention basins in areas deemed beneficial to the community.	Flash Flood	Community Development, Public Works	Active, potential locations are identified as new development occurs (short term)	TBD	Protect, Prevent, Minimize
M	Clear brush and debris from creeks in order to ensure proper flow of streams.	Flash Flood	Public Works	Active, this is an annual maintenance project (short term)	Minimal	Protect, Prevent, Minimize
M	Identify areas in the community, along stream banks, that need some type of bank stabilization.	Flash Flood, Landslides	Public Works, Private property owners	Active (short term)	Minimal	Protect, Prevent, Minimize, Maintain

TABLE A8 : FUTURE HAZARD MITIGATION ACTIVITIES - CEDAR FALLS						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation * denotes Primary)**	**Timeline**	**Est. Cost**	**Goal(s)**
L	Require the installation of back flow valves in structures in order to reduce the risk of sewer backup damage.	Flash Flood	Community Development, Private property owners	Ongoing / code requirement.	Minimal	Protect, Prevent, Minimize, Maintain
M	Consider areas inside and outside of the city limits where buffer strips can be placed in order to control release of runoff and capture debris.	Flash Flood	Community Development, NRCS, DNR	Short Term	Minimal	Protect, Prevent, Minimize, Maintain
L	Maintain relationships with private businesses that have equipment that can be used to help protect the city from a flood event.	Flash Flood, River Flood	Community Development, Public Works	Active (short term)	Minimal	Protect, Restore, Collaborate
M	Continue slip lining to reduce inflow and infiltration into the sanitary sewer system.	Flash Flood, River Flood	Public Works	Active (short term)	High	Protect, Prevent, Maintain
H	Continue to identify, purchase, and remove structures and populations in danger of being flooded; in addition to maintaining a list of properties that they deem as potential buyout candidates.	River Flood	Community Development, Private Property Owners	Active	High	Protect, Prevent, Minimize, Maintain, Educate
L	Elevate or relocate public structures in the floodplain, as needed.	River Flood	Community Development, Public Works	As funds become available (short term)	High	Protect, Prevent, Minimize, Maintain, Educate
M	Maintain, enforce, and update the local Floodplain Ordinance, as is necessary.	River Flood	Community Development	Active (short term)	Minimal	Protect, Prevent, Minimize, Maintain, Educate

TABLE A8 : FUTURE HAZARD MITIGATION ACTIVITIES - CEDAR FALLS						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation * denotes Primary)**	**Timeline**	**Est. Cost**	**Goal(s)**
H	Continue membership in the National Flood Insurance Program (NFIP).	River Flood	Community Development, City of Cedar Falls	Active (short term)	Minimal	Protect, Prevent, Minimize, Maintain, Educate
M	Protect or relocate the 18th Street Fire Station from future flood events.	River Flood	Public Safety, Community Development	Short Term	High	Protect, Maintain
L	Continue to have a local supply of sandbags on hand for future flood events.	River Flood	Public Works	Active (short term)	Low	Protect, Minimize
M	Continue to evaluate public utilities for ways they can be further flood proofed or relocated; for instance, the City has constructed new lift stations in order to mitigate potential impacts of flooding.	River Flood	Public Works*, CFU	Active (short term)	N/A	Protect, Prevent, Maintain
L	Follow the Corps of Engineers operations and maintenance manual.	River Flood	Public Works	Active (short term)	N/A	Protect, Prevent, Maintain, Minimize, Collaborate
H	Construction of a substation in North Cedar Falls to remove some of the electrical load from the substations at the Cedar Falls Utilities (CFU) office complex and provide redundant distribution voltage to the City of Cedar Falls if the substations at the CFU office complex are threatened with flooding.	River Flood	CFU	Pending, budgeted by CFU for construction in 2022 and 2023, contingent on funding and/or load requirements (medium term)	High	Protect, Prevent, Restore
M	Ensure that all first responders are properly trained in the Incident Command procedures.	Infrastructure Failure	All first responder organizations*, Black Hawk County EMA	Active (short term)	Minimal	Protect, Prevent, Minimize, Maintain, Restore

TABLE A8 : FUTURE HAZARD MITIGATION ACTIVITIES - CEDAR FALLS						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation * denotes Primary)**	**Timeline**	**Est. Cost**	**Goal(s)**
M	Establish standard operating procedures for naming a Public Information Officer in the event of a disaster.	Infrastructure Failure	Black Hawk County EMA*, UNI Assistant VP for Marketing and Public Relations, City Administrator's office (Communication Specialist)	Active, addressed in Emergency Operations Plan in 2009, will be updated as needed (short term)	Minimal	Educate
M	Review the need for redundancy in the communication system.	Infrastructure Failure	City of Cedar Falls, CFU	Pending, no timeline established (short term)	Minimal	Protect, Minimize, Maintain, Restore
M	Update Multi-Hazard Emergency Operations Plan as needed.	Infrastructure Failure	Black Hawk County EMA*, City of Cedar Falls	Active	Minimal	Protect, Prevent, Minimize, Maintain, Restore, Collaborate
M	Create and implement a visual damage assessment procedure that includes all city departments.	Infrastructure Failure	City of Cedar Falls	Active, part of City's Multi-Hazard Emergency Operations Plan	Minimal	Protect, Prevent, Minimize, Maintain, Collaborate
M	Improve and update centralized record keeping database for damage assessment/reporting.	Infrastructure Failure	City of Cedar Falls	Active	Minimal to Low	Restore
M	Maintain inspection and enforcement of applicable fire codes.	Infrastructure Failure	Public Safety	Active (short term)	Minimal	Protect, Prevent
L	Maintain 28E agreement for HAZMAT response.	HAZMAT	Public Safety	Active (short term)	Minimal	Protect, Prevent, Minimize, Restore, Collaborate

TABLE A8 : FUTURE HAZARD MITIGATION ACTIVITIES - CEDAR FALLS						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation * denotes Primary)**	**Timeline**	**Est. Cost**	**Goal(s)**
L	Work with Black Hawk County EMA to ensure that local Tier II Reports are being filed.	HAZMAT	Public Safety, Black Hawk County EMA*	Active (short term)	Minimal	Collaborate, Protect, Maintain
H	Ensure that first responders are properly trained to recognize and respond to any potential HAZMAT event.	HAZMAT	Public Safety	Active (short term)	Minimal to Low	Protect, Restore, Collaborate
M	Maintain Storm Water Management Utility Program.	HAZMAT, Landslides	Community Development, Public Works*	Active (short term)	Moderate	Protect, Prevent, Maintain
M	Identify potential areas of pollution sites and pursue cleanup efforts in identified areas.	HAZMAT	DNR, Public Works, and Community Development *	Active (medium term)	TBD	Protect, Prevent, Maintain, Restore
L	Work with Black Hawk County Board of Health to monitor wells and septic tanks/fields.	HAZMAT	DNR, Public Works*, Community Development	Active	TBD	Protect, Prevent, Maintain, Collaborate
L	Replacement of wells and septic tanks/fields with public service, if funding becomes available.	HAZMAT	DNR, Public Works*, Community Development	Active (medium term)	TBD	Protect, Prevent, Maintain
M	Incorporate Best Management Practices (BMP) in order to control the release of runoff, reduce erosion, reduce the amount of silt in waterways, and reduce nitrates in runoff.	HAZMAT, River Flooding	DNR, Public Works*, Community Development	Active, as part of SWPP program (short term)	TBD	Protect, Prevent, Maintain
L	Maintain a policy on proper methods of household hazardous waste disposal.	HAZMAT	Health Department*, Public Works	Active	Moderate	Educate, Protect, Prevent
M	Encourage public not to overuse fertilizer and/or pesticides in order to protect the health of the general public.	HAZMAT	Community Development *, Local groups	Active	Minimal	Educate, Protect

TABLE A8 : FUTURE HAZARD MITIGATION ACTIVITIES - CEDAR FALLS						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation * denotes Primary)**	**Timeline**	**Est. Cost**	**Goal(s)**
H	Maintain a well-trained and equipped law enforcement agency in order to identify and respond to potential threats and events.	Terrorism, Transportation Incident	Public Safety	Active (short term)	Low	Protect, Prevent, Maintain, Restore
H	Maintain a well-trained and equipped fire department in order to provide proper response during a hazard event.	Terrorism, Infrastructure Failure, Grassfire/Wildfire	Public Safety	Active (short term)	Low	Protect, Prevent, Maintain, Restore
M	Purchase and install closed circuit security cameras at critical locations around the community.	Terrorism	CFU*, UNI, Public Works	Active (short term)	TBD	Protect, Prevent
M	Place automatic locks on critical facilities to enable lock down when threat level is elevated.	Terrorism	Finance & Business Operations	Partially implemented, active as new facilities are constructed or as security conditions warrant changes (short term)	Minimal	Protect, Prevent
M	Prevent cyber terrorism through training, software, and protocol procedures and policies.	Terrorism	Finance & Business Operations (IT Division), CFU, Public Safety	Active (short term)	Minimal to Low	Protect, Prevent
L	Maintain mutual aid agreements.	Terrorism	Public Safety	Active (short term)	Minimal	Protect, Restore, Collaborate
M	Enforce and update, as necessary, an open burning policy.	Grassfire/Wildfire	Public Safety	Active (short term)	Minimal	Protect, Prevent, Educate
M	Continue inspections and repairs of dams and levees.	Dam Failure, Levee Failure	Public Works	Active (short term)	Low	Protect, Prevent, Maintain

TABLE A8 : FUTURE HAZARD MITIGATION ACTIVITIES - CEDAR FALLS						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation * denotes Primary)**	**Timeline**	**Est. Cost**	**Goal(s)**
L	Consider performing HAZUS modeling to determine the potential impact of a dam failure or levee break.	Dam Failure, Levee Failure	City of Cedar Falls	Active.	Minimal to Low	Protect, Prevent, Minimize, Maintain
L	Regularly evaluate building codes and consider additions in order to better prepare for a potential earthquake event.	Earthquake	Community Development	Active (short term)	Minimal	Protect, Prevent, Minimize
M	Ensure proper response capabilities to respond to any potential transportation event.	Transportation Incident	Public Safety, Medical Services	Active (short term)	Minimal	Protect, Minimize, Restore
M	Ensure that proper signage is available and in place to facilitate a controlled flow of traffic.	Transportation Incident	Public Works*, DOT	Active, additional signs are kept on hand by Public Works (short term)	TBD	Protect, Prevent, Restore
L	Purchase additional evacuation route signs.	Transportation Incident	Public Works*, DOT	Active, additional signs are kept on hand by Public Works (medium term)	TBD	Restore, Educate
L	Maintain and update an evacuation plan.	Transportation Incident	Black Hawk County EMA*	Active (short term)	Minimal	Protect, Minimize, Restore
L	Expand and update emergency vehicle preemption system.	Transportation Incident	Public Works*	Active (short term)	N/A	Protect, Maintain, Restore
M	Ensure regular inspections of water, sanitary sewer, and storm water lines for leaks and breakages.	Sinkholes	Public Works*, CFU	Active	N/A	Protect, Prevent, Maintain
L	Encourage potential developers and the public to conduct due diligence of a site prior to building.	Sinkholes, Expansive Soils	Community Development, Public Works	Active	Minimal	Prevent, Minimize, Maintain

TABLE A8 : FUTURE HAZARD MITIGATION ACTIVITIES - CEDAR FALLS						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation * denotes Primary)**	**Timeline**	**Est. Cost**	**Goal(s)**
M	Continue enforcement of current building codes.	Expansive Soils	Community Development	Active	Minimal	Protect, Prevent, Maintain
L	Maintain and train personnel on NIMS protocol.	All	Public Safety, Black Hawk County EMA	Active	Minimal	Protect, Prevent, Maintain, Educate
H	Encourage Family Disaster Kits for all households.	All	Black Hawk County EMA	Active	Minimal	Protect, Educate, Restore
M	Maintain a continuity of operations plan.	All	Department Heads, Information Technology Division (FBO)	Active, approved in 2009, to be updated as needed (short term)	N/A	Protect, Minimize, Restore

TABLE A9 : FUTURE HAZARD MITIGATION ACTIVITIES - CEDAR FALLS COMMUNITY SCHOOL DISTRICT						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation * denotes Primary)**	**Timeline**	**Est. Cost**	**Goal(s)**
H	Construct tornado safe rooms in schools.	Tornado/Windstorm	School Board	Long Term	Low to High	Prevent, Protect.
M	Ensure that local schools maintain terrorism response plans.	Terrorism	School Board	Active (short term)	Minimal	Protect, Prevent, Educate.
H	Ensure that schools can continue to meet the educational needs of students during times of unexpected / unforeseen closures.	Tornado/Windstorm; Human Disease/Pandemic; Fire; Terrorism	School Board	Implemented as Necessary	Moderate	Protect; Maintain.

TABLE A10: FUTURE HAZARD MITIGATION ACTIVITIES – UNIVERSITY OF NORTHERN IOWA						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation *denotes Primary)**	**Timeline**	**Est. Cost**	**Goal(s)**
M	Encourage residents to sign up for emergency alerts services on their mobile phones.	Tornado/Windstorm, Infrastructure Failure	UNI Department of Public Safety	Pending, statewide emergency alerts service expected to be implemented by 2015	Medium	Protect, Prevent, Educate.
H	Bury power and communications lines, as is possible.	Tornado/Windstorm, Thunderstorm/Lightning, Winter Storm	UNI Department of Public Safety	Active	High	Protect, Prevent.
M	Purchase and install closed circuit security cameras at critical locations around the community.	Terrorism	UNI Department of Public Safety	Active (short term)	TBD	Protect, Prevent.
M	Consider installing permanent barricades around the UNI-dome.	Terrorism	UNI Department of Public Safety	Medium Term	Moderate	Protect, Prevent, Minimize.
L	Work with Black Hawk County EMA to ensure that local Tier II Reports are being filed.	HAZMAT	UNI Department of Public Safety	Active (short term)	Minimal	Protect.

APPENDIX B: CITY OF DUNKERTON

COMMUNITY PROFILE

Location

The City of Dunkerton is located in the northwestern quadrant of Black Hawk County. The elevation of the community is approximately 950 feet above sea level. Crane Creek flows from west to east across the northernmost portion of the city. The City of Dunkerton is centered at the intersection of Iowa State Highway 281/County Road 54 and County Road C66/Dunkerton Road. The city is surrounded on all sides by the unincorporated area of Black Hawk County. To the west, north, and east, the city is surrounded by Lester Township; to the south, the city shares a border with Barclay Township.

Natural Environment

The city is bordered on all sides by farmland. The land within the city slopes slightly from south to north, with the land sloping down toward the creek bed. There are two waterways located within the City of Dunkerton. The Crane Creek flows from west to east, and serves as part of the northern city limits. The entire incorporated area of Dunkerton lies in the Crane Creek drainage basin. In addition, a small-unnamed tributary, which flows in a northerly direction to Crane Creek, is located in the southeastern portion of the Dunkerton corporate area. As a result of the waterways located in the Dunkerton, the City has an identified 100-year floodplain and has used information regarding the floodplain when making development decisions.

The climate of Dunkerton is of the continental type, which is marked by a great variation in both temperature and precipitation. Temperatures average 70.2º F during the summer months and approximately 19.4º F during the winter months. The average annual rainfall for the City of Dunkerton is 32.9 inches. Average snowfall for the community is approximately 35.5 inches annually.

The soils in the community are typically productive and able to support development. The primary soils classifications include Colo-Zook-Nodaway Association soils in the floodplain and Kenyon-Floyd-Readlyn-Clyde Association soils in the areas of the city that lie outside the floodplain. It should be noted that much of Black Hawk County, including Dunkerton, contains valuable agricultural soils that are capable of sustaining development. Further, if the city is to experience development, it is anticipated that some of these valuable soils will be lost.

The original land cover vegetation of the Dunkerton area was deciduous timber. This land cover is considered the primary motivation for the original settlement of the area. The first settlers were said to have arrived for the abundance of natural resources in the area. Today, much of the original tree cover has been eliminated for row crop farming and the construction of homes and businesses. Much of the remaining tree cover can be found in the low-lying areas of the

community along the river and the channel overflow. Tree cover can also be found throughout the community in residential areas, parks, and cemeteries. These remaining trees contribute to the aesthetics of the community and are viewed as an asset.

Transportation

One major highway passes through the City of Dunkerton, Iowa Highway 281. This transportation route passes through the center of the city in a north/south route. This road connects the city with Interstate 380, just 8 miles south of Dunkerton. In addition, County Road C66 also passes through the city on an east/west route. County Road C66 connects Dunkerton to U.S. Highway 63, 8 miles to the west.

According to the Iowa Department of Transportation, an average of 2,040 cars and trucks travel on Highway 281 into the city each day. An additional 1,020 cars and trucks travel on County Road C66. Finally, an average of 3,650 vehicles travels on city streets each day. Dunkerton is served by the Union Pacific Railroad Company. According to the Iowa Department of Transportation, the Union Pacific Railroad is a Class I railroad that operates 1,891 miles of track within Iowa. Products carried in Union Pacific rail cars include chemicals, coal, food and food products, forest products, grain and grain products, intermodal, metals and minerals, automobiles, and automobile parts.

The third major transportation route is the airspace above the city. The closest major airport is the Waterloo Municipal Airport, located 15 miles west of Dunkerton. There are no major commercial watercraft routes in Dunkerton. Crane Creek does offer a location for recreational watercraft use by the public.

Community Services

Water service in the City of Dunkerton is provided by two wells and serviced through one water tower which has the capacity of 125,000 gallons, and was installed in 2010. The average daily water usage was 44,000 and maximum usage was 85,000 gallons (as recorded during the month of April 2019). The water and sewer system is mapped and regularly updated. A water filtration project is scheduled to start in 2020.

TABLE B1: UTILITY PROVIDERS – DUNKERTON

Utility	Provider
Electric	MidAmerican Energy
Gas	MidAmerican Energy
Water/Sewer	City of Dunkerton
Telephone/Internet	Dunkerton Telephone Coop
Cable TV	Dunkerton Telephone Coop, Mediacom

Demographics - Table B2 provides a summary of Dunkerton's demographics.

TABLE B2: CITY OF DUNKERTON DEMOGRAPHICS					
General Population, 2013-2017 ACS	Total Population	876	***Economic Char, 2013-2017 ACS 5-Year Estimates***	Population In Labor Force	24,542
	Total Males	412		Population in Civilian Labor Force	24,530
	Total Females	464		Persons Employed	23,521
	Median Age	35.4		Persons Unemployed	1,009
	At-Risk Population, under 18	263		Persons in Armed Forces	12
	At-Risk Population, 65 and over	111		Mean Travel Time to Work in Minutes, 16 and over	13.7
	One Race: White	860		Persons Employed in Management, Business, Science, and Arts Occupations	9,012
	One Race: Black or African American	4		Persons Employed in Service Occupations	4,752
	One Race: American Indian and Alaska Native	0		Persons Employed in Sales and Office Occupations	6,378
	One Race: Asian	0		Persons Employed in Natural Resources, Construction, and Maintenance Occupations	997
	One Race: Native Hawaiian and Other Pacific Islander	0		Persons Employed in Production, Transportation, and Material Moving Occupations	2,382
	Two or More Races	12		Median Household Income	58,855
	Hispanic or Latino (of any race)	4		Median Family Income	85,008
				Per Capita Personal Income	30,532
Households by Type, 2010 Census	Total Population in Households	852		All People below Poverty Level	7.2%
	Total Population in Group Quarters	0			
	Total Households	327			
	Total Family Households	237			
	Total Family Households with own children under 18	120	***Social Characteristics, 2013-2017 ACS 5-Year Estimates***		
	Male Householder, no wife present, with own children under 18	6		Total School Enrollment, 3 and over	16,343
	Female Householder, no husband present, with own children under 18	24		Population Enrolled in Nursery School, Preschool	490
	Householder living alone	80		Population Enrolled in Kindergarten and Elementary School, grades K-8	3,373
	Households with individuals under 18 years of age.	125		Population Enrolled in High School, grades 9-12	1,511
	Households with individuals 65 and over	67		Population Enrolled in College or Graduate School	10,969
	Average family size / Average Household Size	2.61 / 3.13		Total Population, 25 and over	21,820
				Persons with Less than 9th Grade Education	369
Selected Housing Char, 2013-2017 ACS	Total Housing Units	350		Persons with 9th to 12th Grade Education, No Diploma	571
	Occupied Housing Units	321		Persons with High School Degree or Equivalency	4,646
	Vacant Housing Units	29		Persons with Some College Education, No Degree	4,036
	Owner-Occupied Housing Units	247		Persons with Associate Degree	2,404
	Population in Owner-Occupied Housing Units	716		Persons with Bachelor's Degree	5,794
	Rental-Occupied Housing Units	74		Persons with Graduate or Higher Degree	4,000
	Population in Rental-Occupied Housing Units	159		Total Civilian Noninstitutionalized Population with a Disability	3,452
	Mobile Homes	0			
	3+Units in Structure	47			

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Dunkerton's evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Dunkerton's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions included: Historical Occurrence, Probability, Magnitude/Severity, Warning Time, and Duration. Due to recent disasters and events that have impacted the planning area, Dunkerton determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table B3 is the analysis scores for the City of Dunkerton. As seen in Table B3, the top three hazards for Dunkerton are Tornado/Windstorm, River Flooding and Drought.

The tables below identify the scoring criteria utilized by the Committee to evaluate each hazard. Further descriptions are provided in Section 3.

PROBABILITY		
Score	**Description**	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2	Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3	Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33% or the event is likely to occur.
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.

MAGNITUDE / SEVERITY		
Rating	**Description**	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least two weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

DURATION	
Score	**Description**
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

TABLE B3: HAZARD RISK ASSESSMENT FOR DUNKERTON					
Hazard	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Total**
Tornado/Windstorm	2	3	4	1	2.5
River Flooding	3	1	1	3	2.1
Drought	2	2	1	4	2.05
Severe Winter Storm	3	1	1	2	2
Grass/Wild Fire	2	1	4	1	1.9
Dam / Levee Failure	1	1	4	4	1.75
Flash Flood	2	1	3	1	1.75
Radiological Incident	1	1	4	4	1.75
HAZMAT Incident	1	1	4	3	1.65
Extreme Heat	2	1	1	3	1.65
Transportation Incident	1	1	4	2	1.55
Sinkholes	1	1	4	1	1.45
Terrorism	1	1	4	1	1.45
Animal/Plant/Crop Disease	1	1	1	4	1.3
Human Disease	1	1	1	4	1.3
Infrastructure Failure	1	1	2	2	1.25
Thunderstorm/Lighting/Hail	1	1	1	2	1.1
Earthquake	1	1	1	1	1
Expansive Soils	1	1	1	1	1
Landslide	1	1	1	1	1

Vulnerability – Identifying Assets (Critical Facilities) & Social Asset Populations

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the community's historical occurrences of tornados this hazard was added to the assessment. The following discussion only considers the assets in the community of Dunkerton.

TABLE B4: SHELTERS IN DUNKERTON	
United Methodist Church	Fire Station
Dunkerton Community School	Dunkerton Public Library
Dunkerton Community Hall	First Baptist Church
Gospel Hall	
Source: Community	

Critical Facilities

Identifying the location of critical facilities is important in order to assess their vulnerability to hazards, since these facilities are important to the community's operations, quality of life, and economic sector. These include but are not limited to schools, hospitals, libraries, police and fire stations, water towers, sirens, and lift stations. *Map 53* shows the locations of these critical facilities throughout Dunkerton.

Table B4 shows the locations identified as shelters in Dunkerton. While these locations have been identified for use if deemed necessary, there may also be hazard events which require residents to shelter themselves "in place". Therefore, any location could potentially become a makeshift shelter for purposes of disaster response.

Homes In Hazardous Areas

The majority of the City of Dunkerton north of Dunkerton Road is in the 100-year floodplain (approximately 202 acres and 14 city blocks). This accounts for roughly half of the city's total population. Table B5 identifies the value of floodplain parcels within the City.

TABLE B5: FLOODPLAIN PARCELS WITHIN THE CITY OF DUNKERTON							
	# of Parcels	**Total Land Value**	**Total Building Value**	**Total Dwelling Value**	**Multi-Residential Land**	**Total Value**	**Percent of City Damaged**
City Floodway Property Values	73	$781,910	$781,373	$627,497	$2,240	$2,193,020	3.94%
City 1% Annual Chance Floodplain Property Values	105	$1,272,020	$1,438,950	$4,705,180	$0	$7,416,150	13.31%
City 0.2% Annual Chance Floodplain Property Values	15	$252,340	$310,280	$1,110,890	$0	$1,673,510	3.00%
Source: Flood overlay shows the 2011 floodplain designations in Black Hawk County, Iowa. The digital flood layer was obtained from FEMA's current Digital Flood Insurance Rate Map. The incorporated boundaries were current as of 5/5/19.							

In addition, persons living in mobile homes (also known as manufactured housing) may also be at risk from tornados or high winds. However, according to the 2017 American Community Survey, there are no mobile homes in Dunkerton.

Finally, persons living in some multi-family units may also be at risk due to the lack of a proper tornado shelter. According to the 2017 American Community Survey, there were an estimated 47 housing units in buildings with at least three units. Using the average persons per household value of 2.61 from the 2010 U.S. Census, there are approximately 123 persons living in multi-family housing units at risk during a tornado event. Table B6 identifies damage scenarios in the event of tornados at intensities from EF0 to EF5.

Vulnerability – Identifying Social Asset Populations

The social vulnerability assessment also identified how the hazards affect the population of Dunkerton, and it is assumed that the identified populations are more likely to require assistance during times of disaster and are therefore, generally speaking, more at-risk than the remaining population. The at-risk population must be identified and targeted in successful mitigation efforts.

According to 2017 ACS data, approximately 111 residents in Dunkerton area 65 years of age or older. Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young people often are not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2017, approximately 263 residents in Dunkerton were under the age of 18.

As mentioned previously, persons living in mobile homes and persons living in multi-family housing units are also considered at risk. There are no persons living in mobile homes and 123 persons living in multi-family housing units in Dunkerton.

Map 31 and *Map 32* illustrate the impact of a hypothetical tornado event in Dunkerton. According to data from the Black Hawk County Assessor's Office, there are a total of 507 parcels in the community with a total value of $55,708,140. Table B6 illustrates the degree of impact that hypothetical tornado scenarios of various strengths would have on Dunkerton.

TABLE B6: DUNKERTON TORNADO SCENARIO

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	41	$1,001,710	$535,380	$4,703,740	$50,160	$5,289,280	$1,322,320	9.49%
EF1	150 Meters	492 Feet	69	$1,616,470	$535,380	$7,829,830	$50,160	$8,415,370	$2,103,843	15.11%
EF2	250 Meters	820 Feet	96	$2,104,070	$1,111,300	$9,461,260	$50,160	$10,622,720	$5,311,360	19.07%
EF3	500 Meters	1640 Feet	146	$3,553,060	$5,648,440	$14,373,500	$50,160	$20,072,100	$10,036,050	36.03%
EF4	900 Meters	2953 Feet	253	$5,450,460	$6,382,200	$25,280,730	$50,160	$31,713,090	$31,713,090	56.93%
EF5	1100 Meters	3609 Feet	312	$6,179,690	$6,382,200	$28,612,150	$50,160	$35,044,510	$35,044,510	62.91%

Parcel value information is current as of 09/25/2018. The source is the Black Hawk County MIS Department. This scenario shows a realistic damage level to buildings and land calculated at the following percentages: EF0-EF1 = 25%; EF2-EF3 = 50%; EF4-EF5 = 100%

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. Table B6 lists all of the structure valuations for the City of Dunkerton. Since 100% of the city is at risk of some kind of hazard event, the entire city is considered to be in the hazard area. This data was used in the Vulnerability discussion in each of the Hazard Profiles in Section 3.

This information was made available from the Black Hawk County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE B7: ASSET INVENTORY – BUILDING / DWELLING VALUES IN DUNKERTON

Class	Land Value	Building Value	Dwelling Value	MR Land	Building Count
Agricultural	447,580	3,110	0	0	0
Cities	593,600	1,204,480	0	0	6
Commercial/Dual Class	855,410	7,103,006	89,564	21,740	54
Industrial	361,450	2,857,580	0	0	7
Religious/Non-Profit	0	0	737,810	50,160	2
Residential	139,650	524,110	471,000	60,000	7
Schools	5,920,100	0	36,189,980	0	307
Utilities	433,740	2,597,640	74,060	0	2
Total*	**$8,776,150**	**$14,289,926**	**$37,562,414**	**$131,900**	**385**

Source: Black Hawk County Assessor 2019 Values

*- Please note that the assessed value for tax-exempt structures may not adequately reflect their fair market rate value, which may be significantly higher than the assessed value. Accordingly, the values listed above should not be regarded as accurate for any purpose.

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced no losses in a 10-year period in which each loss is $1,000 or more. According to available FEMA data (as of 5/31/09), the City of Dunkerton participates in the National Flood Insurance Program and has six repetitive loss properties. Table 45 in Section 3 lists data from each city regarding the National Flood Insurance Program.

Community	CID #	# of NFIP Policies	NFIP Insurance in Force	Total Paid Losses	Total Payments Made	Repetitive Loss Payment	Total RL Properties 2019	Total RL Properties 2013	Total RL Properties 2009
City of Dunkerton	190018	40	4,321,000	59	607,171	$181,602	6	4	5

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The updated hazard mitigation plan goals for the City of Dunkerton are:

1. **PROTECT**: Protect the health and safety of residents, visitors, staff and emergency personnel during and after hazard events.
2. **PREVENT**: Prevent avoidable disasters.
3. **MINIMIZE**: Minimize losses to existing and future structures in hazard areas, especially critical facilities.
4. **MAINTAIN**: Maintain local services and infrastructure in order to reduce community, economic and environmental disruption during and after hazard events.
5. **RESTORE**: Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
6. **EDUCATE**: Educate the public about hazards and resources available.
7. **ACCOUNTABILITY**: Use public funds in an efficient, cost effective and fair manner.
8. **COLLABORATE**: Incorporate each jurisdiction into the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan.

Current Mitigation Actions

Prevention Mitigation Actions

The City has adopted a Floodplain Ordinance, which is a portion of the City's Code of Ordinances, and was last updated in 2012. The City's Building Code Enforcement Officer is in charge of enforcing the floodplain ordinance in addition to other duties. In accordance with NFIP guidelines, the ordinance does not allow for new construction within the floodway. In addition, it requires those structures within the floodway fringe to: (a.) "be adequately anchored to prevent flotation, collapse or lateral movement of the structure"; (b.) "use construction methods and practices that will minimize flood damage" and; (c) "use construction materials and utility equipment that are resistant to flood damage."

The Federal Insurance Administration manages the insurance component of the NFIP, and works closely with FEMA's Mitigation Directorate, which oversees the floodplain management aspect of the program. Residents of Dunkerton are eligible for the insurance benefits provided by this program.

The City has a variety of planning and zoning ordinances that support the floodplain ordinance, including a Zoning Ordinance, Subdivision Ordinance, and Building Ordinance. The City is also active in Creek Right-of-Way Clearance and Management activities. The City of Dunkerton has adopted the 2018 Uniform Building Code. The City has a Building Inspector with Bremer County Building and Zoning.

Many studies have been conducted over the years in attempts to define the flood problem in Dunkerton and to arrive at strategies to alleviate the problem. The studies conducted include the following:

- Army Corps of Engineers - Study dates: January 1991 & February 1992
- Iowa Department of Natural Resources (DNR) – N/A
- U.S. Geological Survey (USGS) – Map

As noted above, Dunkerton was included in the 1991 Corps of Engineers study of the Wapsipinicon River and Tributaries, Black Hawk County and vicinity. The study looked at Crane Creek and its watershed and floodplain areas. The report describes a levee system and provided a 1991 cost estimate. The City decided not to proceed with the project due to the local share cost estimate that was presented. Since that date, the community has been looking for supplemental funding to provide local share.

In addition, a Flood Insurance Study conducted by the Federal Emergency Management Agency. The Flood Insurance Study was a preliminary requirement necessary for initial participation in the National Flood Insurance Program. The scope of the study was the entire incorporated area of the City of Dunkerton, Black Hawk County, IA. The study identified through the use of hydrologic analyses the peak discharge-frequency relationships for each of the 10-, 50-, 100-, and 500-year flood event. The City joined the National Flood Insurance Program February 21, 1979. The current floodplain map was effective July 18, 2011.

Property Protection Mitigation Actions

In response to the damage caused by the 1999 flood, the City of Dunkerton received funding from FEMA and IEMD to acquire residential and commercial properties located in the floodplain. A total of twenty-four residences, one commercial property, and two public properties have been purchased and demolished as of December 2003. Through this process the City will retain ownership of the vacant lots remaining after the demolition of the properties. Restrictions have been placed on the deeds to these lots that will serve to restrict future development. As of 2010, a total of eighty-eight structures remain in the floodplain.

City properties that remain in the floodplain include the City Maintenance Garage. It is a goal of the City to build new facilities in the future, as funding becomes available. At the time of the 1999 flood, City Hall was located in the floodplain and received substantial damage, including the destruction of many city documents. After the flood the City constructed a temporary City Hall on South Canfield Road, out of the floodplain. In May 2000 this temporary structure was damaged by a tornado that went through the community. Construction was recently completed in 2003 for a new city hall located on Tower Street. A new public library was completed in October 2010.

The City has discussed the possibility of elevating structures currently in the floodplain. The current floodplain ordinance places restrictions on the type of construction that can occur on an existing structure located in the floodplain. Building permits are required before construction or re-construction of any housing unit in the floodplain. Homes must be built above a determined elevation. Existing homes must be rehabilitated to provide adequate flood proofing where possible. While the City would prefer to have all structures removed from the floodplain, it also realizes that some residents prefer the location of their homes near the waterway. For some home and business owners, elevation is the only available solution to the problem of damage from floodwaters.

There is also one levee located in the community. This levee is site specific and was built to protect the lift station, which is located in the floodplain, from floodwaters. The City has explored the possibility of constructing a flood levee and gates to reduce the amount of floodwater entering the residential and commercial areas of the city. This remains a goal that the City will continue to explore as funding becomes available.

In an effort to affect the flow of floodwaters, berms and ditches were constructed to divert water flowing directly through certain southerly areas of the community and to protect the Senior Center residential facility. The diverted water still passes through the community but by a different route. There are currently no detention or retention reservoirs within Dunkerton nor are there any other flood control alternatives currently in place. The City does have goals for future projects that will result in flood control activities. The City is planning to pursue projects related to watershed draining improvements in the southwest corner of the city.

Public Education and Awareness Mitigation Actions

A new statewide reverse 911 system known as Alert Iowa was implemented by implemented by Iowa Homeland Security and Emergency Management in 2014. Citizens have the ability to “opt in” to receive weather alerts and enter a cell phone, work phone, and other additional alternative phone numbers. The City has

developed a website and also uses social media to keep its citizens, and other interested parties, aware of local and government affairs. The website address is www.cityofdunkerton.org.

The Public Works employee is contacted via cell phone when on the job or as needed in the case of an emergency. The City operates a number of vehicles and equipment including dump trucks and pick-up trucks. As part of the emergency plan, the City has a list of companies with additional equipment that may be needed in the case of an emergency or hazard situation.

Emergency Services Mitigation Actions

Black Hawk County Emergency Management Agency

The Black Hawk County Emergency Management Agency is governed by a board of eleven commissioners comprised of the Mayors from each incorporated jurisdiction in the County or their designated delegate, a representative of the Black Hawk County Sheriff's Department, and the Chairperson of the Black Hawk County Board of Supervisors. The Emergency Management Agency works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. Furthermore, the agency is responsible for the monthly testing of all outdoor warning sirens in Black Hawk County.

Fire Department

The Dunkerton Fire Department is a volunteer department that provides fire and rescue services for the City of Dunkerton, in addition to Barclay, Bennington, Lester and Poyner Townships. As of 2019, the Dunkerton Volunteer Fire Department consists of 27 volunteers. In 2010, a tornado safe room was added to the fire station. Equipment owned and operated by the local fire department includes:

- 2006 Brush/Rescue vehicle with 250 gallon capacity and a pony pump
- 2000 Tanker truck with 1,500 gallon capacity
- 2003/4 Pumper tanker with 1,250 gallon capacity and 1,250 gallon pump
- 27 complete sets of bunker gear with SCBA masks for each fire fighter
- 5x8 Enclosed Mass Casualty Trailer
- 14 complete SCBA's, MSA brand
- 14 extra bottles as back-up tanks
- One Cascade system with a compressor
- 2008 Ranger 12 ft. Flat Bottom Boat
- Backup generator for fire station
- 2015 Spartan Metro
- 3500 Gallon Tanker / Pumper 1250 Darley pump

Medical Services

The Dunkerton Ambulance Service provides emergency rescue and ambulance service to the community, with a volunteer group of EMT and EMS specialists. As of 2020, the service consists of 12 volunteer Emergency Medical Technicians and serves a response area covering 90 square miles. The Ambulance Service has major equipment consisting of an ambulance, defibrillator, and an inverter. The Ambulance Service replaced the ambulance in 2019. The Dunkerton Ambulance Service also has mutual aid agreements in place with the following cities: Waterloo, Jesup, Fairbank, and Denver.

Dunkerton is served primarily by the two hospitals located in the larger metropolitan area, Unity Point Hospital and Mercy One Medical Center, located in Waterloo. In addition to these major hospitals in the metropolitan area, there are numerous clinics in the area that provide a variety of medical specialties and general family practice. There are two other hospitals available in a 27-mile radius of the City of Dunkerton. Of these hospitals, one is in Cedar Falls and one is in Waverly.

Police

Police protection is provided by the Dunkerton Police Department, Black Hawk County Law Enforcement, and the Iowa State Patrol. The Police Department currently employs one full-time and two part-time patrolmen. As of 2010, the Dunkerton Police Department has major equipment consisting of one 2016 Dodge Charger, one MPH Series II Python Radar, one Remington 870 12-gauge, one GIETAC s400 Laptop, one Digital Ally DVM 750 Camera system.

Hazardous Materials

A regional Hazard Materials Team is on hand to assist the community with a Hazard Materials event or catastrophe. The Team is located within a short distance and is operated by Waterloo Fire Rescue Department. The city is also a partner in the Tri-County Drug Task Force. The group works with the City in the event of the discovery of a methamphetamine lab within the community.

Snow Removal

The City of Dunkerton Public Works Department is responsible for clearing the City's roads after a winter storm event. According to City staff in 2020, there are two full-time and three part-time staff in charge of snow removal. The City maintains one dump truck with a plow, two pickup trucks with a plow, and one tractor with a 14-foot snow pusher in front.

Warning Systems

The City of Dunkerton is reported to have two outdoor warning sirens as of 2020. The outdoor warning system is maintained by Black Hawk County which contracts the work to a private company. The company checks the sirens at least once a year.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the comprehensive efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit community residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

TABLE B8: STAPLEE ELEMENTS

S – Social	• Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the populations, • Actions do not cause relocation of lower income people, • Actions are compatible with the community's social and cultural values.
T- Technical	• Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	• Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	• Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	• It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	• Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E - Environmental	• Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, • Are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table B8) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each mitigation activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each of the proposed mitigation activity will occur. For instance, if the activity happens regularly (either daily, weekly, monthly, or annually) it was identified as On-Going activity; if it will occur within the next 1-5 years it was identified as Short-Term; if the activity would take 5-10 years to occur it was labeled as Mid-Term; and all activities that would take 10 or more years to occur were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The city will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate : Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High : Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, identified the responsible party or parties for each activity, and finally related each activity to at least one of the Hazard Mitigation Plan Goals listed above. Table B8 below is the City of Dunkerton's Implementation Strategy.

TABLE B9 : FUTURE HAZARD MITIGATION ACTIVITIES - DUNKERTON							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
H	Encourage & Support Public Education and Awareness (i.e., proper steps to protect property & health for all hazards, purpose of warning system, Iowa One Call, flood insurance, regulations, HAZMAT education and disposal, vaccinations for humans and pets, Fire Prevention Week for Schools, importance of disaster kits/supplies, local ordinance requirements, smoke and carbon oxide alarms, nuisance abatement education, proper landscaping and building techniques to avoid erosion, etc.).	All	City (all departments)*, Black Hawk County EMA, American Red Cross, Iowa DOT, National Weather Bureau, First Responders, Iowa DNR, ISU Extension, Black Hawk County Health Department, Hawkeye Valley Area Agency of Aging	Active	Minimal	Local, State	Educate, Collaborate, Prevent, Protect
H	Maintain Mutual Aid (28E) Agreements.	All	City Council*	Active	Minimal	Local	Collaborate, Protect, Restore
H	Encourage use of emergency notification services.	All	Black Hawk County Emergency Management*, City (all departments)	Active	Minimal	Local	Educate, Protect
H	Maintain a Well-Trained and Well-Equipped Police Department for all Potential Hazards - Training Plan and Equipment Rotation Plan.	All	City Council*, Police Department	Active	Minimal to High	Local, State, Federal	Maintain, Protect, Restore
H	Maintain a Well-Trained and Well-Equipped Fire Department for all Potential Hazards - Training Plan and Equipment Rotation Plan.	All	City Council*, Fire Department	Active	Minimal to High	Local, State, Federal	Maintain, Protect, Restore
H	Maintain a Well-Trained and Well-Equipped First Responders for all Potential Hazards - Training Plan and Equipment Rotation Plan.	All	City Council*, Black Hawk County, Fire Department, Police Department	Active	Minimal to High	Local, State, Federal	Maintain, Protect, Restore

TABLE B9 : FUTURE HAZARD MITIGATION ACTIVITIES - DUNKERTON							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
H	Maintain a Well-Trained and Well-Equipped Public Works Department of all Potential Hazards - Training Plan and Equipment Rotation Plan.	All	City Council*, Public Works Department	Active	Minimal to High	Local, State	Maintain, Protect, Restore
H	Maintain, Update/Purchase, as needed, City Equipment and Supplies (i.e., Snow Plows, Generators, Surge Protectors, Animal Rescue supplies, Sandbag supplies, Deicer, Technology equipment, etc.).	All	City Council*, Black Hawk County, Fire Dept, Public Works Dept, Police Dept	Active	Minimal to High	Local, State, Federal	Maintain, Protect, Restore
H	Adopt, Review, Maintain, Enforce, and Update, as needed, Existing Policies, Regulations, and Ordinances (i.e, Floodplain, Zoning, Subdivision, Snow Removal, Animal Vaccination and Licensing, etc.).	All	City (all departments)*, City Council, Black Hawk County	Active	Minimal to Low	Local	Maintain, Protect, Prevent
H	Designate, Develop, Maintain and Distribute List of Shelter Sites (all types), Maintain Shelter Agreements with Red Cross, and Conduct Shelter Operation Training with Red Cross.	All	Black Hawk County Emergency Management*, Red Cross	Long Term	Minimal	Local	Maintain, Protect, Restore
H	Develop an Emergency Evacuation and Notification Plan (includes identifying detour and evacuation routes) and Regularly Evaluate Plan.	All	City (all departments)*, Black Hawk County Emergency Management	Long Term	Minimal	Local	Protect, Restore
H	Maintain an Adequate Supply of Road Signage (i.e., detour, closure, snow routes, etc.).	Al	Public Works Department*, City, Iowa DOT	Active	Minimal to Low	Local, State	Maintain, Protect, Educate
H	Continue Incident Management System Training (100, 200, 700), OSHA, and Certified Flood Manager Training for City Employees.	All	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal to Low	Local, State	Educate, Maintain, Protect, Restore
H	Continue to Re-Evaluate Procedures after Major Incidents.	All	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Local	Educate, Protect, Prevent, Minimize

TABLE B9 : FUTURE HAZARD MITIGATION ACTIVITIES - DUNKERTON							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
H	Maintain Outdoor Warning Sirens through Training Procedures for Maintenance and Identification of Who is In-Charge/Responsible for City.	All	City (all departments)*, City Council, Black Hawk County	Active	Low to Moderate	Local	Maintain
H	Develop a Public Information/Media Plan/Procedure.	All	City (all departments)*, Black Hawk County Emergency Management, Schools	Active	Minimal	Local	Educate, Protect, Minimize, Restore
H	Develop and Maintain a Communication Plan (Inter-Departmental and communitywide).	All	City (all departments)*, Black Hawk County, Schools	Active	Minimal	Local	Educate, Protect
H	Maintain Utility Contact Call List.	All	City (all departments)*	Active	Minimal	Local	Protect, Maintain
H	Apply for Grants/Funding as they Become Available.	All	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Local	All
H	Review and Update Emergency Response Plan.	All	City (all departments)*, City Council, Black Hawk County Emergency Management, Schools	Active	Minimal	Local	All
H	Ensure Adequate Coverage of Outdoor Warning Sirens - Relocate existing sirens and/or Purchase Additional Ones.	All	City (all departments)*, City Council, Black Hawk County Emergency Management	Active	Low to High	Local, State, Federal	Maintain, Protect, Minimize

TABLE B9 : FUTURE HAZARD MITIGATION ACTIVITIES - DUNKERTON							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
H	Continue Tree Trimming and Inspection Program/Policy.	Hailstorm, Thunderstorm & Lightning, Windstorm, Severe Winter Storm	City (all departments)*, Utility Providers	Active	Minimal to Low	Local	Protect, Prevent, Minimize
H	Work with Local Utility Provider to Develop Program to Bury Existing Utility Lines; Install Surge Protectors and Squirrel Guards on Major Electrical Lines; Place Lightning Arrestors on Utility Polices; and Upgrade Equipment to Locate and Identify Underground Utilities.	Thunderstorm & Lightning, Tornado, Severe Winter Storm, Energy Failure or Disruption, Communication Failure	City (all departments)*, Utility Providers, Developers	Active	Low to High	Local	Collaborate, Prevent
H	Encourage the Schools to Re-Evaluate Safe Tornado Shelters/Rooms.	Tornado	City Council*, Black Hawk County Emergency Management, Schools	Long Term	Minimal to High	Local, State, Federal	Protect, Prevent, Educate
H	Encourage the Construction of a Tornado Safe Shelter/Room for the General Public.	Tornado	City Council*, Black Hawk County Emergency Management, Developers	Long Term	High	Local, State, Federal	Protect, Prevent, Educate
H	Maintain and Enforce Up-to-Date Building Codes.	Expansive Soils, Tornado	City Council*, City (all departments)	Active	Minimal	Local	Maintain
H	Develop, Enforce, and Maintain Burn Order/Burn Ban Policy.	Windstorm, Extreme Heat	City Council*, City (all departments)	Long Term	Minimal	Local	Maintain, Prevent, Protect
H	Identify and Remedy Sewer System Inflow and Infiltration Problems.	River Flood, Flash Flood	Public Works*, City Council	Active	Minimal to High	Local, State, Federal	Maintain, Prevent
H	Continue to Flood Proof Existing City-Owned Parcels, Equipment, and Utilities Located in 100-Year Floodplain.	River Flood	City Council*	Active	Low to High	Local, State, Federal	Protect, Prevent, Restore

TABLE B9 : FUTURE HAZARD MITIGATION ACTIVITIES - DUNKERTON							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
H	Continue Acquisition, Removal, Relocation of Structures (residential, commercial, public) from 100-Year Floodplain.	River Flood	City Council*	Active	Low to High	Local, State, Federal	Protect, Prevent, Restore
H	Continue to Work on Clearing Crane Creek of Sand, Debris, Etc.	River Flood	Black Hawk County*, Iowa DNR	Long Term	Low to Moderate	Local, State, Federal	Prevent, Maintain
H	Remove Existing Bridge and Replace with High-Water Flow Crossing.	River Flood	City Council*, Black Hawk County, Iowa DOT	Long Term	High	Local, State, Federal	Maintain, Prevent, Protect
H	Encourage the Use of Best Management Practices (BMP) to Manage Storm Runoff (Buffer Strips, Retention Basins for New Subdivisions, etc.).	Flash Flood, River Flood	City (all departments)*, Black Hawk County, Developers, Private Property Owners, Iowa DNR	Active	Minimal to High	Local, State	Maintain, Protect, Prevent, Minimize
H	Conduct Regular Storm Sewer Cleaning (drainage grates) and Opening of Sewer for Brush and Debris.	Flash Flood, River Flood	Public Works*	Active	Low to Moderate	Local	Maintain
H	Continue Fire Department's Annual Walk-Thru of Hazardous Material Sites and Support Building Inspector is Assuring Tanks are Adequately Contained.	Fixed HAZMAT	Fire Department*, Building Department	Active	Minimal	Local	Protect, Prevent
H	Continue to Work with Black Hawk County EMA to Ensure local Tier II HAZMAT Reports are Filed.	Fixed HAZMAT	Business Owners, Black Hawk County Emergency Management*	Long Term	Minimal	Local	Protect, Prevent
H	Continue Working Relationship with Northeast Iowa Response Group.	Fixed HAZMAT, Transportation-HAZMAT or Radiological	City (all departments)*, City Council	Long Term	Minimal	Local	Collaborate
H	Ensure Local Schools, Businesses, Industries, and the City have Terrorism/Crisis Response Plan in Place.	Terrorism	Black Hawk County Emergency Management*, City Council, School	Long Term	Minimal	Local	Educate, Protect, Minimize, Restore

TABLE B9 : FUTURE HAZARD MITIGATION ACTIVITIES - DUNKERTON							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
H	Maintain Proper Agency Contact Information for Proper Disposal of Radiological Materials.	Transportation-HAZMAT or Radiological	City (all departments)*, City Council	Long Term	Minimal	Local	Maintain, Protect, Prevent
H	Continue to Work with Local Industries (Co-Op) and Businesses with Training and Developing Policies and Procedures for Chemicals.	Terrorism	City (all departments)*, Black Hawk County Emergency Management, Industries	Long Term	Minimal to Low	Local	Collaborate, Protect
H	Regulatory Update and Maintain Firewall Protection Software, Viral Security Software, and Password Protected Encryption for System Users for all City Computers.	Terrorism	City (all departments)*, City Council	Active	Minimal	Local	Maintain
H	Continue to Cooperate with Black Hawk County Health Department and Local Medical Facilities to Help Ensure Effectiveness of Prevention, Detection, and Response Mechanisms.	Disease	City (all departments)*, Black Hawk County Emergency Management	Long Term	Minimal	Local	Collaborate
H	Update Water Distribution System (i.e., Replace Existing 4-inch Water Supply Lines with Larger Lines).	Drought, Structure Fire	Public Works*, City Council	Long Term	Moderate to High	Local, State, Federal	Maintain
H	Maintain Pre-Plans, Walk-Thru, and Drills with Businesses and Schools.	Structure Fire	City (all departments)*, Black Hawk County Emergency Management, Schools, Businesses	Active	Minimal	Local	Protect, Educate, Collaborate
H	Conduct Regular Inspections of Public Buildings and After a Fire to Ensure Structural Integrity.	Structural Failure	City (all departments)*	Active	Minimal	Local	Maintain, Restore
H	Maintain List of Contractors for Hazardous Spills, etc.	Transportation	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Local	Maintain, Protect, Restore

TABLE B9 : FUTURE HAZARD MITIGATION ACTIVITIES - DUNKERTON							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
H	Recruit and Train Volunteer Storm Watchers and Spotters.	Thunderstorms & Lightning, Tornado	City Council*, City (all departments), Black Hawk County Emergency Management	Active	Minimal	Local	Educate, Protect
H	Flood Proof Structures in or near Flood Hazard Areas.	Flash Flood, River Flood	City Council*, Private Property Owners	Long Term	Low to High	Local, State, Federal	Protect, Prevent
H	Remain a Member of National Flood Insurance Program.	Flash Flood, River Flood	City Council*	Long Term	Minimal	Local	Protect, Minimize
H	Continue to Regularly Back-Up City Data and Store Back-up and Software Offsite (safe deposit box, etc.).	Thunderstorm & Lightning, Tornado, Terrorism	City (all departments)*	Active	Minimal	Local	Protect, Minimize
H	Identify At-Risk Residents who May Need Emergency Medical Assistance and/or Transportation and Develop and Maintain Procedures to Assist and Contact.	Thunderstorm & Lighting, Windstorm, Tornado, Hailstorm, Severe Winter Storm, Extreme Heat	City (all departments)*, Black Hawk County Emergency Management, Hawkeye Valley Area Agency of Aging	Active	Minimal	Local	Protect, Restore
H	Identify a Building for use as a Public Safe Shelter / Tornado Safe Room.	Tornado, Windstorm, Hailstorm	Black Hawk County Emergency Management*, Red Cross, City (all departments), Schools	Long Term	Minimal	Local	Protect
H	Encourage the Installation of Back Flow Valves.	Flash Flood, River Flood	City (all departments)*, City Council, Developers, Private Property Owners	Active	Minimal to Low	Local	Prevent

TABLE B9 : FUTURE HAZARD MITIGATION ACTIVITIES - DUNKERTON							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
H	Maintain a List of Potential Storm Sewer Improvement Projects.	Flash Flood, River Flood	City (all departments)*, City Council	Active	Minimal	Local	Maintain
H	Continue to Test Local Drinking Water Supply to Monitor Quality.	Disease	Public Works*	Active	Minimal	Local	Protect, Maintain
H	Identify Fixed HAZMAT Sites in Community.	Fixed HAZMAT, Terrorism	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Local	Protect, Prevent
M	Install Back-up Generators at City Hall, Wells, Schools, and Critical Facilities.	All	City Council*, Black Hawk County, Schools	Active	Moderate to High	Local, State, Federal	Protect, Restore
M	Develop and Maintain Continuing Education Plan/Procedures.	All	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Local	All
M	Develop and Update, as needed, Contingency Operations Government Plan.	All	City (all departments)*, City Council, Black Hawk County Emergency Management	Long Term	Minimal	Local	All
M	Update Local Ordinances and Regulations to Require Utilities for New Construction is Buried.	Thunderstorm & Lightning, Tornado, Severe Winter Storm	City Council*	Active	Minimal	Local	Prevent
M	Develop, Enforce, and Maintain Debris, Rubbish, and Brush Disposal Program (includes temporary sites for disposal).	Windstorm, Tornado, Hailstorm	City Council*, City (all departments), Black Hawk County	Active	Minimal to Low	Local, State, Federal	Restore
M	Identify Bonded Contractors available for Affected Residents.	Hailstorm, Windstorm, Tornado	City (all departments)*, Black Hawk County	Long Term	Minimal	Local	Restore, Educate

TABLE B9 : FUTURE HAZARD MITIGATION ACTIVITIES - DUNKERTON							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
M	Explore Alternative Water Supply Options to Improve Water Supply System (i.e., either an Additional Well to Supplement System, Installation of an Emergency Hookup to Rural Water System, etc.).	Drought, Disease	City Council*, Public Works	Long Term	Moderate to High	Local, State, Federal	Protect
M	Develop and Enforce, when necessary, Water Restriction Ordinance.	Drought	City Council*, City (all departments)	Active	Minimal	Local	Minimize, Protect
M	Develop and Enforce an Ordinance on Cleaning Up and Proper Disposal of Pet Waste in Public Areas.	Disease	City Council*, City (all departments)	Long Term	Minimal	Local	Protect, Educate
M	Spray as Needed for Mosquitoes and Other Insects.	Disease	Public Works*, Black Hawk County	Active	Minimal	Local	Protect
M	Maintain Control and Protection of City Buildings and Utilities (Lockdown Policy, etc.).	Terrorism	City (all departments)*, City Council	Active	Minimal	Local	Maintain
M	Continue to Maintain a List of Railroad Personnel Contacts and Project Manufacturers.	Transportation	City (all departments)*	Long Term	Minimal	Local	Maintain
M	Place Tile in Back of Curbs on New Construction.	Expansive Soils	Public Works*, City Council, Developers	Long Term	Low to High	Local	Prevent
M	Maintain Relationship/Contract with Cedar Bend Humane Society and Black Hawk County.	Disease	City Council*, City (all departments)	Active	Minimal	Local	Maintain, Collaborate
M	Work with Designated Authorities to Ensure Dead Animals are Properly Disposed.	Disease	City (all departments)*, Black Hawk County, Iowa DOT, Iowa DNR	Active	Minimal	Local, State	Collaborate, Protect

APPENDIX C: CITY OF ELK RUN HEIGHTS

COMMUNITY PROFILE

Location

The city of Elk Run Heights is located approximately three miles east of the geographic center of Black Hawk County. The elevation of the community is approximately 850 feet above sea level. The main roads within the city are all local: Dubuque Road, Gilbertville Road, Lafayette Road, and Plaza Drive. Interstate 380/US Highway 20 runs east-west just south of the city; Exit 68 in Evansdale is the closest access point to Elk Run Heights. The city is bordered to the west and south by Evansdale, to the southeast by the Black Hawk County unincorporated area, to the east by Raymond, and to the north by the Black Hawk County unincorporated area.

Natural Environment

Elk Run Creek is the only body of water present in Elk Run Heights. The creek meanders in a northeast-southwest direction, cutting through the northwest corner of the city. As shown in *Map 10*, there is very little development in the Elk Run Creek floodplain. However, due to its close proximity to the Cedar River southwest of the city, approximately two city blocks are in the river's 500-year floodplain.

The climate of Elk Run Heights is of the continental type, which is characterized by a great variation in both temperature and precipitation. Average temperatures range from 73.4º F in July to 15.9º F in January. The average amount of monthly precipitation also varies greatly, with most falling between April and September. Average annual precipitation for the city is 32.9 inches.

According to the Black Hawk County Soil Survey conducted in 1977 by the United State Department of Agriculture Soil Conservation Service, the majority of soils in Elk Run Heights are of the Finchford Series. The Finchford Series "consists of nearly level to moderately sloping, excessively drained soils on high alluvial terraces and adjacent escarpments. These soils have very low available water capacity and very rapid permeability". Slopes range from 0 to 2 percent. Due to their location in and near the Elk Run Creek floodplain, some of the soils in Elk Run Heights may be subject to flooding.

Transportation

The major transportation route affecting the City of Elk Run Heights is U.S. Interstate 380/US Highway 20. This route actually lies just to the south of Elk Run Heights, and is the primary exit/entry location for travel in and out of the community. Other significant routes include Gilbertville Road, Dubuque Road, Plaza Drive, South Elk Run Road (County V43), and Lafayette Road (County D22). Car and truck traffic in the city are highest on Interstate 380/US Highway 20.

According to the Iowa Department of Transportation, an average of 24,300 cars and trucks travel on that stretch of highway south of Elk Run Heights each day. An additional 4,250 vehicles travel each day on County Highway V43 north of Elk Run Heights, while 2,890 vehicles per day travel D22 east of Elk Run Heights. These amounts do not include the number of cars using city streets each day.

In addition to the roadways that serve the City of Elk Run Heights, there is also a rail line that runs through the community. This line is owned and operated by the Chicago Central and Pacific Railroad Company; and it runs along the north side of Dubuque Road. The nearest airport is the Waterloo Municipal Airport.

The City of Elk Run Heights is connected to an extensive trail system that serves pedestrian and bicycle users. The Cedar Valley Nature Trail, which runs west of town along Elk Run Creek, connects Elk Run Heights to the Cedar Falls and Waterloo metro trail systems. In addition, the Cedar Valley Nature Trail runs south to the City of Cedar Rapids. There are no major commercial watercraft routes in Elk Run Heights. The Cedar River does offer a location for recreational watercraft use by the public.

Community Services

The City of Elk Run Heights owns and operates, including billing and repair, all of the water lines in the community. The city's water is purchased from Waterloo Waterworks and enters the city by way of a water main; therefore, Elk Run Heights does not have nor maintain a water tower. Waterloo Works is municipally owned and maintains an elevated storage capacity of approximately 3,000,000 gallons. The capacity of the water supply system is 50 MGD, while the average consumption is 12.2 MGD.

The current Wastewater Treatment Facility consists of an activated sludge system. The facility is located in the extreme northwest corner of the city. The wastewater is transported to the facility with the assistance of three wastewater lift stations. The primary wastewater lift station is located near the northern extent of Sutton Avenue, south of the railroad tracks and Dubuque Road. The second wastewater lift station is located near the intersection of James Street and Gilbert Drive. The third and final lift station is situated near the intersection of Gilbertville Road and Plaza Drive.

Table C1 lists the primary utility providers in Elk Run Heights.

TABLE C1: UTILITY PROVIDERS – ELK RUN HEIGHTS

Utility	Provider
Electric	Mid-American Energy
Gas	Mid-American Energy
Water	Waterloo Waterworks
Sewer	City
Telephone/Internet	CenturyLink, Mediacom
Cable TV	Mediacom

Demographics

TABLE C2: CITY OF ELK RUN HEIGHTS DEMOGRAPHICS					
General Population, 2013-2017 ACS	Total Population	1,014	***Economic Char, 2013-2017 ACS 5-Year Estimates***	Population in Labor Force	612
	Total Males	511		Population in Civilian Labor Force	612
	Total Females	503		Persons Employed	595
	Median Age	52.3		Persons Unemployed	17
	At-Risk Population, under 18	107		Persons in Armed Forces	0
	At-Risk Population, 65 and over	229		Mean Travel Time to Work in Minutes, 16 and over	15.5
	One Race: White	967		Persons Employed in Management, Business, Science, and Arts Occupations	179
	One Race: Black or African American	0		Persons Employed in Service Occupations	113
	One Race: American Indian and Alaska Native	10		Persons Employed in Sales and Office Occupations	117
	One Race: Asian	0		Persons Employed in Natural Resources, Construction, and Maintenance Occupations	53
	One Race: Native Hawaiian and Other Pacific Islander	0		Persons Employed in Production, Transportation, and Material Moving Occupations	133
	Two or More Races	17		Median Household Income	58,073
	Hispanic or Latino (of any race)	34		Median Family Income	67,778
				Per Capita Personal Income	30,896
Households by Type, 2010 Census	Total Population in Households	1,117		All People below Poverty Level	6.4%
	Total Population in Group Quarters	0			
	Total Households	461			
	Total Family Households	337			
	Total Family Households with own children under 18	114	***Social Characteristics, 2013-2017 ACS 5-Year Estimates***		
	Male Householder, no wife present, with own children under 18	12		Total School Enrollment, 3 and over	129
	Female Householder, no husband present, with own children under 18	23		Population Enrolled in Nursery School, Preschool	4
	Householder living alone	101		Population Enrolled in Kindergarten and Elementary School, grades K-8	63
	Households with individuals under 18 years of age.	125		Population Enrolled in High School, grades 9-12	21
	Households with individuals 65 and over	126		Population Enrolled in College or Graduate School	41
	Average household size / Average Family Size	2.42 / 2.79		Total Population, 25 and over	846
				Persons with Less than 9th Grade Education	35
Selected Housing Char, 2013-2017 ACS	Total Housing Units	490		Persons with 9th to 12th Grade Education, No Diploma	52
	Occupied Housing Units	469		Persons with High School Degree or Equivalency	369
	Vacant Housing Units	21		Persons with Some College Education, No Degree	198
	Owner-Occupied Housing Units	405		Persons with Associate Degree	92
	Population in Owner-Occupied Housing Units	887		Persons with Bachelor's Degree	79
	Rental-Occupied Housing Units	64		Persons with Graduate or Higher Degree	21
	Population in Rental-Occupied Housing Units	128		Total Civilian Noninstitutionalized Population with a Disability	210
	Mobile Homes	3			
	3 + Units in Structure	0			

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Elk Run Heights's evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Elk Run Heights's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions included: Historical Occurrence, Probability, Magnitude/Severity, Warning Time, and Duration. Due to recent disasters and events that have impacted the planning area, Elk Run Heights determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table C3 is the analysis scores for the City of Elk Run Heights. As seen in Table C3, the top three hazards are River Flooding, Flash Floods, and Tornado/Windstorms.

The tables below identify the scoring criteria utilized by the Committee to evaluate each hazard. Further descriptions are provided in Section 3.

PROBABILITY		
Score	**Description**	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2	Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3	Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33% or the event is likely to occur.
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.

MAGNITUDE / SEVERITY		
Rating	**Description**	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least two weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

DURATION	
Score	**Description**
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

TABLE C3: HAZARD RISK ASSESSMENT FOR ELK RUN HEIGHTS					
Hazard	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Total**
River Flooding	4	4	2	4	3.7
Flash Flood	4	4	2	3	3.6
Tornado/Windstorm	3	4	4	4	3.55
Severe Winter Storm	4	4	1	3	3.45
Extreme Heat	3	4	4	3	3.45
Transportation Incident	3	3	3	3	3
Thunderstorm/Lighting/Hail	4	2	2	1	2.8
Terrorism	1	4	3	3	2.4
Grass/Wild Fire	2	2	3	4	2.35
HAZMAT Incident	2	2	3	3	2.25
Earthquake	1	4	3	1	2.2
Radiological Incident	1	3	3	4	2.2
Infrastructure Failure	1	2	3	4	1.9
Sinkholes	1	1	3	4	1.6
Expansive Soils	1	1	3	3	1.5
Drought	1	1	1	4	1.3
Landslide	1	1	3	1	1.3
Animal/Plant/Crop Disease	1	1	1	4	1.3
Human Disease	1	1	1	4	1.3
Dam / Levee Failure	1	1	1	1	1

Vulnerability – Identifying Assets (Critical Facilities) & Social Asset Populations

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the community's historical occurrences of tornados this hazard was added to the assessment. The following discussion only considers the assets in the community of Elk Run Heights.

TABLE C4: SHELTERS IN ELK RUN HEIGHTS
Elk Run Heights Elementary School (316 McCoy Road)
Faith Assembly Church (5112 Lafayette Road)
City Hall (5042 Lafayette Road)
Source: Community

Critical Facilities

Identifying the location of critical facilities is important in order to assess their vulnerability to hazards, since these facilities are important to the community's operations, quality of life, and economic sector. These include but are not limited to schools, hospitals, libraries, police and fire stations, water towers, sirens, and lift stations. *Map 54* shows the locations of these critical facilities throughout Elk Run Heights. Table C4 shows the locations identified as shelters in Elk Run Heights. While these locations have been identified for use if deemed necessary, there may also be hazard events which require residents to shelter themselves "in place". Therefore, any location could potentially become a makeshift shelter for purposes of disaster response.

Homes In Hazardous Areas

Map 10 and Map 11 shows the areas in Elk Run Heights within the 100-year and 500-year floodplains. According to data made available by the Black Hawk County Assessor's office, there are only 10 parcels of land with a total value of $1,283,080 in the 100-year floodplain, and 8 parcels with a total value of $306,960 in the 500-year floodplain.

TABLE C5: FLOODPLAIN PARCELS WITHIN ELK RUN HEIGHTS

	# of Parcels	Total Land Value	Total Building Value	Total Dwelling Value	Multi-Residential Land	Total Value	Percent of City Damaged
City Floodway Property Values	10	$355,970	$34,750	$892,360	$0	$1,283,080	4.00%
City 1% Annual Chance Floodplain Property Values	8	$145,760	$20,580	$140,590	$0	$306,930	0.96%
City 0.2% Annual Chance Floodplain Property Values	0	$0	$0	$0	$0	$0	0.00%

Source: Flood overlay shows the 2011 floodplain designations in Black Hawk County, Iowa. The digital flood layer was obtained from FEMA's current Digital Flood Insurance Rate Map. The incorporated boundaries were current as of 5/5/19.

According to the 2013-2017 American Community Survey, there are 3 mobile homes and 0 housing units in multi-unit buildings in Elk Run Heights. Persons living in mobile homes and multi-unit buildings are considered at higher risk during a tornado event.

Vulnerability – Identifying Social Asset Populations

The social vulnerability assessment also identified how the hazards affect the population of Elk Run Heights, and it is assumed that the identified populations are more likely to require assistance during times of disaster and are therefore, generally speaking, more at-risk than the remaining population. The at-risk population must be identified and targeted in successful mitigation efforts.

According to 2017 ACS data, 22.6% of 1,014 residents, or approximately 229 persons, are 65 years or older. Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young people often are not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2017, 107 persons were under the age of 18.

As mentioned previously, persons living in mobile homes and persons living in multi-family housing units are also considered at risk. The City of Elk Run Heights has 3 mobile homes and as of the 2017 ACS and no multi-family housing with 3 or more units.

Map 33 and *Map 34* illustrate the impact of a hypothetical tornado event in Elk Run Heights. Table C5 illustrates the degree of impact that hypothetical tornado scenarios of various strengths would have on Elk Run Heights.

TABLE C6: ELK RUN HEIGHTS TORNADO SCENARIO

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	62	$1,406,000	$355,090	$6,351,010	$0	$6,706,100	$1,676,525	8.87%
EF1	150 Meters	492 Feet	135	$2,832,540	$355,090	$14,376,230	$0	$14,731,320	$3,682,830	19.48%
EF2	250 Meters	820 Feet	199	$4,119,560	$1,873,035	$20,209,425	$5,440	$22,087,900	$11,043,950	29.21%
EF3	500 Meters	1640 Feet	332	$6,588,415	$2,800,135	$32,170,365	$10,655	$34,981,155	$17,490,578	46.26%
EF4	900 Meters	2953 Feet	444	$9,438,845	$7,508,245	$44,228,715	$10,655	$51,747,615	$51,747,615	68.43%
EF5	1100 Meters	3609 Feet	490	$10,263,165	$8,049,655	$47,747,865	$10,655	$55,808,175	$55,808,175	73.79%

Parcel value information is current as of 09/25/2018. The source is the Black Hawk County MIS Department. This scenario shows a realistic damage level to buildings and land calculated at the following percentages: EF0-EF1 = 25%; EF2-EF3 = 50%; EF4-EF5 = 100%

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. Table C6 lists Building / Dwelling values by class for the City of Elk Run Heights. Since 100% of the city is at risk of some kind of hazard event, the entire city is considered to be in the hazard area. This data was used in the Vulnerability discussion in each of the Hazard Profiles in Section 3.

This information was made available from the Black Hawk County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE C7: ASSET INVENTORY – BUILDING / DWELLING VALUES IN ELK RUN HEIGHTS

Class	Land Value	Building Value	Dwelling Value	MR Land	Building Count
Agricultural	251,000	23,530	556,180	-	1
Cities	317,250	151,100	-	-	5
Commercial/Dual Class	1,457,615	7,754,115	38,325	10,655	25
Industrial	151,250	1,217,650	-	-	3
Religious/Non-Profit	60,760	843,080	-	-	2
Residential	9,520,350	-	56,060,450	-	461
Schools	100,600	355,090	-	-	1
Utilities	8,200	1,180	-	-	0
Total*	**$11,867,025**	**$10,345,745**	**$56,654,955**	**$10,655**	**498**

Source: Black Hawk County Assessor 2019 Values

*- Please note that the assessed value for tax-exempt structures may not adequately reflect their fair market rate value, which may be significantly higher than the assessed value. Accordingly, the values listed above should not be regarded as accurate for any purpose.

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced no losses in a 10-year period in which each loss is $1,000 or more. According to available FEMA data (as of 5/31/09), the City of Elk Run Heights participates in the National Flood Insurance Program and has no repetitive loss properties. Table 45 in Section 3 lists data from each city regarding the National Flood Insurance Program.

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The updated (non-revised) hazard mitigation plan goals for the City of Elk Run Heights are:

1. **PROTECT**: Protect the health and safety of residents, visitors, staff and emergency personnel during and after hazard events.
2. **PREVENT**: Prevent avoidable disasters.
3. **MINIMIZE**: Minimize losses to existing and future structures in hazard areas, especially critical facilities.
4. **MAINTAIN**: Maintain local services and infrastructure in order to reduce community, economic and environmental disruption during and after hazard events.
5. **RESTORE**: Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
6. **EDUCATE**: Educate the public about hazards and resources available.
7. **ACCOUNTABILITY**: Use public funds in an efficient, cost effective and fair manner.
8. **COLLABORATE**: Incorporate each jurisdiction into the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan.

Current Mitigation Actions

Prevention Mitigation Actions

The Zoning Ordinance was last updated during March of 1999. The Zoning Ordinance recognizes eight differing districts. These districts include an Agricultural District, two Residential Districts, two Commercial Districts, and an Industrial District. Included within the Zoning Ordinance are the various articles.

The City of Elk Run Heights became an active member in the National Flood Insurance Program (NFIP) on September 1, 1983 by adopting its initial floodplain ordinance. The City updated the Floodplain Ordinance most recently in 1989. The Floodplain Management Ordinance identifies and defines the permitted and restricted uses that fall within four distinguishable areas as identified on the corresponding flood insurance rate map. These four areas include the floodway, the floodway fringe, the general floodplain, and the shallow flooding district. The City Clerk is charged with the administration and enforcement of the Floodplain Ordinance. In accordance with NFIP guidelines, the ordinance does not allow for new construction within the floodway.

In February 1983 a Flood Insurance Study (FIS) was prepared for the City of Elk Run Heights. The study was conducted under the auspices of FEMA, who cooperated with members of the community and the Iowa Natural Resources Council to gather relevant data. The 1983 Elk Run Heights FIS cited other studies as well that pertained to the flooding situation in and around the City. The first was a document titled Interim Review of Reports for Flood Control, Iowa and Cedar Rivers, Iowa and Minnesota at Evansdale Iowa, 1973, which was produced by the U.S. Army Corps of Engineers. The second was an additional Flood Insurance Study produced by FEMA for all of the unincorporated areas of Black Hawk County. Finally, in conjunction with the Elk Run Heights FIS, a Flood Insurance Rate Map was published. This map identifies the 100-year and 500-year floodplains within the city limits. At the time of the study no flood protection measures were identified with the exception of the note that vegetation was mitigating the erosion of the creek banks.

The City of Elk Run Heights has adopted and enforces the following codes:

- 2012 Uniform Building Code of the International Conference of Building Officials
- IAPMO Installation Standards of the International Association of Plumbing and Mechanical Officials
- 1991 Uniform Plumbing Code
- 1991 Uniform Mechanical Code of the International Conference of Building Officials
- 1990 Electric Code and all provisions of National Electric Code standards referred to therein published by the National Fire Protection Association

However, the City has and enforces a building code, which is a significant earthquake mitigation activity. It is expected that if an earthquake were to occur, the damage would be limited to the shifting of buildings off of their foundations, cracked plaster on walls and ceilings, and perhaps some bowed walls. Underground utilities would be at greater risk of damage during the winter season if the ground were frozen to depths of four feet or greater.

Property Protection Mitigation Actions

The City participated in the 1999 Flood Recovery Program by using money made available through FEMA and the Iowa Department of Economic Development (IDED). The City identified two structures that they felt would be excellent candidates for buyouts. Both of these structures have been acquired and demolished. The total assessed value for these properties was $62,180. Damages suffered by these properties during the 1999 flood were estimated at $11,000.

Due to the location of Elk Run Heights on the banks of Elk Run Creek and near the Cedar River the probability of flooding remains a possibility. However, the probability of flooding was greatly reduced with the construction of a large drainage ditch on the north of Dubuque Road (north of town). The ditch rerouted water west to Elk Run Creek that previously flowed through residential housing and the heart of the community. The benefits of the drainage ditch were obvious during the flood of 1999. Additionally, the construction of Interstate 380 is viewed as being effective at preventing water from entering the community from the south.

Public Education and Awareness Mitigation Actions

A new statewide reverse 911 system known as Alert Iowa was implemented by implemented by Iowa Homeland Security and Emergency Management in 2014. Citizens have the ability to "opt in" to receive weather alerts and enter a cell phone, work phone, and other additional alternative phone numbers. Radio, television, cellular telephones, landline telephones, newspapers, warning sirens, NOAA Radio Service and the internet are available to the public at large. The City has developed a website in order to keep its citizens, and other interested parties, aware of local and government affairs. The website address is www.elkrunheightsia.com.

Emergency Services Mitigation Actions

Black Hawk County Emergency Management Agency

The Black Hawk County Emergency Management Agency is governed by a board of eleven commissioners comprised of the Mayors from each incorporated jurisdiction in the County or their designated delegate, a representative of the Black Hawk County Sheriff's Department, and the Chairperson of the Black Hawk County Board of Supervisors. The Emergency Management Agency works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. Furthermore, the agency is responsible for the monthly testing of all outdoor warning sirens in Black Hawk County.

Fire Department

The City of Elk Run Heights currently contracts its fire service from Waterloo Fire and Rescue. Some of the services provided include fire suppression, extrication, carbon monoxide detection, water rescue, ice rescue, confined space rescue, trench rescue, and rope rescue. These services are accomplished with 21 front line units ranging from airport crash fire rescue to aerial ladders, to ambulances and rescue boats staffed by an average of 34 firefighters per shift at seven different fire stations. The current fire rating for the City of Elk Run Heights is six (6). No decrease in the rating is expected as it would require a full-time fire department to lower rates. A larger water supply is also required.

Medical Services

In addition to numerous private clinics and practicing physicians, Black Hawk County has four major medical facilities, all of which are located in either Waterloo

or Cedar Falls. Three of these facilities are considered Regional Hospitals, otherwise referred to as Level II. Mercy One Medical Center and Unity Point Hospital are located in Waterloo. Mercy One Medical Center has a second location in Cedar Falls. Another smaller facility, Peoples Community Health Clinic (Level IV) is affiliated with Covenant Medical Center, and located in downtown Waterloo.

Police

The City of Elk Run Heights currently contracts with the Black Hawk County Sheriff's Department for police protection. The City contracts on an annual basis with the Sheriff's Department for their service.

Hazardous Materials

A regional Hazard Materials Team is prepared to assist the community during a Hazard Materials event or catastrophe. The Team is located within a short distance of the city and is operated by Waterloo Fire Rescue Department. The city is also a partner in the Tri-County Drug Task Force. The group works with the City in the event of the discovery of a methamphetamine lab within the community.

Snow Removal

Snow removal and ice prevention techniques are practiced by City and County employees on the corresponding local and county roadways within the city limits. The City currently employs one full and two part time drivers for snow removal efforts. Equipment used for snow and ice removal includes a Ford F700 Truck, Snow Plow (for truck), and Small John Deere Loader Tractor. In an ideal winter storm scenario, it is estimated that all of the City roads can be adequately cleared within five hours.

Warning Systems

There are no tornado warning sirens in the City of Elk Run Heights. However, the neighboring cities of Evansdale and Raymond have three sirens and one siren, respectively. Two of the sirens in Evansdale are within 2,000 feet of the City's border with Elk Run Heights. Considering that Elk Run Heights is only 1.06 square miles in total area, the surrounding cities' sirens are considered to provide adequate warning to those living and working in Elk Run Heights.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the comprehensive efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit community residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

TABLE C8: STAPLEE ELEMENTS

S – Social	• Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the populations, • Actions do not cause relocation of lower income people, • Actions are compatible with the community's social and cultural values.
T- Technical	• Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	• Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	• Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	• It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	• Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E - Environmental	• Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, • Are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental. The Committee was asked to discuss the STAPLEE elements (Table C8) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each mitigation activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each of the proposed mitigation activity will occur. For instance, if the activity happens regularly (either daily, weekly, monthly, or annually) it was identified as On-Going activity; if it will occur within the next 1-5 years it was identified as Short-Term; if the activity would take 5-10 years to occur it was labeled as Mid-Term; and all activities that would take 10 or more years to occur were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The city will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate : Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High : Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, identified the responsible party or parties for each activity, and finally related each activity to at least one of the Hazard Mitigation Plan Goals listed above. Table C8 below is the City of Elk Run Heights' Implementation Strategy.

TABLE C9 : FUTURE HAZARD MITIGATION ACTIVITIES - ELK RUN HEIGHTS							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation** * - Denotes primary agency	**Timeline**	**Est. Cost**	**Funding Source**	**Goals**
H	Encourage & Support Public Education and Awareness (Encourage use of Emergency Notification System / Code Red, Use of Surge Protectors, NOAA radios, trim trees, HAZMAT handling and storage, Iowa One Call, 'Shelter in Place', public health news, current vaccinations for domestic animals, reducing production of mosquitoes, etc.).	All	City Council*, Black Hawk County EMA, Black Hawk County Heath Department, American Red Cross	Active	Minimal	Local, State, Federal	Educate
H	Maintain contract for law enforcement, fire protection, and EMS services.	All	City Council*	Active	Minimal	Local	Maintain, Protect
H	Encourage and support emergency notification system.	All	City Council*	Active	Minimal to Low	Local, State, Federal	Protect, Educate
H	Enforce local regulations for new development to bury utility lines.	Thunderstorm and Lightning, Windstorm, Hailstorm, Communication Failure	City Council*, Utility Providers, Private Developers	Active	Minimal	Local	Prevent
H	Maintain a well-equipped Street Department.	Severe Winter Storm, Sinkhole, Transportation Incident– Highway, Water, Rail, Air	City Council*	Active	Low to Moderate	Local	Maintain,
H	Continue to back-up City data digitally and store off-site.	Thunderstorm and Lightning, Windstorm, Hailstorm, Energy Failure or Disruption	City Council*	Active	Minimal	Local	Protect, Prevent.
H	Continue bridge inspections.	Transportation Incident– Highway, Water, Rail, Air	Public Works*, Black Hawk County, Iowa DOT	Active	Low to High	Local, State, Federal	Protect, Prevent, Maintain

TABLE C9 : FUTURE HAZARD MITIGATION ACTIVITIES - ELK RUN HEIGHTS							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation** * - Denotes primary agency	**Timeline**	**Est. Cost**	**Funding Source**	**Goals**
H	Continue to work with Black Hawk County EMA to ensure local Tier II HAZMAT reports are filed.	Fixed HAZMAT	Black Hawk County EMA*, Private Businesses, Iowa DNR	Active	Minimal	Private	Collaborate
H	Maintain contract for service with Northeast Iowa Response Group.	Fixed HAZMAT, Transportation Incident-HAZMAT or Radiological	City Council*	Active	Minimal	Local	Maintain, Collaborate, Protect, Restore
H	Maintain an Evacuation / Detour Plan.	Transportation Incident - HAZMAT & Radiological	City Council*, Black Hawk County EMA	Active	Minimal	Local	Minimize, Protect
H	Maintain warning sirens.	Tornado, Windstorm, Thunderstorm & Lightning, Radiological or Nuclear Event	Black Hawk County EMA*	Active	Minimal to Low	Local, State, Federal	Protect, Minimize, Maintain
H	Update and maintain security controls of IT and vulnerable targets.	Terrorism - Conventional, Cyber	City Council*	Active	Minimal to Low	Local, State	Maintain, Minimize
H	Continue to encourage and /or require smoke detectors, sprinkler systems, and fire extinguishers.	Structural Fire	City Council*, Contracted Fire Department, Black Hawk County EMA	Active	Minimal	Local	Educate, Prevent, Minimize
H	Continue building inspections.	Structural Failure	City Building Inspector*	Active	Minimal	Local	Maintain, Protect, Prevent
H	Identify and remove dangerous structures.	Structural Failure	City Council*	Underway	Minimal to Low	Local	Protect, Prevent
H	Maintain routine street program.	Severe Winter Storm, Flash Flood, Expansive Soils	City Council*	Active	Low to Moderate	Local	Maintain

TABLE C9 : FUTURE HAZARD MITIGATION ACTIVITIES - ELK RUN HEIGHTS							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation** * - Denotes primary agency	**Timeline**	**Est. Cost**	**Funding Source**	**Goals**
H	Enforce Storm Water Management Program.	Groundwater Contamination or Watershed Health	City Council*	Active	Minimal	Local	Maintain
H	Continue proper handling of HAZMAT.	Groundwater Contamination or Watershed Health	City Council*, Private Business Owners	Active	Minimal to Low	Local, Private	Protect, Restore
H	Continue to promote green space in floodplain.	Groundwater Contamination or Watershed Health	City Council*	Active	Minimal	Local, Private	Educate, Minimize
H	Enforce sedimentation and erosion control program.	Groundwater Contamination or Watershed Health	City Council*	Active	Minimal	Local, Private	Maintain
H	Continue water sampling program.	Groundwater Contamination or Watershed Health	City Council*	Active	Minimal to Low	Local	Protect
H	Maintain current gas detectors.	Explosion	City Council*, Private Property Owners	Active	Low to Moderate	Local, Private	Maintain
H	Ensure gas lines are marked before digging (Iowa One Call).	Explosion	City Council*, Private Property Owners, Developers	Active	Minimal	Local, Private	Prevent
H	Continue coordination and communication activities with Black Hawk County EMA.	All	City Council*	Active	Minimal	Local	Collaborate
H	Continue cooperation and communication with Black Hawk County Health Department.	Disease – Human and Animal	City Council*, Black Hawk Co EMA	Active	Minimal	Local	Collaborate
H	Continue basic NIMS training.	All	City Council*, Black Hawk Co EMA	Active	Minimal to Low	Local, State	Protect, Prevent

TABLE C9 : FUTURE HAZARD MITIGATION ACTIVITIES - ELK RUN HEIGHTS							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation** * - Denotes primary agency	**Timeline**	**Est. Cost**	**Funding Source**	**Goals**
M	Regularly review and update, and enforce existing policies, regulations, and ordinances (i.e., Storm Sewer, Building Codes, Floodplain Management, etc.).	Thunderstorm and Lightning, Expansive Soils, Structure Fire, Structural Failure, Earthquake, Flash Flood, Trans Incident	City Council*	Active	Minimal	Local	Maintain, Protect, Prevent
M	Ensure back-up power generation at critical facilities and infrastructure.	Thunderstorm and Lightning, Windstorm, Hail	City Council*	Underway	Low	Local	Minimize, Protect
M	Maintain water lines and repair/replace when needed.	Flash Flood, Sinkhole	City Council*	Active	Moderate to High	Local, State, Federal	Maintain
M	Support redundant communication systems for emergency and city personnel.	Communication Failure	City Council*, Contractor for Services	Active	Minimal to Low	Local	Restore, Protect
M	Maintain community website to assist disseminate information to the public.	Communication Failure	City Council*	Active	Minimal	Local	Educate
M	Continue implementation of Contingency Operations Government Plan.	All	City Council*	Active	Minimal	Local	Restore, Protect, Minimize
M	Manage storm water through monitoring residential modification to ditches.	River Flood, Flash Flood	City Council*	Active	Minimal	Local	Maintain, Minimize
L	Consider the development of a Tornado Safe Room for the general public.	Tornado	City Council*, Black Hawk Co EMA	Medium to Long Term	Moderate to High	Local, State, Federal	Protect
L	Maintain membership to the NFIP.	River Flood, Flash Flood	City Council*	Active	Minimal	Local	Maintain, Minimize
L	Coordinate with Red Cross and EMA for shelter.	Severe Winter Storm, Extreme Heat	Black Hawk Co EMA*	Active	Minimal	Local	Collaborate

TABLE C9 : FUTURE HAZARD MITIGATION ACTIVITIES - ELK RUN HEIGHTS							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation** * - Denotes primary agency	**Timeline**	**Est. Cost**	**Funding Source**	**Goals**
L	Maintain backup fuel supplies or identify a ready source of supply.	Transportation Incident - Pipeline	City Council*	Active	Minimal to Low	Local	Maintain, Restore
L	Enforce the issuance of burn bans, when necessary.	Drought, Grass or Wildfire	City Council*	Active	Minimal	Local	Prevent, Protect
L	Enforce water restrictions, when necessary.	Drought	City Council*	Active	Minimal	Local	Prevent, Protect
L	Support the construction of a northeast bypass project.	Transportation Incident- Highway, Rail, Water, Air	City Council*, Iowa DOT	Active (long term)	High	State, Federal	Maintain, Protect
L	Establish designated routes for the transportation of hazardous materials.	Transportation Incident - HAZMAT & Radiological, Radiological or Nuclear	City Council*	Active	Minimal	Local, State	Protect, Prevent, Minimize
L	Maintain security at vulnerable targets.	Terrorism - Biological, Chemical, Radiological	City Council*	Active	Low to Moderate	Local, State	Protect
L	Enact a curfew, if necessary, per Code.	Riot or Violent Demonstration	City Council*	Active	Minimal	Local	Protect
L	Improve water distribution system when funding becomes available.	Structure Fire	City Council*	Active	Moderate to High	Local, State, Federal	Maintain
L	Educate the public on how to identify approved/certified contractors.	All	City Council*, Private Property Owners, County EMA	Active	Minimal	Local, Private	Educate

APPENDIX D: CITY OF EVANSDALE

COMMUNITY PROFILE

Location

The City of Evansdale is located near the geographic center of Black Hawk County. The elevation of the community is approximately 840 feet above sea level. Three major thoroughfares run east-west through the city: Interstate 380/US Highway 20, Dubuque Road, and Lafayette Road. Two local roads, Evansdale Drive and River Forest Road, also accommodate thru-traffic and serve as the only two access routes to I-380/US 20 (Exits 68 and 70 respectively) in Evansdale. The city is bordered by the Cedar River to the west and south, the Black Hawk County unincorporated area to the southeast, Elk Run Heights to the east, and Waterloo to the north and northwest. The City of Waterloo is situated across the Cedar River from Evansdale to the west.

Natural Environment

There are two waterways located within the City of Evansdale. The Cedar River flows from northwest to southeast, and serves as the western and southern city limits. The Cedar River is served by several tributaries and eventually flows into the Iowa River. The Cedar River drainage area is 5,146 square miles, with a total of 3,197.5 river and streams miles.

Elk Run Creek flows through the city and runs from northeast to southwest and is one of the tributaries flowing into the Cedar River. Elk Run Creek empties into the Cedar River at the southern edge of the Evansdale city limits. The drainage area of Elk Run Creek is 32 square miles. As a result of the two waterways located in the city, the city has an identified 100-year floodplain and has used information regarding the floodplain when making development decisions.

According to the Black Hawk County Soil Survey conducted in 1977 by the United State Department of Agriculture Soil Conservation Service, the soil in Evansdale is "Loamy alluvial land, channeled … nearly level and gently sloping, excessively drained to poorly drained loamy soils formed in loamy alluvial sediments; on bottom lands and terraces". These soils tend to act as drainage ways for more elevated surrounding areas. Drainage can be a problem if there is no suitable outlet for the waters. In addition, due to their location in and near the Cedar and Elk Run Creek floodplains, some of the soils in Evansdale may be subject to flooding.

Transportation

Two major highways pass through the City of Evansdale, Interstate 380/US Highway 20 and Dubuque Road (Old US Highway 20). Where these highways pass through the city, they are four-lane divided highways. Interstate 380 passes through the southern portion of the city and Dubuque Road passes through the northern portion of the city. Vehicular traffic in the city is highest on Interstate. According to the Iowa Department of Transportation (IDOT), as of 2017, an

average of 38,000 cars and trucks travel on that stretch of highway each day. As of 2017, an additional 4,420 vehicles travel each day on Dubuque Road, according to the IDOT. These amounts do not include the number of cars using city streets each day.

The major rail transportation route located near the city is the Canadian National Railway Company rail line that runs just north of the city's northern city limits. This railroad operates 6,400 miles of track in the United States, with 558 miles located in Iowa. Trains running on the track north of Evansdale occasionally carry chemicals and other farm products that could cause a hazard if spilled or leaked into the environment. The nearest airport is the Waterloo Municipal Airport, located north of Waterloo, approximately eight miles from Evansdale. Bus service is available within the city for some populations. The city is served by the Iowa Northland Regional Transit Commission and the Waterloo Metropolitan Transit Authority Paratransit service, both of which offers transportation services to special populations.

In addition, the City of Evansdale is connected to an extensive trail system that serves pedestrian and bicycle users. The Cedar Valley Lakes Trail connects Evansdale to Waterloo, and the Cedar Valley Nature Trail runs south out of the City to Cedar Rapids. The two Cedar Valley trails are connected by the Gilbertville Drive Trail. The Cedar Valley Nature trail bridge south of Evansdale was destroyed by flooding in June 2008 and has since been replaced. There are no major commercial watercraft routes in Evansdale. The Cedar River does offer a location for recreational watercraft use by the public.

Community Services

The city has a municipal water supply and is connected to the cities of Waterloo and Elk Run Heights for emergency needs. The city has adequate water supply and quality water, and has recently constructed of a 750,000-gallon storage facility. The water system has a design capacity of 1,400,000 gallons per day. Average daily use is currently 350,000 gallons per day with peak usage of 650,000 gallons per day.

The capacity of the city's wastewater facility is currently more than adequate. Design capacity is currently 1,000,000 gallons per day. Currently the average usage is 410,000 gallons per day, with peak usage at 675,000 gallons per day. In addition, the wastewater system is televised by quadrant periodically and infiltration and inflow are kept in check. The plant has undergone major renovation about every ten years and with continuous maintenance and modification the facility is adequate to meet increasing environmental standards. The City is exploring options to make updates to its wastewater treatment facility in order to comply with Iowa Department of Natural Resources guidelines.

TABLE D1: UTILITY PROVIDERS – EVANSDALE

Utility	Provider
Electric	Mid-American Energy
Gas	Mid-American Energy
Water/Sewer	City
Telephone/Internet	CenturyLink, Mediacom
Cable TV	Mediacom

Finally, the facility is entirely within the floodplain; however, it is well protected by a levee and has never been damaged by floodwaters. The city's lift station is protected by a levee system as well.

Demographics

The community demographics appear in Table D2.

TABLE D2: CITY OF EVANSDALE DEMOGRAPHICS					
General Population, 2013-2017 ACS	Total Population	4,780	***Economic Char, 2013-2017 ACS 5-Year Estimates***	Population In Labor Force	2,530
	Total Males	2,482		Population in Civilian Labor Force	2,530
	Total Females	2,298		Persons Employed	2,404
	Median Age	37.0		Persons Unemployed	126
	At-Risk Population, under 18	1,105		Persons in Armed Forces	0
	At-Risk Population, 65 and over	687		Mean Travel Time to Work in Minutes, 16 and over	16.0
	One Race: White	4,431		Persons Employed in Management, Business, Science, and Arts Occupations	481
	One Race: Black or African American	18		Persons Employed in Service Occupations	466
	One Race: American Indian and Alaska Native	11		Persons Employed in Sales and Office Occupations	507
	One Race: Asian	0		Persons Employed in Natural Resources, Construction, and Maintenance Occupations	398
	One Race: Native Hawaiian and Other Pacific Islander	0		Persons Employed in Production, Transportation, and Material Moving Occupations	552
	Two or More Races	309		Median Household Income	48,651
	Hispanic or Latino (of any race)	128		Median Family Income	5,324
				Per Capita Personal Income	22,441
Households by Type, 2010 Census	Total Population in Households	4,740		All People below Poverty Level	11.4%
	Total Population in Group Quarters	14			
	Total Households	1,987			
	Total Family Households	1,316			
	Total Family Households with own children under 18	549	***Social Characteristics, 2013-2017 ACS 5-Year Estimates***		
	Male Householder, no wife present, with own children under 18	53		Total School Enrollment, 3 and over	1,159
	Female Householder, no husband present, with own children under 18	169		Population Enrolled in Nursery School, Preschool	79
	Householder living alone	535		Population Enrolled in Kindergarten and Elementary School, grades K-8	503
	Households with individuals under 18 years of age.	620		Population Enrolled in High School, grades 9-12	352
	Households with individuals 65 and over	499		Population Enrolled in College or Graduate School	225
	Average household size / Average Family Size	2.39 / 2.87		Total Population, 25 and over	3,066
				Persons with Less than 9th Grade Education	105
Housing Char, 2013-2017 ACS	Total Housing Units	2,007		Persons with 9th to 12th Grade Education, No Diploma	226
	Occupied Housing Units	1,949		Persons with High School Degree or Equivalency	1,376
	Vacant Housing Units	58		Persons with Some College Education, No Degree	627
	Owner-Occupied Housing Units	1,297		Persons with Associate Degree	419
	Population in Owner-Occupied Housing Units	3,359		Persons with Bachelor's Degree	208
	Rental-Occupied Housing Units	652		Persons with Graduate or Higher Degree	105
	Population in Rental-Occupied Housing Units	1,415		Total Civilian Noninstitutionalized Population with a Disability	646
	Mobile Homes	0			
	3+ Units in Structure	175			

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identifies and profiles the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Evansdale evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Evansdale's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions included: Historical Occurrence, Probability, Magnitude/Severity, Warning Time, and Duration. Due to recent disasters and events that have impacted the planning area, Evansdale determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table D3 identifies the analysis scores for the City of Evansdale. As seen in Table D3, the top hazards are Flash Flood, River Flooding and Severe Winter Storm.

The tables below identify the scoring criteria utilized by the Committee to evaluate each hazard. Further descriptions are provided in Section 3.

PROBABILITY		
Score	**Description**	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2	Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3	Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33% or the event is likely to occur.
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.

MAGNITUDE / SEVERITY		
Rating	**Description**	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least two weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

DURATION	
Score	**Description**
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

TABLE D3: HAZARD RISK ASSESSMENT FOR EVANSDALE					
Hazard	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Total**
Flash Flood	4	2	2	3	3
River Flooding	4	2	1	4	2.95
Severe Winter Storm	4	1	2	2	2.6
Thunderstorm/Lighting/Hail	4	1	2	1	2.5
Tornado/Windstorm	3	1	3	1	2.2
Extreme Heat	2	1	1	2	1.55
Infrastructure Failure	2	1	1	1	1.45
Dam / Levee Failure	1	1	1	4	1.3
Animal/Plant/Crop Disease	1	1	1	1	1
HAZMAT Incident	1	1	1	1	1
Grass/Wild Fire	1	1	1	1	1
Drought	1	1	1	1	1
Transportation Incident	1	1	1	1	1
Human Disease	1	1	1	1	1
Radiological Incident	1	1	1	1	1
Expansive Soils	1	1	1	1	1
Landslide	1	1	1	1	1
Sinkholes	1	1	1	1	1
Earthquake	1	1	1	1	1
Terrorism	1	1	1	1	1

Vulnerability – Identifying Assets (Critical Facilities) & Social Asset Populations

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the community's historical occurrences of tornados this hazard was added to the assessment. The following discussion only considers the assets in the community of Evansdale.

TABLE D4: SHELTERS IN EVANSDALE
City Hall
Bunger Middle School
Poyner Elementary School
Community Response Center
Source: Community

Critical Facilities

Identifying the location of critical facilities is important in order to assess their vulnerability to hazards, since these facilities are important to the community's operations, quality of life, and economic sector. These include but are not limited to schools, hospitals, libraries, police and fire stations, water towers, sirens, and lift stations. *Map 55* shows the locations of these critical facilities throughout Evansdale. Table D4 shows the locations identified as shelters in Evansdale. While these locations have been identified for use if deemed necessary, there may also be hazard events which require residents to shelter themselves "in place". Therefore, any location could potentially become a makeshift shelter for purposes of disaster response.

Homes In Hazardous Areas

As shown in *Map 12 & Map 13*, the majority of Evansdale's area is within the 500-year floodplain. Fortunately, the same does not hold true for the 100-year floodplain. In the southeast portion of the city, Interstate 380/US Highway 20 acts as a flood barrier protecting the city just north of the highway and keeping it out of the 100-year floodplain. There are also levee improvements along the Cedar River and Elk Run Creek, keeping the majority of the nearby development outside the 100-year floodplain. Table D5 identifies the value of floodplain parcels within Evansdale.

TABLE D5: FLOODPLAIN PARCELS WITHIN EVANSDALE

	# of Parcels	Total Land Value	Total Building Value	Total Dwelling Value	Multi-Residential Land	Total Value	Percent of City Damaged
City Floodway Property Values	102	$1,586,070	$720	$1,930,330	$0	$3,517,120	1.42%
City 1% Annual Chance Floodplain Property Values	56	$658,560	$0	$2,722,180	$0	$3,380,740	1.36%
City 0.2% Annual Chance Floodplain Property Values	1	$11,390	$0	$85,660	$0	$97,050	0.04%

Source: Flood overlay shows the 2011 floodplain designations in Black Hawk County, Iowa. The digital flood layer was obtained from FEMA's current Digital Flood Insurance Rate Map. The incorporated boundaries were current as of 5/5/19.

In addition, persons living in mobile homes (also known as manufactured housing) may also be at risk from tornadoes or high winds. According to rep 2008-2012 American Community Survey 5-Year Estimates, there are an estimated 85 mobile homes in Evansdale. However, the local community reports fewer mobile homes, at 31. Using the average household size of 2.39 persons/housing units, there are an estimated 74 persons living in mobile homes in the city.

Finally, persons living in some multi-family units may also be at risk due to the lack of a proper tornado shelter. According to the 2008-2012 American Community Survey 5-Year Estimates, there are an estimated 175 housing units in multi-family buildings of 3 or more units in Evansdale. Therefore, there are an estimated 418 persons living in multi-family buildings of 3 or more units in the city.

Vulnerability – Identifying Social Asset Populations

The social vulnerability assessment also identified how the hazards affect the population of Evansdale, and it is assumed that the identified populations are more likely to require assistance during times of disaster and are therefore, generally speaking, more at-risk than the remaining population. The at-risk population must be identified and targeted in successful mitigation efforts.

According to 2013-2017 ACS data, 14.4% of 4,780 residents, or approximately 687 persons, are 65 years or older. Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young people often are not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2017, 23.1% of 4,780 residents, or 1,105 persons, were under the age of 18, according to the ACS.

As mentioned previously, persons living in mobile homes and persons living in multi-family housing units are also considered at risk. There are approximately 74 persons living in mobile homes and 418 persons living in multi-family housing units in Evansdale.

Map 35 & Map 36 illustrate the impact of a hypothetical tornado event in Evansdale. According to data from the Black Hawk County Assessor's Office, there are a total of 2,199 structures in the community with a total value of $270,859,379. Table D5 illustrates the degree of impact that hypothetical tornado scenarios of various strengths would have on Evansdale.

TABLE D6: EVANSDALE TORNADO SCENARIO

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	113	$2,444,550	$108,880	$6,856,640	$235,500	$7,201,020	$1,800,255	2.90%
EF1	150 Meters	492 Feet	231	$4,324,670	$108,880	$15,868,970	$235,500	$16,213,350	$4,053,338	6.52%
EF2	250 Meters	820 Feet	319	$5,859,440	$3,468,060	$20,757,630	$235,500	$24,461,190	$12,230,595	9.84%
EF3	500 Meters	1640 Feet	586	$10,316,590	$7,984,400	$39,023,330	$356,500	$47,364,230	$23,682,115	19.06%
EF4	900 Meters	2953 Feet	1060	$19,081,483	$9,560,002	$76,232,448	$359,147	$86,151,597	$86,151,597	34.67%
EF5	1100 Meters	3609 Feet	1318	$23,129,973	$10,952,352	$93,914,318	$359,147	$105,225,817	$105,225,817	42.35%

Parcel value information is current as of 09/25/2018. The source is the Black Hawk County MIS Department. This scenario shows a realistic damage level to buildings and land calculated at the following percentages: EF0-EF1 = 25%; EF2-EF3 = 50%; EF4-EF5 = 100%

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. Table D6 lists all of the structure valuations for the City of Evansdale. Since 100% of the city is at risk of some kind of hazard event, the entire city is considered to be in the hazard area. This data was used in the Vulnerability discussion in each of the Hazard Profiles in Section 3.

The information in Table D7 was made available from the Black Hawk County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE D7: ASSET INVENTORY – BUILDING / DWELLING VALUES IN EVANSDALE

Class	Land Value	Building Value	Dwelling Value	MR Land	Building Count
Agricultural	207,710	7,760	743,440	0	7
Cities	3,452,110	2,182,920	2,457,000	0	40
Commercial/Dual Class	8,565,703	32,747,980	342,560	67,117	222
County	43,820	0	0	0	0
Industrial/Dual Class	549,136	3,176,941	114,239	17,714	10
Multi-residential	0	0	5,240,630	615,720	19
Religious/Non-Profit	569,590	1,297,630	657,130	0	15
Residential	34,326,170	0	169,650,630	0	1,884
Schools	401,200	2,908,700	0	0	2
State	513,630	0	0	0	0
	$48,629,069	**$42,321,931**	**$179,205,629**	**$700,551**	**2,199**

Source: Black Hawk County Assessor 2019 Values

*- Please note that the assessed value for tax-exempt structures may not adequately reflect their fair market rate value, which may be significantly higher than the assessed value. Accordingly, the values listed above should not be regarded as accurate for any purpose.

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced no losses in a 10-year period in which each loss is $1,000 or more. According to available FEMA data (as of 9/30/2019), the City of Evansdale participates in the National Flood Insurance Program and has three repetitive loss properties. Table 45 in Section 3 lists data from each city regarding the National Flood Insurance Program.

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The updated (non-revised) hazard mitigation plan goals for the City of Evansdale are:

1. **PROTECT**: Protect the health and safety of residents, visitors, staff and emergency personnel during and after hazard events.
2. **PREVENT**: Prevent avoidable disasters.
3. **MINIMIZE**: Minimize losses to existing and future structures in hazard areas, especially critical facilities.
4. **MAINTAIN**: Maintain local services and infrastructure in order to reduce community, economic and environmental disruption during and after hazard events.
5. **RESTORE**: Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
6. **EDUCATE**: Educate the public about hazards and resources available.
7. **ACCOUNTABILITY**: Use public funds in an efficient, cost effective and fair manner.
8. **COLLABORATE**: Incorporate each jurisdiction into the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan.

Current Mitigation Actions

Prevention Mitigation Actions

The community adopted a land use plan prior to establishing a Zoning Ordinance in 1968-69. The plan was updated in 1989 after the completion of flood control measures and the opening of the Interstate 380 that passes through the community.

The Zoning Ordinance was introduced to the community in 1960. Floodplain control has been a key element that the Planning and Zoning Commission and the Zoning Administrator has had to manage over the past 49 years. The Zoning Code recognizes Residential, Multi-Unit Residential, Commercial, Manufacturing, Agricultural and Unclassified areas. Unclassified areas are predominately no-build floodplain areas.

The City of Evansdale has adopted the Uniform, Building, Plumbing, Electrical and Mechanical Codes. The City has a Code and Zoning Administrator with an office in City Hall. The enforcement of the various codes since 1960 has dramatically reduced the number of household fire calls, caused by improper electrical and heating installations.

Property Protection Mitigation Actions

In an effort to protect Evansdale properties from flooding, the city has initiated many programs. Through a combined Urban Renewal and Iowa Department of Transportation program, the city operated a housing removal and demolition program. These houses were purchased to make way for the new interstate highway. However, some of these homes were in the 100-year floodplain and were at risk of flooding. The program ran from 1970 through 1982, and a total of 51 houses were purchased and demolished and/or moved to a new location.

As a result of the 1993 flood, the city also undertook a flood buy-out program. This program was funded in part by the City of Evansdale, Iowa Emergency Management Division, Federal Emergency Management Agency, and Community Development Block Grant Funds. The buy-out program ran from 1994 to 1997 and a total of 7 houses were purchased and demolished and/or moved to a new location.

In 1995, the city approved an elevation project that was undertaken by a local citizen wishing to raise a house to an elevation out of the 100-year floodplain. This is allowed by the City Code of Ordinance. There is a limited number of residential housing in the floodplain that has a cost to benefit ratio to provide financial assistance to elevate, rather than acquire and demolish.

After Evansdale was flooded in June 2008, the city submitted an application for buyout program funding from FEMA. An application to buyout eight properties was approved by FEMA in May 2009. This included five residential properties and three vacant lots. The city received buyout funding from FEMA totaling $661,143. The buyout program resulted in the purchase of seven houses that were demolished and the acquisition of two vacant lots.

Public Education and Awareness Mitigation Actions

A new statewide reverse 911 system known as Alert Iowa was implemented by implemented by Iowa Homeland Security and Emergency Management in 2014. Citizens have the ability to "opt in" to receive weather alerts and enter a cell phone, work phone, and other additional alternative phone numbers.

Radio, television, cellular telephones, landline telephones, newspapers, warning sirens, NOAA Radio Service and the internet are available to the public at large. The City has developed a website in order to keep its citizens, and other interested parties, aware of local and government affairs. The website address is www.evansdale.govoffice.com.

Emergency Services Mitigation Actions

Black Hawk County Emergency Management Agency

The Black Hawk County Emergency Management Agency is governed by a board of eleven commissioners comprised of the Mayors from each incorporated jurisdiction in the County or their designated delegate, a representative of the Black Hawk County Sheriff's Department, and the Chairperson of the Black Hawk County Board of Supervisors. The Emergency Management Agency works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. Furthermore, the agency is responsible for the monthly testing of all outdoor warning sirens in Black Hawk County.

Fire Department

The City of Evansdale provides fire and rescue services through its on-call volunteer department. The Evansdale Fire Rescue provides fire, rescue and advanced care EMS services to the residents of the City of Evansdale Rescue and Advanced Care EMS services to the cities of Raymond and Gilbertville in Black Hawk County along with a portion of rural Black Hawk County. The fire department has in place 28E agreements with surrounding communities to provide and receive assistance as needed on a mutual aid basis. The communities that the Evansdale Fire Rescue maintains 28E agreements with include Raymond, Gilbertville, Dunkerton, Cedar Falls, La Porte City, Hudson, and Waterloo. The Evansdale Fire Rescue is rated by the ISO as a Class 4 department. The Evansdale Fire Rescue also operates two ambulances licensed to operate at a "Provisional Paramedic" level. As of 2020, the fire department is staffed by one full-time medic, two on-call paramedics, one advanced EMTs, and thirteen on-call EMTs.

Medical Services

There is no hospital located in Evansdale. However, Black Hawk County has four major medical facilities, all of which are located in either Waterloo or Cedar Falls. Three of these facilities are considered Regional Hospitals, otherwise referred to as Level II. Mercy One Medical Center and Unity Point Hospital are located in Waterloo. Mercy One Medical Center has a second location in Cedar Falls. Another smaller facility, Peoples Community Health Clinic (Level IV),

affiliated with Covenant Medical Center, is located in downtown Waterloo.

Police

The Evansdale Police Department, Black Hawk County Sheriff's Office, and the Iowa State Patrol provide police protection. The Evansdale Police Department is staffed with full-time, part-time and reserve officers. The Department serves the city of Evansdale and Elk Run Heights. Equipment used by the Police Department includes five patrol cars, two bicycles, five mobile radios, 15 portable radios, camera and video equipment, and emergency medical equipment.

Hazardous Materials

The City of Evansdale contracts with the Northeast Iowa Response Group (affiliated with Waterloo Fire Rescue) to assist with any hazardous materials incidents that may occur within the city. The team is based within a short distance from Evansdale and staffed with specialized technicians from the Waterloo Fire Rescue. Evansdale is also an active member of the Tri-County Drug Task Force who is available to assist in the clean-up of clandestine laboratories that may be discovered in the community.

Snow Removal

The NOAA estimates that approximately 70 percent of all deaths attributed to winter storms occur in an automobile. Therefore, the City of Evansdale views proper snow and ice removal from roadways to be essential in mitigating negative effects of these events. Snow removal and ice prevention techniques are practiced by city and state employees on the corresponding local and state roadways within the city limits. The city employs full-time and part-time drivers for snow removal efforts. One driver is used for each piece of equipment. In the event that a driver cannot perform his or her duties, drivers are pulled from other city departments as necessary. Equipment used for snow and ice removal includes:

- Two double axel trucks with snow blades
- Two single axel dump trucks with snow blades
- One end-loader with a snow plow
- One skid-loader with a snow plow, and
- One skid-loader with a snow blower

Warning Systems

In the event of a tornado the City of Evansdale has a system of outdoor warning sirens that, given enough time, allow people to search for suitable shelter. In addition to siren alerts in the community there are also a wide variety of early warning messages provided through local radio and television stations as well as the Weather Channel.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the comprehensive efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit community residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

TABLE D8: STAPLEE ELEMENTS

S – Social	• Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the populations, • Actions do not cause relocation of lower income people, • Actions are compatible with the community's social and cultural values.
T- Technical	• Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	• Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	• Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	• It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	• Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E - Environmental	• Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, • Are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table D8) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each mitigation activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each of the proposed mitigation activity will occur. For instance, if the activity happens regularly (either daily, weekly, monthly, or annually) it was identified as On-Going activity; if it will occur within the next 1-5 years it was identified as Short-Term; if the activity would take 5-10 years to occur it was labeled as Mid-Term; and all activities that would take 10 or more years to occur were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The city will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, identified the responsible party or parties for each activity, and finally related each activity to at least one of the Hazard Mitigation Plan Goals listed above. Table D9 below is the City of Evansdale's Implementation Strategy.

TABLE D9: Future Hazard Mitigation Actions - Evansdale						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
H	Regularly review and amend Fire, Medical, and Hazardous Material response standard operating procedures.	All	City Council*	Ongoing	Minimal	Protect
H	Adopt a recovery ordinance.	All	City Council*	Ongoing	Minimal	Restore
H	Develop a Continuity of Operations Plan.	All	City Council*	Ongoing	Minimal	Restore, Protect
H	Update Emergency Response Plan.	All	City Council*, County EMA	Ongoing	Minimal	Protect, Restore
H	Cooperate with the metropolitan evacuation plan.	All	City Council*, County EMA	Ongoing	Minimal	Cooperate
L	Plan for water conservation or rationing should the conditions warrant such action.	Drought	City Council*, Fire Dept	Ongoing	Minimal	Protect, Maintain, Restore
L	Consult the Natural Resources Conservation Service (NRCS) soil survey for the location of unstable soils.	Expansive Soils	City Council*	Ongoing	Minimal	Prevent, Protect
H	Establish local “Cooling Sites” for at risk populations such as the elderly and/or disabled.	Extreme Heat	City Council*, County EMA	Ongoing	Minimal	Protect
H	Construct storm water pump stations at various locations within the city.	Flash Flood, River Flood	City Council*	Ongoing	Low to Moderate	Protect, Prevent
H	Maintain, enforce, and update Zoning and Floodplain Ordinances as needed.	Flash Flood, River Flood	City Council*	Ongoing	Minimal	Protect, Prevent
H	Acquisition and removal of homes from the floodplain.	Flash Flood, River Flood	City Council*, FEMA, IEMD	Ongoing/Complete	High	Prevent
H	Construct additional levees on the east side of Elk Run Creek.	Flash Flood, River Flood	City Council*, Army Corps of Engineers	Long Term	High	Prevent

TABLE D9: Future Hazard Mitigation Actions - Evansdale						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
H	Upgrade pumps in the Michigan Avenue lift station.	Flash Flood, River Flood	City Council*, FEMA, Iowa Homeland Security	Short-term	High	Maintain, Protect, Prevent
H	Elevate wastewater treatment facility buildings above 100-year base flood elevation.	Flash Flood, River Flood	City Council*, FEMA, Iowa Homeland Security	Short-term	High	Maintain, Protect, Prevent
M	Maintain and update sandbagging plan.	Flash Flood, River Flood	City Council*	Ongoing	Minimal	Protect, Prevent
L	Maintain the clearing of drainage ditch northwest of the Community.	Flash Flood, River Flood	City Council*	Ongoing	Minimal	Maintain
L	Purchase a sandbagging machine.	Flash Flood, River Flood	City Council*, County EMA	Ongoing	Minimal	Protect
H	Ensure that MSDS forms are updated on a regular basis.	HAZMAT	City Council*	Ongoing	Minimal	Protect, Prevent
H	Inform city employees of any hazardous materials they may encounter in the workplace.	HAZMAT	City Council*, County EMA	Ongoing	Minimal	Protect, Prevent, Educate
H	Cap old wells to prevent contamination.	HAZMAT	City Council*, Iowa DNR	Ongoing	Minimal	Protect, Prevent
H	Encourage residents to fill and cap old septic tanks to prevent sinkholes.	HAZMAT, Sinkholes	City Council*	Ongoing	Minimal	Protect, Prevent
H	Continue to encourage the installation of sprinkler systems in multi-family dwellings, industrial buildings, and public buildings (schools included).	Infrastructure Failure	City Council*	Ongoing	Minimal	Educate, Protect, Prevent
H	Encourage the installation of carbon monoxide detectors in houses and public buildings.	Infrastructure Failure	City Council*	Ongoing	Minimal	Protect, Educate, Prevent
H	Install Global Positioning Systems in all emergency vehicles.	Infrastructure Failure	City Council*, County EMA, Iowa Homeland Security	Ongoing	Minimal	Protect, Maintain
H	Recruit and retain volunteers.	Infrastructure Failure	City Council*, Fire Dept	Ongoing	Minimal	Protect, Educate

TABLE D9: Future Hazard Mitigation Actions - Evansdale						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
H	Regularly review and update Incident Command process as needed.	Infrastructure Failure	City Council*, Fire Dept, Police Dept	Ongoing	Minimal	Protect, Restore, Educate
H	Support the National Incident Management System (NIMS).	Infrastructure Failure	City Council*, County EMA	Ongoing	Minimal	Maintain
H	Enforce City guidelines for burning.	Infrastructure Failure, Drought, Grassfire/Wildfire	City Council*, Fire Dept, Police Dept	Ongoing	Minimal	Protect, Prevent, Educate
H	Review and improve evacuation plans and file with LEPC.	Infrastructure Failure, Levee Failure	City Council*	Ongoing	Minimal	Protect, Prevent
H	Continue dike inspection program.	Levee Failure	City Council*, Army Corps of Engineers	Ongoing	Minimal	Maintain
H	Continue to maintain dike as needed.	Levee Failure	City Council*, Public Works Dept	Ongoing	Minimal	Maintain
H	Identify any sinkholes that develop with proper warning signage.	Sinkholes	City Council*, Iowa DNR	Ongoing	Minimal	Protect, Prevent
L	Evaluate current terrorism mitigation efforts.	Terrorism	City Council*	Ongoing	Minimal	Protect, Prevent
M	Continue storm sewer drainage and emergency pumping capability improvement projects.	Thunderstorm/Lightning	City Council*, FEMA, Iowa Homeland Security	Ongoing	Minimal	Maintain, Prevent, Protect
H	Review and make updates, as needed, to storm water management program.	Thunderstorm/Lightning, Flash Flood, River Flood, HAZMAT	City Council*	Ongoing	Minimal	Maintain, Prevent, Protect
H	Encourage local utility to install surge protectors on major electric lines.	Thunderstorm/Lightning, Infrastructure Failure	City Council*, MidAmerican Energy	Long Term	N/A	Protect, Prevent
M	Continue to work with MidAmerican's tree inspection and trimming program.	Thunderstorm/Lightning, Tornado/Windstorm, Winter Storm, Infrastructure Failure,	City Council*, MidAmerican Energy	Ongoing	Minimal	Protect, Prevent, Maintain

TABLE D9: Future Hazard Mitigation Actions - Evansdale						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
H	Purchase new generators to provide emergency power in times of need. (for pumping station, lift station, sewer and water treatment plants).	Thunderstorm/Lightning, Winter Storm, Infrastructure Failure	City Council*	Short-term	Minimal	Protect, Restore
H	Develop a "Tornado Safe Room" awareness program.	Tornado/Windstorm	County EMA*	Long Term	Minimal	Protect
M	Install new rotating warning siren to replace existing.	Tornado/Windstorm	City Council*, County EMA	Ongoing/complete	Low	Protect
M	Maintain participation in the emergency notification system.	Tornado/Windstorm	County EMA*, Police Dept, City Council	Ongoing	Minimal	Educate, Protect
M	Encourage the public to sign up for emergency alerts services.	Tornado/Windstorm	City Council*	Ongoing	Minimal	Educate, Protect
M	Maintain, enforce and update Building Codes as needed.	Tornado/Windstorm, Flash Flood, River Flood, Infrastructure Failure, Earthquake	City Council*, Building Inspector	Ongoing	Minimal	Maintain
H	Educate the public.	All	City Council*, Police Dept, Fire Dept, County EMA, County Conservation, Iowa DNR	Ongoing	Minimal	Educate
H	Identify locations and encourage the construction of "Tornado Safe" shelters at popular outdoor recreation sites or at sites utilized by at risk populations (senior housing, multi-family housing, trailer parks).	Tornado/Windstorm, Infrastructure Failure, Radiological	City Council*, FEMA, Iowa Homeland Security	Long Term	Low	Protect, Educate
H	Maintain existing Mutual Aid agreements with surrounding communities and the Northeast Iowa Response Group for mutual aid emergency assistance.	Transportation Incident, Infrastructure Failure, HAZMAT, Terrorism	City Council*	Ongoing	Minimal	Protect, Restore

TABLE D9: Future Hazard Mitigation Actions - Evansdale						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
H	Continue to provide necessary training to Fire Department personnel, Police Department personnel, and ambulance crews.	Transportation Incident, Infrastructure Failure, HAZMAT, Terrorism, Grassfire/Wildfire,	City Council*, Police Dept, Fire Dept	Ongoing	Minimal to Moderate	Protect, Restore, Educate
H	Designate official "Heat Shelters" that have back-up generator power and can be made available for those in need during a winter storm.	Winter Storm	City Council*, County EMA	Ongoing	Minimal	Protect, Prevent, Restore
H	Stockpile sufficient sand and salt supplies for use on snowy/icy roads.	Winter Storm	City Council*	Ongoing	Minimal	Protect, Prevent, Maintain

APPENDIX E: CITY OF GILBERTVILLE

COMMUNITY PROFILE

Location

Gilbertville is located the southeast quadrant of Black Hawk County. Its elevation is approximately 846 feet above sea level. The city is bordered on the north, east, and south by farmland, and on the west by the Cedar River. The land within the city is generally flat with a few areas of steeper grade near the Cedar River and the creek that runs through the community.

Natural Environment

There is one major waterway, Cedar River, located near the City of Gilbertville. The Cedar River flows from northwest to southeast, and borders the western city limits. The Cedar River is served by several tributaries and eventually flows into the Iowa River. The Cedar River drainage area is 5,146 square miles, with a total of 3,197.5 river and streams miles.

According to the Black Hawk County Soil Survey conducted in 1977 by the United State Department of Agriculture Soil Conservation Service, the soil in Gilbertville is "Loamy alluvial land, channeled … nearly level and gently sloping, excessively drained to poorly drained loamy soils formed in loamy alluvial sediments; on bottom lands and terraces". These soils tend to act as drainage ways for more elevated surrounding areas. Drainage can be a problem if there is no suitable outlet for the waters. In addition, due to their location in and near the Cedar River floodplain, some of the soils in Gilbertville may be subject to flooding.

Transportation

Iowa State Highway 297 and Black Hawk County Highway D38, as well as multiple local roads, provide access to Gilbertville. 5th Street is Gilbertville's main thoroughfare, which the city's modest business district is situated along. Interstate 380 runs north-south approximately two miles east of Gilbertville. 10th Avenue provides access to the Interstate at Exit 62. US Highway 218, which also runs north-south, is approximately 2 ½ miles west of Gilbertville. East Washburn Road provides the most direct access to the highway.

The Cedar Valley Nature Trail bypasses Gilbertville less than a half-mile west of the city, on the other side of the Cedar River. Residents can take the trail north straight to Evansdale and Elk Run Heights or south straight to La Porte City.

There is neither a railroad nor airport in Gilbertville. The nearest airport is the Waterloo Regional Airport, approximately 15 miles northwest of Gilbertville.

Community Services

The City has a municipal water supply that is derived from two wells. A third emergency well exists, but has not been used for some time. The City has an elevated storage capacity of 25,000 gallons. Average daily use is approximately 50,000 gallons per day with 70 gallons per capita per day.

The capacity of the City's Wastewater Facility is currently more than adequate. Design capacity is currently 200,000 gallons per day. Currently the average usage is 7,000 gallons per day, with peak usage at 311,000 gallons per day. The system is considered to be a mechanical type system, as opposed to a primary, secondary, lagoon, or trickling system.

TABLE E1: UTILITY PROVIDERS – GILBERTVILLE

Utility	Provider
Electric	Mid-American Energy
Gas	Mid-American Energy
Water/Sewer	City
Telephone/Internet	CenturyLink, Mediacom
Cable TV	Mediacom

Demographics

The community's demographics appear in table E2.

TABLE E2: CITY OF GILBERTVILLE DEMOGRAPHICS					
General Population, 2013-2017 ACS	Total Population	750	***Economic Char, 2013-2017 ACS 5-Year Estimates***	Population In Labor Force	405
	Total Males	384		Population in Civilian Labor Force	402
	Total Females	366		Persons Employed	384
	Median Age	52.1		Persons Unemployed	18
	At-Risk Population, under 18	82		Persons in Armed Forces	3
	At-Risk Population, 65 and over	187		Mean Travel Time to Work in Minutes, 16 and over	19.9
	One Race: White	750		Persons Employed in Management, Business, Science, and Arts Occupations	79
	One Race: Black or African American	0		Persons Employed in Service Occupations	57
	One Race: American Indian and Alaska Native	0		Persons Employed in Sales and Office Occupations	76
	One Race: Asian	0		Persons Employed in Natural Resources, Construction, and Maintenance Occupations	67
	One Race: Native Hawaiian and Other Pacific Islander	0		Persons Employed in Production, Transportation, and Material Moving Occupations	105
	Two or More Races	0		Median Household Income	50,250
	Hispanic or Latino (of any race)	0		Median Family Income	64,167
				Per Capita Personal Income	29,408
Households by Type, 2010 Census	Total Population in Households	712		All People below Poverty Level	11.2%
	Total Population in Group Quarters	0			
	Total Households	303			
	Total Family Households	199			
	Total Family Households with own children under 18	80	***Social Characteristics, 2013-2017 ACS 5-Year Estimates***		
	Male Householder, no wife present, with own children under 18	8		Total School Enrollment, 3 and over	106
	Female Householder, no husband present, with own children under 18	14		Population Enrolled in Nursery School, Preschool	7
	Householder living alone	87		Population Enrolled in Kindergarten and Elementary School, grades K-8	30
	Households with individuals under 18 years of age.	56		Population Enrolled in High School, grades 9-12	16
	Households with individuals 65 and over	104		Population Enrolled in College or Graduate School	53
	Average household size / Average Family Size	2.35 / 2.87		Total Population, 25 and over	558
				Persons with Less than 9th Grade Education	23
Housing Characteristics, 2013-2017 ACS	Total Housing Units	382		Persons with 9th to 12th Grade Education, No Diploma	14
	Occupied Housing Units	355		Persons with High School Degree or Equivalency	262
	Vacant Housing Units	27		Persons with Some College Education, No Degree	125
	Owner-Occupied Housing Units	259		Persons with Associate Degree	66
	Population in Owner-Occupied Housing Units	549		Persons with Bachelor's Degree	58
	Rental-Occupied Housing Units	96		Persons with Graduate or Higher Degree	10
	Population in Rental-Occupied Housing Units	200		Total Civilian Noninstitutionalized Population with a Disability	99
	Mobile Homes	0			
	3+ Units in Structure	25			

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Gilbertville evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Gilbertville's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions included: Historical Occurrence, Probability, Magnitude/Severity, Warning Time, and Duration. Due to recent disasters and events that have impacted the planning area, Gilbertville determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table E3 identifies the analysis scores for the City of Gilbertville. As seen in Table E3, the top hazards are Transportation Incident, Thunderstorm/Lightning/Hail and Severe Winter Storm.

The tables below identify the scoring criteria utilized by the Committee to evaluate each hazard. Further descriptions are provided in Section 3.

PROBABILITY		
Score	**Description**	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2	Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3	Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33% or the event is likely to occur.
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.

MAGNITUDE / SEVERITY		
Rating	**Description**	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least two weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

DURATION	
Score	**Description**
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

TABLE E3: HAZARD RISK ASSESSMENT FOR GILBERTVILLE					
Hazard	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Total**
Transportation Incident	4	4	4	3	3.9
Thunderstorm/Lighting/Hail	4	2	4	1	3.1
Severe Winter Storm	4	2	2	3	3
Tornado/Windstorm	3	3	4	1	2.95
Extreme Heat	4	2	1	4	2.95
Grass/Wild Fire	4	1	4	2	2.9
Terrorism	1	4	4	4	2.65
Earthquake	1	4	4	4	2.65
Infrastructure Failure	2	2	4	4	2.5
River Flooding	3	2	1	4	2.5
HAZMAT Incident	1	3	4	3	2.25
Flash Flood	2	2	4	1	2.2
Human Disease	1	3	2	4	2.05
Dam / Levee Failure	1	2	3	4	1.9
Radiological Incident	1	2	3	4	1.9
Drought	2	1	1	4	1.75
Sinkholes	1	1	4	4	1.75
Landslide	1	1	4	3	1.65
Expansive Soils	1	1	3	4	1.6
Animal/Plant/Crop Disease	1	1	2	4	1.45

Vulnerability – Identifying Assets (Critical Facilities) & Social Asset Populations

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the community's historical occurrences of tornados this hazard was added to the assessment. The following discussion only considers the assets in the community of Gilbertville.

TABLE E4: SHELTERS IN GILBERTVILLE
Don Bosco School
Source: Community

Critical Facilities

Identifying the location of critical facilities is important in order to assess their vulnerability to hazards, since these facilities are important to the community's operations, quality of life, and economic sector. These include but are not limited to schools, hospitals, libraries, police and fire stations, water towers, sirens, and lift stations. *Map 56* shows the locations of these critical facilities throughout Gilbertville.

Table E4 shows the location identified as a shelter in Gilbertville, the Don Bosco School, which has a capacity of 3,200 persons. While this location has been identified for use if deemed necessary, there may also be hazard events which require residents to shelter themselves "in place". Therefore, any location could potentially become a makeshift shelter for purposes of disaster response.

Homes In Hazardous Areas

As shown in *Map 14 & Map 15*, the vast majority of the city is outside the 100-year floodplain. Only a small portion of the city's southwest corner is within the floodplain, and that area is mostly preservation or park space. Fortunately, there are no structures of any kind identified within the floodplain. However, there are 68 parcels in the floodplain. The value of all property within the city's floodplain was $6,815,810 in 2019.

TABLE E5: FLOODPLAIN PARCELS WITHIN GILBERTVILLE

	# of Parcels	Total Land Value	Total Building Value	Total Dwelling Value	Multi-Residential Land	Total Value	Percent of City Damaged
City Floodway Property Values	6	$165,240	$30,450	$0	$0	$195,690	0.35%
City 1% Annual Chance Floodplain Property Values	62	$793,190	$4,200,950	$1,625,980	$0	$6,620,120	11.72%
City 0.2% Annual Chance Floodplain Property Values	0	$0	$0	$0	$0	$0	0.00%

Source: Flood overlay shows the 2011 floodplain designations in Black Hawk County, Iowa. The digital flood layer was obtained from FEMA's current Digital Flood Insurance Rate Map. The incorporated boundaries were current as of 5/5/19.

Persons residing in mobile homes and multi-unit apartments are considered at a higher risk of tornados. There are no mobile homes in Gilbertville; however, there are 25 housing units in multi-unit buildings consisting of 3 or more units. Using the average household size for Gilbertville according to the 2010 U.S Census, there are approximately 59 persons residing in multi-unit buildings consisting of 3 or more units.

Vulnerability – Identifying Social Asset Populations

The social vulnerability assessment also identified how the hazards affect the population of Gilbertville, and it is assumed that the identified populations are more likely to require assistance during times of disaster and are therefore, generally speaking, more at-risk than the remaining population. The at-risk population must be identified and targeted in successful mitigation efforts.

According to 2013-2017 ACS data, approximately 187 persons are 65 years or older, representing 24.9 percent of the population. Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young people often are not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2017, 82 persons were under the age of 18, representing 10.9% of the population.

As mentioned previously, persons living in mobile homes and persons living in multi-family housing units are also considered at risk. There are no persons living in mobile homes and an estimated 59 persons living in multi-family housing units in Gilbertville.

Map 37 and *Map 38* illustrate the impact of a hypothetical tornado event in Gilbertville. According to data from the Black Hawk County Assessor's Office, there are a total of 497 parcels of land in the community with a total value of $56,509,680. Table E6 illustrates the degree of impact that hypothetical tornado scenarios of various strengths would have on Gilbertville.

TABLE E6: GILBERTVILLE TORNADO SCENARIO

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	80	$1,164,268	$646,762	$5,338,748	$28,412	$6,013,922	$1,503,481	10.64%
EF1	150 Meters	492 Feet	157	$2,270,928	$699,432	$11,207,178	$28,412	$11,935,022	$2,983,756	21.12%
EF2	250 Meters	820 Feet	221	$3,535,288	$5,750,142	$16,665,978	$57,332	$22,473,452	$11,236,726	39.77%
EF3	500 Meters	1640 Feet	334	$5,708,838	$6,233,892	$28,401,708	$57,332	$34,692,932	$17,346,466	61.39%
EF4	900 Meters	2953 Feet	458	$7,602,008	$6,235,532	$38,075,518	$57,332	$44,368,382	$44,368,382	78.51%
EF5	1100 Meters	3609 Feet	496	$8,236,628	$6,377,612	$41,636,288	$57,332	$48,071,232	$48,071,232	85.07%

Parcel value information is current as of 09/25/2018. The source is the Black Hawk County MIS Department. This scenario shows a realistic damage level to buildings and land calculated at the following percentages: EF0-EF1 = 25%; EF2-EF3 = 50%; EF4-EF5 = 100%

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. Table E6 lists all of the structure valuations for the City of Gilbertville. Since 100% of the city is at risk of some kind of hazard event, the entire city is considered to be in the hazard area. This data was used in the Vulnerability discussion in each of the Hazard Profiles in Section 3.

This information was made available from the Black Hawk County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE E7: ASSET INVENTORY – BUILDING / DWELLING VALUES IN GILBERTVILLE

Class	Land Value	Building Value	Dwelling Value	MR Land	Building Count
Cities	519,080	638,940	0	0	9
Commercial/Dual Class	100,228	1,038,342	77,038	5,912	13
County	3,940	0	0	0	0
Multi-residential	0	0	199,490	22,500	1
Religious/Non-Profit	465,660	5,047,800	403,570	28,920	11
Residential	7,344,370	0	42,267,860	0	329
Total	**8,433,278**	**6,725,082**	**42,947,958**	**57,332**	**363**

Source: Black Hawk County Assessor 2019 Values

*- Please note that the assessed value for tax-exempt structures may not adequately reflect their fair market rate value, which may be significantly higher than the assessed value. Accordingly, the values listed above should not be regarded as accurate for any purpose.

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced no losses in a 10-year period in which each loss is $1,000 or more. According to available FEMA data (as of 9/30/19), the City of Gilbertville participates in the National Flood Insurance Program and has no repetitive loss properties. Table 45 in Section 3 lists data from each city regarding the National Flood Insurance Program.

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The updated (non-revised) hazard mitigation plan goals for the City of Gilbertville are:

1. **PROTECT**: Protect the health and safety of residents, visitors, staff and emergency personnel during and after hazard events.
2. **PREVENT**: Prevent avoidable disasters.
3. **MINIMIZE**: Minimize losses to existing and future structures in hazard areas, especially critical facilities.
4. **MAINTAIN**: Maintain local services and infrastructure in order to reduce community, economic and environmental disruption during and after hazard events.
5. **RESTORE**: Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
6. **EDUCATE**: Educate the public about hazards and resources available.
7. **ACCOUNTABILITY**: Use public funds in an efficient, cost effective and fair manner.
8. **COLLABORATE**: Incorporate each jurisdiction into the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan.

Current Mitigation Actions

Prevention Mitigation Actions

The City of Gilbertville has adopted a Floodplain Regulation Ordinance, which is included in the City's Code of Ordinance. The Mayor is responsible for administering the floodplain ordinance in addition to other duties. In accordance with NFIP guidelines, the ordinance does not allow for new construction within the floodway. In addition, it requires those structures within the floodway fringe to be adequately anchored to prevent flotation, collapse or lateral movement of the structure; use construction methods and practices that will minimize flood damage and; use construction materials and utility equipment that are resistant to flood damage.

The Federal Insurance Administration manages the insurance component of the NFIP, and works closely with FEMA's Mitigation Directorate, which oversees the floodplain management aspect of the program. Gilbertville, because of its membership, is eligible for the insurance benefits provided by this program.

Property Protection Mitigation Actions

According to City officials, Gilbertville has not participated in any housing buyout or property protection programs.

Public Education and Awareness Mitigation Actions

A new statewide reverse 911 system known as Alert Iowa was implemented by implemented by Iowa Homeland Security and Emergency Management in 2014. Citizens have the ability to "opt in" to receive weather alerts and enter a cell phone, work phone, and other additional alternative phone numbers.

Radio, television, cellular telephones, landline telephones, newspapers, warning sirens, NOAA Radio Service and the internet are available to the public at large. The City has developed a website in order to keep its citizens, and other interested parties, aware of local and government affairs. The website address is www.gilbertvilleia.com.

Emergency Services Mitigation Actions

Black Hawk County Emergency Management Agency

The Black Hawk County Emergency Management Agency is governed by a board of eleven commissioners comprised of the Mayors from each incorporated jurisdiction in the County or their designated delegate, a representative of the Black Hawk County Sheriff's Department, and the Chairperson of the Black Hawk County Board of Supervisors. The Emergency Management Agency works in conjunction with local fire, rescue, police, and government officials to draft and

implement workable emergency action plans in the community. Furthermore, the agency is responsible for the monthly testing of all outdoor warning sirens in Black Hawk County.

Fire Department

The City of Gilbertville operates a volunteer Fire Department. As of 2010, the City of Gilbertville has approximately 19 volunteer firemen. The fire department has in place 28E agreements with surrounding communities to provide and receive assistance as needed on a mutual aid basis. The communities that the Gilbertville Volunteer Fire Department maintains 28E agreements include: Dunkerton, Evansdale, Hudson, Jesup, La Porte City, Raymond, and Waterloo. The Gilbertville Volunteer Fire Department operates the following equipment: 1988 Ford Pumper, 2005 Kenworth Pumper, 1983 Chevy Tanker, 1991 Chevy Crew Cab Pickup, 2004 Ford F350 Grass Truck, 2010 Tanker, and 2009 Honda MUV.

Medical Services

There is no hospital located in Gilbertville; however, Black Hawk County is presently a regional health care center. In addition to numerous private clinics and practicing physicians, Black Hawk County has four major medical facilities, all of which are located in either Waterloo or Cedar Falls. Three of these facilities are considered Regional Hospitals, otherwise referred to as Level II. Mercy One Medical Center and Unity Point Hospital are located in Waterloo. Mercy One Medical Center has a second location in Cedar Falls. Another smaller facility, Peoples Community Health Clinic (Level IV), affiliated with Covenant Medical Center, is located in downtown Waterloo.

Police

The Gilbertville Police Department, Black Hawk County Law Enforcement, and the Iowa State Patrol provide police protection. The Gilbertville Police Department currently consists of a full-time Police Chief, Assistant Police Chief, and three officers.

Hazardous Materials

A regional Hazard Materials Team is on hand to assist the community with a Hazard Materials event or catastrophe. The Team is located within a short distance and is operated by Waterloo Fire Rescue Department. The city is also a partner in the Tri-County Drug Task Force. The group works with the City in the event of the discovery of a methamphetamine lab within the community.

Snow Removal

City of Gilbertville views proper snow and ice removal from roadways to be essential in mitigating negative effects of these events. Snow removal and ice prevention techniques are practiced by city and county employees on the corresponding local and county roadways within the city limits. Equipment used for

snow and ice removal include: 1992 John Deere Backhoe, 1997 Ford F450 Truck, 1993 International Dump Truck, 2009 Ford 4x4 pickup truck, 1965 Pelican Street Sweeper, and 1991 Ford Truck with Snowplow. In the event that a driver cannot perform his or her duties, drivers can be pulled from other city departments as necessary.

Warning Systems

There is currently one tornado warning siren in the center of the city.

TABLE E8: STAPLEE ELEMENTS

S – Social	• Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the populations, • Actions do not cause relocation of lower income people, • Actions are compatible with the community's social and cultural values.
T- Technical	• Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	• Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	• Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	• It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	• Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E - Environmental	• Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, • Are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the comprehensive efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit community residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table E8) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified

future mitigation activity. Afterwards, the average priority for each mitigation activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each of the proposed mitigation activity will occur. For instance, if the activity happens regularly (either daily, weekly, monthly, or annually) it was identified as On-Going activity; if it will occur within the next 1-5 years it was identified as Short-Term; if the activity would take 5-10 years to occur it was labeled as Mid-Term; and all activities that would take 10 or more years to occur were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The city will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.
The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, identified the responsible party or parties for each activity, and finally related each activity to at least one of the Hazard Mitigation Plan Goals listed above. Table E9 below is the City of Gilbertville's Implementation Strategy.

TABLE E9 : FUTURE HAZARD MITIGATION ACTIVITIES – GILBERTVILLE							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
Medium	Maintain an Adequate Supply of Road Signage (i.e., detour, closure, snow routes, etc.).	All	Public Works Department*, City, Iowa DOT	Active	Minimal to Low	Local, State	Maintain
High	Encourage & Support Public Education and Awareness (i.e., proper steps to protect property & health for all hazards, purpose of warning system, Iowa One Call, flood insurance, regulations, HAZMAT education and disposal, vaccinations for humans and pets, Fire Prevention Week for Schools, importance of disaster kits/supplies, local ordinance requirements, smoke and carbon oxide alarms, nuisance abatement education, proper landscaping and building techniques to avoid erosion, etc.).	All	City (all departments)*, Black Hawk County EMA, American Red Cross, Iowa DOT, National Weather Bureau, First Responders, Duane Arnold Energy Plant, Iowa DNR, ISU Extension, Black Hawk County Health Department, Hawkeye Valley Area Agency of Aging	Active	Minimal	Local, State	Educate
High	Maintain Mutual Aid (28E) Agreements.	All	City Council*	Active	Minimal	Local	Maintain, Cooperate
High	Encourage use of emergency notification services.	All	Black Hawk County Emergency Management*, City (all departments)	Active	Minimal	Local	Educate, Protect
High	Maintain a Well-Trained and Well-Equipped Police Department for all Potential Hazards - Training Plan and Equipment Rotation Plan.	All	City Council*, Police Department	Active	Minimal to High	Local, State, Federal	Maintain, Protect
High	Maintain a Well-Trained and Well-Equipped Fire Department for all Potential Hazards - Training Plan and Equipment Rotation Plan.	All	City Council*, Fire Department	Active	Minimal to High	Local, State, Federal	Maintain, Protect
High	Maintain a Well-Trained and Well-Equipped First Responders for all Potential Hazards - Training Plan and Equipment Rotation Plan.	All	City Council*, Black Hawk County, Fire Department, Police Department	Active	Minimal to High	Local, State, Federal	Maintain, Protect
High	Maintain a Well-Trained and Well-Equipped Public Works Department of all Potential Hazards - Training Plan and Equipment Rotation Plan.	All	City Council*, Public Works Department	Active	Minimal to High	Local, State	Maintain, Protect
High	Continue Incident Management System Training (100, 200, 700), OSHA, and Certified Flood Manager Training for City Employees.	All	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal to Low	Local, State	Maintain, Protect

TABLE E9 : FUTURE HAZARD MITIGATION ACTIVITIES – GILBERTVILLE							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
High	Continue to Re-Evaluate Procedures after Major Incidents.	All	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Local	Restore
High	Maintain Outdoor Warning Sirens through Training Procedures for Maintenance and Identification of Who is In-Charge/Responsible for City.	All	City (all departments)*, City Council, Black Hawk County	Active	Low to Moderate	Local	Maintain, Protect
High	Install Back-up Generators at City Hall, Wells, Schools, and Critical Facilities.	All	City Council*, Black Hawk County, Schools	Active	Moderate to High	Local, State, Federal	Protect, Restore, Maintain
High	Apply for Grants/Funding as they Become Available.	All	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Local	Protect, Prevent, Maintain, Accountability
High	Develop and Update, as needed, Contingency Operations Government Plan.	All	City (all departments)*, City Council, Black Hawk County Emergency Management	Active	Minimal	Local	Protect, Restore
High	Review and Update Emergency Response Plan.	All	City (all departments)*, City Council, Black Hawk County Emergency Management, Schools	Active	Minimal	Local	Protect, Restore
Medium	Maintain, Update/Purchase, as needed, City Equipment and Supplies (i.e., Snow Plows, Generators, Surge Protectors, Animal Rescue supplies, Sandbag supplies, Deicer, Technology equipment, etc.).	All	City Council*, Black Hawk County, Fire Department, Public Works Department, Police Department	Active	Minimal to High	Local, State, Federal	Maintain
Medium	Adopt, Review, Maintain, Enforce, and Update, as needed, Existing Policies, Regulations, and Ordinances (i.e, Floodplain, Zoning, Subdivision, Snow Removal, Animal Vaccination and Licensing, etc.).	All	City (all departments)*, City Council, Black Hawk County	Active	Minimal to Low	Local	Maintain, Protect
Medium	Designate, Develop, Maintain and Distribute List of Shelter Sites (all types), Maintain Shelter Agreements with Red Cross, and Conduct Shelter Operation Training with Red Cross.	All	Black Hawk County Emergency Management*, Red Cross	Active	Minimal	Local	Protect, Educate, Collaborate

TABLE E9 : FUTURE HAZARD MITIGATION ACTIVITIES – GILBERTVILLE							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
Medium	Develop an Emergency Evacuation and Notification Plan (includes identifying detour and evacuation routes) and Regularly Evaluate Plan.	All	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Local	Protect, Educate
Medium	Develop a Public Information/Media Plan/Procedure.	All	City (all departments)*, Black Hawk County Emergency Management, Schools	Active	Minimal	Local	Protect, Restore, Educate
Medium	Develop and Maintain a Communication Plan (Inter-Departmental and communitywide).	All	City (all departments)*, Black Hawk County, Schools	Active	Minimal	Local	Protect, Educate, Collaborate,
Medium	Develop and Maintain Continuing Education Plan/Procedures.	All	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Local	Maintain
Medium	Maintain Utility Contact Call List.	All	City (all departments)*	Active	Minimal	Local	Maintain
Medium	Acquire Land and Build new Fire Station to Accommodate Department Needs.	All	City Council*, Fire Department	Active	Moderate to High	Local, State, Federal	Protect
Low	Identify any Language Barriers in Community and Develop Procedures to Address the Barriers (i.e, Translators, etc.).	All	Black Hawk County Emergency Management*, City (all departments), Schools	Active	Minimal	Local	Educate, Protect, Prevent
Low	Ensure Adequate Coverage of Outdoor Warning Sirens - Relocate existing sirens and/or Purchase Additional Ones.	All	City (all departments)*, City Council, Black Hawk County Emergency Management	Active	Low to High	Local, State, Federal	Protect
High	Continue to Cooperate with Black Hawk County Health Department and Local Medical Facilities to Help Ensure Effectiveness of Prevention, Detection, and Response Mechanisms.	Disease	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Local	Collaborate, Prevent, Protect
High	Continue to Test Local Drinking Water Supply to Monitor Quality.	Disease	Public Works*	Active	Minimal	Local	Protect, Prevent
Low	Spray as Needed for Mosquitoes and Other Insects.	Disease	Public Works*, Black Hawk County	Active	Minimal	Local	Protect, Prevent
Low	Maintain Relationship/Contract with Cedar Bend Humane Society and Black Hawk County.	Disease	City Council*, City (all departments)	Active	Minimal	Local	Collaborate

TABLE E9 : FUTURE HAZARD MITIGATION ACTIVITIES – GILBERTVILLE							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
Low	Work with Designated Authorities to Ensure Dead Animals are Properly Disposed.	Disease	City (all departments)*, Black Hawk County, Iowa DOT, Iowa DNR	Active	Minimal	Local, State	Collaborate, Prevent
Low	Develop and Enforce, when necessary, Water Restriction Ordinance.	Drought	City Council*, City (all departments)	Active	Minimal	Local	Restore
Low	Explore Alternative Water Supply Options to Improve Water Supply System (i.e., either an Additional Well to Supplement System, Installation of an Emergency Hookup to Rural Water System, etc.).	Drought, Disease	City Council*, Public Works	Active	Moderate to High	Local, State, Federal	Protect, Maintain
High	Update Water Distribution System (i.e., Replace Existing 4-inch Water Supply Lines with Larger Lines).	Drought, Structure Fire	Public Works*, City Council	Active	Moderate to High	Local, State, Federal	Protect, Maintain
Medium	Place Tile in Back of Curbs on New Construction.	Expansive Soils	Public Works*, City Council, Developers	Active	Low to High	Local	Prevent
Medium	Maintain and Enforce Up-to-Date Building Codes.	Expansive Soils, Tornado	City Council*, City (all departments)	Active	Minimal	Local	Maintain, Protect, Prevent
Medium	Continue to Work with Black Hawk County EMA to Ensure local Tier II HAZMAT Reports are Filed.	Fixed HAZMAT	Business Owners, Black Hawk County Emergency Management*	Active	Minimal	Local	Collaborate
Low	Identify Fixed HAZMAT Sites in Community.	Fixed HAZMAT, Terrorism	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Local	Protect, Prevent
Medium	Continue Working Relationship with Northeast Iowa Response Group.	Fixed HAZMAT, Transportation-HAZMAT or Radiological	City (all departments)*, City Council	Active	Minimal	Local	Collaborate
High	Remain a Member of National Flood Insurance Program.	Flash Flood, River Flood	City Council*	Active	Minimal	Local	Protect
Medium	Encourage the Use of Best Management Practices (BMP) to Manage Storm Runoff (Buffer Strips, Retention Basins for New Subdivisions, etc.).	Flash Flood, River Flood	City (all departments)*, Black Hawk County, Developers, Private Property Owners, Iowa DNR	Active	Minimal to High	Local, State	Educate

TABLE E9 : FUTURE HAZARD MITIGATION ACTIVITIES – GILBERTVILLE							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
Medium	Conduct Regular Storm Sewer Cleaning (drainage grates) and Opening of Sewer for Brush and Debris.	Flash Flood, River Flood	Public Works*	Active	Low to Moderate	Local	Maintain
Low	Flood Proof Structures in or near Flood Hazard Areas.	Flash Flood, River Flood	City Council*, Private Property Owners	Active	Low to High	Local, State, Federal	Maintain, Protect
Low	Encourage the Installation of Back Flow Valves.	Flash Flood, River Flood	City (all departments) *, City Council, Developers, Private Property Owners	Active	Minimal to Low	Local	Prevent
Low	Maintain a List of Potential Storm Sewer Improvement Projects.	Flash Flood, River Flood	City (all departments) *, City Council	Active	Minimal	Local	Protect, Prevent, Maintain
Medium	Continue Tree Trimming and Inspection Program/Policy.	Hailstorm, Thunderstorm & Lightning, Windstorm, Severe Winter Storm	City (all departments) *, Utility Providers	Active	Minimal to Low	Local	Protect, Prevent
Medium	Identify Bonded Contractors available for Affected Residents.	Hailstorm, Windstorm, Tornado	City (all departments) *, Black Hawk County	Active	Minimal	Local	Restore
High	Evaluate and replace aging city water lines on an annual basis.	Infrastructure Failure	Public Works*	Active	High		Maintain
Low	Identify and Maintain List of Fall Out Shelters.	Nuclear or Radiological Incident	Black Hawk County Emergency Management*	Active	Minimal	Local	Protect
Medium	Identify and Remedy Sewer System Inflow and Infiltration Problems.	River Flood, Flash Flood	Public Works*, City Council	Active	Minimal to High	Local, State, Federal	Protect, Prevent
High	Conduct Regular Inspections of Public Buildings and After a Fire to Ensure Structural Integrity.	Structural Failure	City (all departments) *	Active	Minimal	Local	Maintain
Medium	Maintain Pre-Plans, Walk-Thru, and Drills with Businesses and Schools.	Structure Fire	City (all departments) *, Black Hawk County Emergency Management, Schools, Businesses	Active	Minimal	Local	Maintain
High	Regulatory Update and Maintain Firewall Protection Software, Viral Security Software, and Password Protected Encryption for System Users for all City Computers.	Terrorism	City (all departments) *, City Council	Active	Minimal	Local	Maintain

TABLE E9 : FUTURE HAZARD MITIGATION ACTIVITIES – GILBERTVILLE							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
Medium	Ensure Local Schools, Businesses, Industries, and the City have Terrorism/Crisis Response Plan in Place.	Terrorism	Black Hawk County Emergency Management*, City Council, School	Active	Minimal	Local	Protect, Prevent, Educate
Low	Continue to Work with Local Industries (Co-Op) and Businesses with Training and Developing Policies and Procedures for Chemicals.	Terrorism	City (all departments) *, Black Hawk County Emergency Management, Industries	Active	Minimal to Low	Local	Collaborate
High	Identify At-Risk Residents who May Need Emergency Medical Assistance and/or Transportation and Develop and Maintain Procedures to Assist and Contact.	Thunderstorm & Lighting, Windstorm, Tornado, Hailstorm, Severe Winter Storm, Extreme Heat	City (all departments) *, Black Hawk County Emergency Management, Hawkeye Valley Area Agency of Aging	Active	Minimal	Local	Protect
Low	Update Local Ordinances and Regulations to Require Utilities for New Construction is Buried.	Thunderstorm & Lightning, Tornado, Severe Winter Storm	City Council*	Active	Minimal	Local	Protect, Prevent
Medium	Work with Local Utility Provider to Develop Program to Bury Existing Utility Lines; Install Surge Protectors and Squirrel Guards on Major Electrical Lines; Place Lightning Arrestors on Utility Polices; and Upgrade Equipment to Locate and Identify Underground Utilities.	Thunderstorm & Lightning, Tornado, Severe Winter Storm, Energy Failure or Disruption, Communication Failure	City (all departments) *, Utility Providers, Developers	Active	Low to High	Local	Prevent, Maintain
Medium	Continue to Regularly Back-Up City Data and Store Back-up and Software Offsite (safe deposit box, etc.).	Thunderstorm & Lightning, Tornado, Terrorism	City (all departments) *	Active	Minimal	Local	Protect
Medium	Recruit and Train Volunteer Storm Watchers and Spotters.	Thunderstorms & Lightning, Tornado	City Council*, City (all departments), Black Hawk County Emergency Management	Active	Minimal	Local	Protect
High	Encourage the Schools to Re-Evaluate Safe Tornado Shelters/Rooms.	Tornado	City Council*, Black Hawk County Emergency Management, Schools	Active	Minimal to High	Local, State, Federal	Protect, Educate
High	Encourage the Construction of a Tornado Safe Shelter/Room for the General Public.	Tornado	City Council*, Black Hawk County Emergency Management, Developers	Active	High	Local, State, Federal	Protect

TABLE E9 : FUTURE HAZARD MITIGATION ACTIVITIES – GILBERTVILLE							
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Funding Source**	**Goal**
High	Identify a Building for use as a Public Safe Shelter / Tornado Safe Room.	Tornado, Windstorm, Hailstorm	Black Hawk County Emergency Management*, Red Cross, City (all departments), Schools	Active	Minimal	Local	Protect
Low	Maintain List of Contractors for Hazardous Spills, etc.	Transportation – HAZMAT or Radiological	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Local	Protect, Restore
Low	Develop, Enforce, and Maintain Burn Order/Burn Ban Policy.	Windstorm, Extreme Heat	City Council*, City (all departments)	Active	Minimal	Local	Protect, Prevent
Medium	Develop, Enforce, and Maintain Debris, Rubbish, and Brush Disposal Program (includes temporary sites for disposal).	Windstorm, Tornado, Hailstorm	City Council*, City (all departments), Black Hawk County	Active	Minimal to Low	Local, State, Federal	Protect, Prevent

APPENDIX F: CITY OF HUDSON

COMMUNITY PROFILE

Location

The City of Hudson is located in the southwestern quadrant of Black Hawk County. The elevation of the community is approximately 902 feet above sea level. Black Hawk Creek bisects the community from northeast to southwest with the majority of the development in the southernmost part of the incorporated area. US Highway 63 is the most prominent highway in the city. Other major roads include Iowa State Highway 58, Eldora Rd/5th Street, and West Schrock Road. The city is bordered by farmland to the west, south, and east; Waterloo to the northeast; and US Highway 20 (Cedar Falls) to the north.

Natural Environment

The Black Hawk Creek largely defines the topography of Hudson. The terrain fluctuates from relatively flat expanses of land, generally located in or along the floodplain, to the undulating topography that characterizes the agricultural areas of northeast Iowa. The geographic area of Hudson and its surroundings are comprised of excellent soils for agriculture. Much of the land within Hudson is still in active production.

The soils in Hudson, as have been excerpted from the Black Hawk County Soil Survey, are generally comprised of buildable soil types that will support development.

Transportation

As mentioned, the major roadways in Hudson are US Highway 63, US Highway 20, and Iowa State Highway 58. There are no airports or railroads in the city. The Waterloo Regional Airport is the closest airport, about 13 miles north-northeast of the city. The Sergeant Road Trail, which parallels US Highway 63 on its western side, connects the city directly to downtown Waterloo and the wider metropolitan trail network. Hudson is the southern terminus of the Sergeant Road Trail.

Community Services

Hudson purchases its water from Waterloo Water Works at an average of 65 million gallons per year. The water towner was built in 1969 and has an elevated storage capacity of 250,000 gallons. The average water consumption in the city is approximately 173,905 gallons per day. The demand for water fluctuates with industry demand and time of year. The peak consumption is reported to be approximately 418,880 gallons per day. The most recent annual usage figure was

63,475,380 gallons. In addition to the 250,000-gallon storage capacity of the water tower, the system has a back-up capacity of 750 gallons per minute. A long-term goal for the water supply system includes the construction of a new 350,000-gallon water tower.

The City of Hudson currently bills for 850 active water meters in the community. Of these 850 water meters, 775 are for service provided to residential properties. The remaining meters are comprised of commercial, industrial, and government properties.

The wastewater treatment facility and collection system, otherwise known as the sanitary sewer system, in owned and operated by the City. The facility includes a lagoon which holds 24 million gallons. The sewage treatment plant is considered a secondary system, more specifically, a two-cell aerated lagoon system. 100 percent of the city is served by this system. The average load on the system is approximately 199,000 gallons per day. The reported peak load is 740,000 gallons per day. The systems designed capacity is 500,000 gallons per day.

TABLE F1: UTILITY PROVIDERS – HUDSON

Utility	Provider
Electric	Hudson Municipal Utility, Mid-American Energy
Gas	Mid-American Energy
Water	Waterloo Waterworks
Sewer	City
Telephone/Internet	CenturyLink, Mediacom
Cable TV	Mediacom, Dish, Direct TV

Demographics

Table F2 provides a summary of Hudson's demographics.

TABLE F2: CITY OF HUDSON DEMOGRAPHICS					
General Population, 2013-2017 ACS	Total Population	2,472	***Economic Char, 2013-2017 ACS 5-Year Estimates***	Population In Labor Force	1,479
	Total Males	1,259		Population in Civilian Labor Force	1,479
	Total Females	1,213		Persons Employed	1,419
	Median Age	41.3		Persons Unemployed	60
	At-Risk Population, under 18	574		Persons in Armed Forces	0
	At-Risk Population, 65 and over	338		Mean Travel Time to Work in Minutes, 16 and over	17.0
	One Race: White	2,439		Persons Employed in Management, Business, Science, and Arts Occupations	590
	One Race: Black or African American	0		Persons Employed in Service Occupations	123
	One Race: American Indian and Alaska Native	0		Persons Employed in Sales and Office Occupations	390
	One Race: Asian	12		Persons Employed in Natural Resources, Construction, and Maintenance Occupations	103
	One Race: Native Hawaiian and Other Pacific Islander	0		Persons Employed in Production, Transportation, and Material Moving Occupations	213
	Two or More Races	17		Median Household Income	88,750
	Hispanic or Latino (of any race)	15		Median Family Income	96,842
				Per Capita Personal Income	37,100
Households by Type, 2010 Census	Total Population in Households	2,282		All People below Poverty Level	1.74%
	Total Population in Group Quarters	0			
	Total Households	878			
	Total Family Households	688			
	Total Family Households with own children under 18	296	***Social Characteristics, 2013-2017 ACS 5-Year Estimates***		
	Male Householder, no wife present, with own children under 18	21		Total School Enrollment, 3 and over	612
	Female Householder, no husband present, with own children under 18	32		Population Enrolled in Nursery School, Preschool	100
	Householder living alone	162		Population Enrolled in Kindergarten and Elementary School, grades K-8	290
	Households with individuals under 18 years of age.	312		Population Enrolled in High School, grades 9-12	35
	Households with individuals 65 and over	221		Population Enrolled in College or Graduate School	387
	Average household size / Average Family Size	2.60 / 2.94		Total Population, 25 and over	1,705
				Persons with Less than 9th Grade Education	0
Housing Characteristics, 2013-2017 ACS	Total housing Units	941		Persons with 9th to 12th Grade Education, No Diploma	35
	Occupied Housing Units	917		Persons with High School Degree or Equivalency	357
	Vacant Housing Units	24		Persons with Some College Education, No Degree	376
	Owner-Occupied Housing Units	808		Persons with Associate Degree	303
	Population in Owner-Occupied Housing Units	2,246		Persons with Bachelor's Degree	419
	Rental-Occupied Housing Units	109		Persons with Graduate or Higher Degree	185
	Population in Rental-Occupied Housing Units	222		Total Civilian Noninstitutionalized Population with a Disability	189
	Mobile Homes	0			
	3+ Units in Structure	44			

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Hudson evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Hudson's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions included: Historical Occurrence, Probability, Magnitude/Severity, Warning Time, and Duration. Due to recent disasters and events that have impacted the planning area, Hudson determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table F3 is the analysis scores for the City of Hudson. As seen in Table F3, the top three hazards are Tornado/Windstorm, Thunderstorm/Lightning/Hail and Flash Flood.

The tables below identify the scoring criteria utilized by the Committee to evaluate each hazard. Further descriptions are provided in Section 3.

PROBABILITY		
Score	**Description**	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2	Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3	Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33% or the event is likely to occur.
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.

MAGNITUDE / SEVERITY		
Rating	**Description**	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least two weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

DURATION	
Score	**Description**
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

TABLE F3: HAZARD RISK ASSESSMENT FOR HUDSON					
Hazard	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Total**
Tornado/Windstorm	3	3	4	1	2.95
Thunderstorm/Lighting/Hail	4	2	3	1	2.95
Flash Flood	3	2	3	3	2.7
HAZMAT Incident	2	2	4	3	2.4
Infrastructure Failure	2	2	4	3	2.4
Severe Winter Storm	3	2	2	1	2.35
Extreme Heat	3	1	2	3	2.25
Grass/Wild Fire	2	2	4	1	2.2
River Flooding	2	2	2	3	2.1
Human Disease	2	2	1	4	2.05
Radiological Incident	1	2	4	3	1.95
Drought	2	1	1	4	1.75
Earthquake	1	2	4	1	1.75
Terrorism	1	2	4	1	1.75
Landslide	1	2	3	1	1.6
Expansive Soils	1	1	4	2	1.55
Dam / Levee Failure	1	1	3	3	1.5
Transportation Incident	1	1	4	1	1.45
Sinkholes	1	1	4	1	1.45
Animal/Plant/Crop Disease	1	1	1	4	1.3

Vulnerability – Identifying Assets (Critical Facilities) & Social Asset Populations

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the community's historical occurrences of tornados this hazard was added to the assessment. The following discussion only considers the assets in the community of Hudson.

TABLE F4: SHELTERS IN HUDSON

Hudson Community School	Community Center Hall
Saint Timothy Lutheran Church	Community Church
Source: Community	

Critical Facilities

Identifying the location of critical facilities is important in order to assess their vulnerability to hazards, since these facilities are important to the community's operations, quality of life, and economic sector. These include but are not limited to schools, hospitals, libraries, police and fire stations, water towers, sirens, and lift stations. *Map 57* illustrates the locations of these critical facilities throughout Hudson. Table F4 shows the locations identified as shelters in Hudson. While these locations have been identified for use if deemed necessary, there may also be hazard events which require residents to shelter themselves "in place". Therefore, any location could potentially become a makeshift shelter for purposes of disaster response.

Homes In Hazardous Areas

There are 223 parcels within the floodplain area which include approximately 10 residential units and several streets. Streets include IA Highway 58, Butterfield Road, West Shaulis Road, Watters Road, Hickory Lane, Fifth Street, Dale Road, Waterloo Road (a.k.a. Eldora Road), U.S. Highway 63, and "Private Road" (located approximately midway between Strayer Road and Waters Road, west of Highway 58). See Table F5 and *Maps 16 & 17* for specific floodplain information.

TABLE F5: FLOODPLAIN PARCELS WITHIN HUDSON

	# of Parcels	Total Land Value	Total Building Value	Total Dwelling Value	Multi-Residential Land	Total Value	Percent of City Damaged
City Floodway Property Values	70	$2,460,390	$1,022,110	$1,695,760	$0	$5,178,260	2.46%
City 1% Annual Chance Floodplain Property Values	137	$5,272,470	$7,100,310	$3,359,940	$0	$15,732,720	7.49%
City 0.2% Annual Chance Floodplain Property Values	16	$696,630	$1,435,100	$132,650	$0	$2,264,380	1.08%
Source: Flood overlay shows the 2011 floodplain designations in Black Hawk County, Iowa. The digital flood layer was obtained from FEMA's current Digital Flood Insurance Rate Map. The incorporated boundaries were current as of 5/5/19.							

In addition, persons living in mobile homes (also known as manufactured housing) may also be at risk from tornadoes or high winds. According to the 2017 American Community Survey (ACS), there are no mobile homes in Hudson. Finally, persons living in some multi-family units may also be at risk due to the lack of a proper tornado shelter. According to the 2017 American Community Survey, there were an estimated 44 housing units in buildings with at least three units. Therefore, using the 2017 average household size value of 2.94, there are approximately 129 persons living in housing units in buildings with at least three units.

Vulnerability – Identifying Social Asset Populations

The social vulnerability assessment also identified how the hazards affect the population of Hudson, and it is assumed that the identified populations are more likely to require assistance during times of disaster and are therefore, generally speaking, more at-risk than the remaining population. The at-risk population must be identified and targeted in successful mitigation efforts.

According to 2017 ACS Census data, approximately 338 persons are 65 years or older, representing 13.6% of the population. Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young people often are not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2017, approximately 574 persons were under the age of 18, representing 23.2% of the population. As mentioned previously, persons living in mobile homes and persons living in multi-family housing units are also considered at risk. There are no mobile homes in Hudson, and there are approximately 234 persons living in multi-family housing units.

Map 39 and *Map 40* illustrate the impact of a hypothetical tornado event in Hudson. According to data from the Black Hawk County Assessor's Office, there are a total of 1095 structures in the community with an estimated total value of $225,594,140. Table F6 illustrates the degree of impact that hypothetical tornado scenarios of various strengths would have on Hudson.

TABLE F6: HUDSON TORNADO SCENARIO

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	97	$1,953,420	$177,530	$11,522,930	$0	$11,700,460	$2,925,115	5.57%
EF1	150 Meters	492 Feet	201	$3,976,300	$270,160	$24,424,670	$0	$24,694,830	$6,173,708	11.75%
EF2	250 Meters	820 Feet	307	$5,911,250	$428,990	$37,186,120	$12,600	$37,627,710	$18,813,855	17.91%
EF3	500 Meters	1640 Feet	516	$10,081,240	$2,561,330	$59,142,040	$12,600	$61,715,970	$30,857,985	29.37%
EF4	900 Meters	2953 Feet	786	$16,437,438	$9,374,956	$87,807,754	$130,252	$97,312,962	$97,312,962	46.31%
EF5	1100 Meters	3609 Feet	902	$19,998,908	$13,868,106	$100,844,584	$198,652	$114,911,342	$114,911,342	54.69%

Parcel value information is current as of 09/25/2018. The source is the Black Hawk County MIS Department. This scenario shows a realistic damage level to buildings and land calculated at the following percentages: EF0-EF1 = 25%; EF2-EF3 = 50%; EF4-EF5 = 100%

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. Table F6 lists all of the structure valuations for the City of Hudson. Since 100% of the city is at risk of some kind of hazard event, the entire city is considered to be in the hazard area. This data was used in the Vulnerability discussion in each of the Hazard Profiles in Section 3.

This information was made available from the Black Hawk County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE F7: ASSET INVENTORY – BUILDING /DWELLING VALUES IN HUDSON

Class	Land Value	Building Value	Dwelling Value	MR Land	Building Count
Agricultural	5,515,600	277,690	8,512,560	0	35
Cities	1,058,980	1,972,080	0	0	12
Commercial/Dual Class	4,943,948	16,558,126	177,964	22,912	122
County	189,530	119,960	0	0	1
Industrial	315,480	795,090	0	0	4
Multi-residential	0	0	1,037,280	130,440	5
Religious/Non-Profit	514,590	2,318,680	0	0	5
Residential	27,234,050	0	152,795,120	0	909
Schools	401,650	685,930	0	0	2
State	2,600	0	0	0	0
Utilities	13,410	470	0	0	0
	$40,189,838	**$22,728,026**	**$162,522,924**	**$153,352**	**1,095**

Source: Black Hawk County Assessor 2019 Values

*- Please note that the assessed value for tax-exempt structures may not adequately reflect their fair market rate value, which may be significantly higher than the assessed value. Accordingly, the values listed above should not be regarded as accurate for any purpose.

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced no losses in a 10-year period in which each loss is $1,000 or more. According to available FEMA data (as of 09/30/19), the City of Hudson participates in the National Flood Insurance Program and has no repetitive loss properties. Table 45 in Section 3 lists data from each city regarding the National Flood Insurance Program.

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The updated (non-revised) hazard mitigation plan goals for the City of Hudson are:

1. **PROTECT**: Protect the health and safety of residents, visitors, staff and emergency personnel during and after hazard events.
2. **PREVENT**: Prevent avoidable disasters.
3. **MINIMIZE**: Minimize losses to existing and future structures in hazard areas, especially critical facilities.
4. **MAINTAIN**: Maintain local services and infrastructure in order to reduce community, economic and environmental disruption during and after hazard events.
5. **RESTORE**: Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
6. **EDUCATE**: Educate the public about hazards and resources available.
7. **ACCOUNTABILITY**: Use public funds in an efficient, cost effective and fair manner.
8. **COLLABORATE**: Incorporate each jurisdiction into the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan.

Current Mitigation Actions

Prevention Mitigation Actions

The City of Hudson adopted a new Comprehensive Plan in August 2013. Hudson adopted an official Development Ordinance on December 9th, 1996. The ordinance became effective on January 2nd, 1997. The Development Ordinance (Ordinance Number 512) is an ordinance creating zoning, subdivision and platting, and flood plain management regulations for the purpose of protecting health, welfare, and public safety within the City of Hudson. The zoning portion of this ordinance created ten separate zoning districts for purposes of implementing the Comprehensive Plan, promoting public health and welfare, helping to achieve greater efficiency, and economize land development, among other goals. Although the Development Ordinance defined ten districts, not all ten have been implemented on the landscape of Hudson. The last HMP for Hudson was adopted by City Council on December 13, 2010. At this time the City of Hudson has adopted and enforces the 2006 International Building Code (UBC) for construction projects within city limits.

The primary flood research document prepared for the City of Hudson was the July 1979 Flood Insurance Study. This document was prepared under the auspices of the United States Department of Housing and Urban Development, who, at the time was charged with the oversight of the Federal Insurance Administration. This responsibility has since been transferred to the Federal Emergency Management Agency. The Flood Insurance Study focused on the one major stream to have a substantial presence in the City of Hudson; Black Hawk Creek. Dewild Grant Reckert and Associates Company was contracted to conduct the hydrologic and hydraulic analyses for the study area. Other organizations that had a hand in the development of the study include: the Flood Insurance Administration, the Iowa Natural Resources Council, the U.S. Army Corps of Engineers, officials of the City of Hudson, and members of the general public. The U.S. Army Corps of Engineers has also conducted substantive research studies and/or documents relative to Hudson and Black Hawk Creeks in 1968, 1982, and 1992. In addition, several areas of Black Hawk County have recently been studied and/or are currently being restudied in order to provide more detailed and accurate floodplain information. One of these areas includes Black Hawk Creek, within the Hudson city limits.

On January 16th, 1980 the City of Hudson became a regular member in the National Flood Insurance Program (NFIP) by adopting its initial floodplain ordinance. The Federal Insurance Administration manages the insurance component of the NFIP, and works closely with FEMA's Mitigation Directorate, which oversees the floodplain management aspect of the program. The Floodplain Ordinance is a portion of the City's Development Ordinance (#512, Adopted 1/2/97, Section 3.16). The Zoning Administrator, who is duly appointed by the Mayor and City Council, is charged with the responsibility of enforcing the provisions of the floodplain ordinance in addition to his/her other duties. The ordinance also identifies the City Council, the Board of Adjustment, and the Planning and Zoning Commission as bodies to which appeals and variance requests are submitted.

In accordance with NFIP guidelines, the ordinance does not allow for new construction within the floodway without first obtaining a development permit. In addition, if a floodplain permit is issued for development in a special flood hazard area the ordinance requires those structures to "be designed or anchored to prevent the flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effect of buoyancy." The areas to which these regulations apply are determined by referencing maps developed in conjunction with the Flood Insurance Study for the City of Hudson.

Property Protection Mitigation Actions

The City of Hudson has implemented a number of tools that are useful in protecting property in the community. In addition, there have also been some protection measures that have occurred as a result of private development. These measures include the adoption of a floodplain ordinance, the implementation of the zoning ordinance, the elevation of the city's sanitary sewer treatment facility, and the construction of the railroad line.

The construction of the railroad is, as previously referenced, the result of private development. When the railroad was constructed, the tracks were elevated in order to ensure that the tracks remained operational during high water events. Therefore, the elevated railroad land acts as a man-made levy, located between the developed portion of Hudson and Black Hawk Creek. Although the railroad no longer sustains an active line through Hudson, the flood protection benefits of the original construction remain.

There have been no known property acquisitions or demolitions in the City of Hudson for the purpose of flood hazard mitigation.

Public Education and Awareness Mitigation Actions

A new statewide reverse 911 system known as Alert Iowa was implemented by implemented by Iowa Homeland Security and Emergency Management in 2014. Citizens have the ability to "opt in" to receive weather alerts and enter a cell phone, work phone, and other additional alternative phone numbers. Radio, television, cellular telephones, landline telephones, newspapers, warning sirens, NOAA Radio Service and the internet are available to the public at large. The City has developed a website in order to keep its citizens, and other interested parties, aware of local and government affairs. The website address is www.cityofhudsonia.com.

Emergency Services Mitigation Actions

Black Hawk County Emergency Management Agency

The Black Hawk County Emergency Management Agency is governed by a board of eleven commissioners comprised of the Mayors from each incorporated jurisdiction in the County or their designated delegate, a representative of the Black Hawk County Sheriff's Department, and the Chairperson of the Black Hawk County Board of Supervisors. The Emergency Management Agency works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. Furthermore, the agency is responsible for the monthly testing of all outdoor warning sirens in Black Hawk County.

Fire Department

The Hudson Fire Department takes pride in having a well-equipped station. As of 2018, the City of Hudson had 33 volunteer firefighters. In addition to the

standard firefighting responsibilities, the Hudson Fire Department is also a Certified Provisional Paramedic Service. Therefore, volunteers of the department often are called to act in various roles. This increased responsibility is evident in the variety of training a number of the volunteers have taken part in. As of 2018, there were 25 Firefighter-1 certificates, seven Firefighter-2 certificates, nine EMT-B certificates, four EMT-P certificates, one EMT-PS certificates, and one EMT-PS-CCB.

The current building which houses the fire department was built in 1998. As of 2018, equipment owned and operated by the fire department includes two engines, three tankers, two ambulances, one command car, one grass rig, and one rescue truck. The information was garnered from the 2001 Hudson Fire Department Annual Report, which was presented to the City of Hudson in late December, 2001.

The City of Hudson maintains mutual aid agreements, some by 28E agreement with Dike, Reinbeck, Traer, and all of the departments in Black Hawk County. Of the departments in Black Hawk County, those most likely to provide or be provided mutual aid by the Hudson Fire Department are La Porte City, Gilbertville, Waterloo, and Cedar Falls.

Medical Services

Although there are no hospitals located within the City of Hudson, Black Hawk County is presently a regional health care center. In addition to numerous private clinics and practicing physicians, Black Hawk County has four major medical facilities, all of which are located in either Waterloo or Cedar Falls. Three of these facilities are considered Regional Hospitals, otherwise referred to as Level II. Mercy One Medical Center and Unity Point Hospital are located in Waterloo. Mercy One Medical Center has a second location in Cedar Falls. Another smaller facility, Peoples Community Health Clinic (Level IV), affiliated with Covenant Medical Center, is located in downtown Waterloo. Distance from Hudson to these facilities ranges from 6.8 miles to 10.2 miles.

Police

The Hudson Police Department, Black County Sheriff's Department, and the Iowa State Patrol provide police protection in the City of Hudson. As of 2018, the Hudson Police Department (same building as City Hall) employed four full-time officers and two part-time officers. The Police Department has maintained two marked patrol vehicles. One is a 2017 Ford Explorer; the other is a 2017 Ford F150. The Department maintains mutual aid agreements with surrounding local law enforcement agencies and the Iowa State Patrol. Of the local law enforcement agencies, the Hudson Police Department cooperates most regularly with the Black Hawk County Sheriff's department.

Hazardous Materials

A regional Hazard Materials Team is on hand to assist the community with a Hazard Materials event or catastrophe. The Team is located within a short distance and is operated by Waterloo Fire Rescue Department. The city is also a partner in the Tri-County Drug Task Force. The group works with the City in the event of the discovery of a methamphetamine lab within the community.

Snow Removal

The NOAA estimates that approximately 70 percent of all deaths attributed to winter storms occur in an automobile. Therefore, the City of Hudson views proper snow and ice removal from roadways to be essential in mitigating negative effects of these events. Snow removal and ice prevention techniques are practiced by city and state employees on the corresponding local and state roadways within the city limits. As of 2018, the city currently employs four full time drivers for snow removal efforts.

Equipment used by City personnel for snow and ice removal includes the following: 1995 dump truck, 2002 dump truck, motor grader, end loader, a pickup with blade, and a tractor with attached snow blower. In the event that a driver cannot perform his or her duties, drivers are pulled from other city departments as necessary.

In an ideal winter storm scenario it is estimated that all of the city roads can be passable within three hours. Barring extreme winds or mechanical failure it is estimated that roads can be completely cleared in 6-10 hours, depending on the amount and rate of snowfall.

The city also assists in the trimming of trees. They will trim trees when they exceed encroach within 15 feet of the roadway and eight feet above the sidewalk. Furthermore, all trees are to be kept trimmed to a distance of ten feet from overhead power lines. This greatly decreases the likelihood of branches falling on pedestrians, power lines, or vehicles during heavy snowfall, ice, or high wind events. Furthermore, the city does clean up fallen branches in the city right of way following any storms.

Warning Systems

There is one early warning siren in the community. It is a rotating siren with a rechargeable DC backup which was purchased and installed by the City in 2000. The siren is in the Hudson City Park, which is located on Washington Street between First and Second Streets. The siren can be activated locally at the Hudson Fire Department station, while the Consolidated Dispatch Center or the Black Hawk County Emergency Management office can activate it remotely. Remote activation is the most commonly employed method of activation for tornadoes. The siren currently provides adequate warning to the majority of the developed portion of the city, though outlying areas need upgrading.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the comprehensive efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit community residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

TABLE F8: STAPLEE ELEMENTS

S – Social	• Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the populations, • Actions do not cause relocation of lower income people, • Actions are compatible with the community's social and cultural values.
T- Technical	• Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	• Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	• Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	• It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	• Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E - Environmental	• Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, • Are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table F8) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each mitigation activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each of the proposed mitigation activity will occur. For instance, if the activity happens regularly (either daily, weekly, monthly, or annually) it was identified as On-Going activity; if it will occur within the next 1-5 years it was identified as Short-Term; if the activity would take 5-10 years to occur it was labeled as Mid-Term; and all activities that would take 10 or more years to occur were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The city will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate : Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High : Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, identified the responsible party or parties for each activity, and finally related each activity to at least one of the Hazard Mitigation Plan Goals listed above. Table F9 below is the City of Hudson's Implementation Strategy.

TABLE F9: FUTURE HAZARD MITIGATION ACTIVITIES - HUDSON						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
High	Encourage & Support Public Education and Awareness (i.e., proper steps to protect property & health for all hazards, purpose of warning system, Iowa One Call, flood insurance, regulations, HAZMAT education and disposal, vaccinations for humans and pets, Fire Prevention Week for Schools, importance of disaster kits/supplies, local ordinance requirements, smoke and carbon monoxide alarms, nuisance abatement education, proper landscaping and building techniques to avoid erosion, etc.).	All	City (all departments)*, Black Hawk County EMA, American Red Cross, Iowa DOT, National Weather Bureau, First Responders, Duane Arnold Energy Plant, Iowa DNR, ISU Extension, Black Hawk County Health Department, Hawkeye Valley Area Agency of Aging	Active	Minimal	Educate
High	Maintain Mutual Aid (28E) Agreements.	All	City Council*	Active	Minimal	Protect, Restore, Collaborate
High	Encourage Use of emergency notification services.	All	Black Hawk County Emergency Management*, City (all departments)	Statewide emergency notification service to be available by 2015	Minimal	Educate, Protect
High	Maintain a Well-Trained and Well-Equipped Police Department for all Potential Hazards - Training Plan and Equipment Rotation Plan.	All	City Council*, Police Department	Active	Minimal to High	Protect, Restore
High	Maintain a Well-Trained and Well-Equipped Fire Department for all Potential Hazards - Training Plan and Equipment Rotation Plan.	All	City Council*, Fire Department	Active	Minimal to High	Protect, Restore
High	Maintain Well-Trained and Well-Equipped First Responders for all Potential Hazards - Training Plan and Equipment Rotation Plan.	All	City Council*, Black Hawk County, Fire Department, Police Department	Active	Minimal to High	Protect, Restore

TABLE F9: FUTURE HAZARD MITIGATION ACTIVITIES - HUDSON						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
High	Maintain a Well-Trained and Well-Equipped Public Works Department of all Potential Hazards - Training Plan and Equipment Rotation Plan.	All	City Council*, Public Works Department	Active	Minimal to High	Protect, Maintain, Restore
High	Maintain, Update/Purchase, as needed, City Equipment and Supplies (i.e., Snow Plows, Generators, Surge Protectors, Animal Rescue supplies, Sandbag supplies, Deicer, Technology equipment, etc.).	All	City Council*, Black Hawk County, Fire Department, Public Works Department, Police Department	Active	Minimal to High	Protect, Maintain
High	Adopt, Review, Maintain, Enforce, and Update, as needed, Existing Policies, Regulations, and Ordinances (i.e, Floodplain, Zoning, Subdivision, Snow Removal, Animal Vaccination and Licensing, etc.).	All	City (all departments)*, City Council, Black Hawk County	Active	Minimal to Low	Protect, Prevent
High	Designate, Develop, Maintain and Distribute List of Shelter Sites (all types), Maintain Shelter Agreements with Red Cross, and Conduct Shelter Operation Training with Red Cross.	All	Black Hawk County Emergency Management*, Red Cross	Active, County	Minimal	Protect, Maintain
High	Develop an Emergency Evacuation and Notification Plan (includes identifying detour and evacuation routes) and Regularly Evaluate Plan.	All	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Protect, Minimize
High	Continue Incident Management System Training (100, 200, 700), OSHA, and Certified Flood Manager Training for City Employees.	All	City(all departments)*, Black Hawk County Emergency Management	Active, OSHA	Minimal to Low	Protect, Maintain, Educate
High	Continue to Re-Evaluate Procedures after Major Incidents.	All	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Protect, Restore

TABLE F9: FUTURE HAZARD MITIGATION ACTIVITIES - HUDSON						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
High	Maintain Outdoor Warning Sirens through Training Procedures for Maintenance and Identification of Who is In-Charge/Responsible for City.	All	City (all departments)*, City Council, Black Hawk County	Active	Low to Moderate	Maintain, Protect
Medium	Maintain an Adequate Supply of Road Signage (i.e., detour, closure, snow routes, etc.).	All	Public Works Department*, City, Iowa DOT	Active	Minimal to Low	Maintain, Protect
Medium	Identify any Language Barriers in Community and Develop Procedures to Address the Barriers (i.e, Translators, etc.).	All	Black Hawk County Emergency Management*, City (all departments), Schools	Long Term	Minimal	Educate, Protect
Medium	Develop and Maintain a Communication Plan (Inter-Departmental and communitywide).	All	City (all departments)*, Black Hawk County, Schools	Active	Minimal	Collaborate, Educate, Maintain
Medium	Develop and Maintain Continuing Education Plan/Procedures.	All	City (all departments)*, Black Hawk County Emergency Management	Long Term	Minimal	Maintain
Medium	Apply for Grants/Funding as they Become Available.	All	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Accountability
Medium	Develop and Update, as needed, Contingency Operations Government Plan.	All	City (all departments)*, City Council, Black Hawk County Emergency Management	Long Term	Minimal	Protect, Minimize, Restore
Medium	Review and Update Emergency Response Plan.	All	City (all departments)*, City Council, Black Hawk County Emergency Management, Schools	Active	Minimal	Protect, Minimize, Restore
Medium	Ensure Adequate Coverage of Outdoor Warning Sirens - Relocate existing sirens and/or Purchase Additional Sirens as needed.	All	City (all departments)*, City Council, Black Hawk County Emergency Management	Active	Low to High	Protect, Maintain
High	Spray as Needed for Mosquitoes and Other Insects.	Disease	Public Works*, Black Hawk County	Active	Minimal	Protect

TABLE F9: FUTURE HAZARD MITIGATION ACTIVITIES - HUDSON						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
High	Continue to Cooperate with Black Hawk County Health Department and Local Medical Facilities to Help Ensure Effectiveness of Prevention, Detection, and Response Mechanisms.	Disease	City (all departments)*, Black Hawk County Emergency Management	Active	Minimal	Collaborate, Protect, Prevent
High	Continue to Test Local Drinking Water Supply to Monitor Quality.	Disease	Public Works*	Active	Minimal	Protect, Prevent
Medium	Maintain Relationship/Contract with Cedar Bend Humane Society and Black Hawk County.	Disease	City Council*, City (all departments)	Active, local veterinarian	Minimal	Collaborate, Maintain
Medium	Work with Designated Authorities to Ensure Dead Animals are Properly Disposed.	Disease	City (all departments)*, Black Hawk County, Iowa DOT, Iowa DNR	Long Term	Minimal	Collaborate, Protect
Medium	Enforce, when necessary, Water Restriction Ordinance.	Drought	City Council*, City (all departments)	Active	Minimal	Protect, Prevent, Minimize
Medium	Explore Alternative Water Supply Options to Improve Water Supply System (i.e., either an Additional Well to Supplement System, Installation of an Emergency Hookup to Rural Water System, etc.).	Drought, Disease	City Council*, Public Works	In planning stages for loop with Waterloo	Moderate to High	Restore, Protect
Medium	Update Water Distribution System (i.e., Replace Existing 4-inch Water Supply Lines with Larger Lines).	Drought, Structure Fire	Public Works*, City Council	In early planning stages	Moderate to High	Protect, Maintain
Medium	Maintain and Enforce Up-to-Date Building Codes.	Expansive Soils, Tornado	City Council*, City (all departments)	Active	Minimal	Maintain, Protect, Prevent
High	Continue Fire Department's Annual Walk-Thru of Hazardous Material Sites and Support Building Inspector is Assuring Tanks are Adequately Contained.	Fixed HAZMAT	Fire Department*, Building Department	Active	Minimal	Maintain, Protect, Prevent

TABLE F9: FUTURE HAZARD MITIGATION ACTIVITIES - HUDSON						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
High	Continue to Work with Black Hawk County EMA to Ensure local Tier II HAZMAT Reports are Filed.	Fixed HAZMAT	Business Owners, Black Hawk County Emergency Management *	Pending	Minimal	Collaborate, Protect, Prevent
High	Identify Fixed HAZMAT Sites in Community.	Fixed HAZMAT, Terrorism	City (all departments)*, Black Hawk County Emergency Management	Active, Fire Department	Minimal	Protect, Prevent
High	Continue Working Relationship with Northeast Iowa Response Group.	Fixed HAZMAT, Transportation-HAZMAT or Radiological	City (all departments)*, City Council	Long Term	Minimal	Collaborate, Protect, Prevent, Restore
Medium	Construct Levees to Protect People and Property.	Flash Flood	City Council*, Black Hawk County, Developers, Army Corp. of Engineers	Long Term	Moderate to High	Protect, Prevent, Minimize
High	Conduct Regular Storm Sewer Cleaning (drainage grates) and Opening of Sewer for Brush and Debris.	Flash Flood, River Flood	Public Works*	Active	Low to Moderate	Maintain
High	Flood Proof Structures in or near Flood Hazard Areas.	Flash Flood, River Flood	City Council*, Private Property Owners	Long Term	Low to High	Minimize, Prevent
High	Remain a Member of National Flood Insurance Program.	Flash Flood, River Flood	City Council*	Active	Minimal	Protect, Minimize
High	Encourage the Installation of Back Flow Valves.	Flash Flood, River Flood	City (all departments)*, City Council, Developers, Private Property Owners	Long Term, hydrants only few buildings	Minimal to Low	Prevent, Maintain, Educate
Low	Encourage the Use of Best Management Practices (BMP) to Manage Storm Runoff (Buffer Strips, Retention Basins for New Subdivisions, etc.).	Flash Flood, River Flood	City (all departments)*, Black Hawk County, Developers, Private Property Owners, Iowa DNR	Active	Minimal to High	Educate
Medium	Maintain a List of Potential Storm Sewer Improvement Projects.	Flash Flood, River Flood	City (all departments)*, City Council	Underway, GIS mapping to be complete in 2014	Minimal	Maintain, Protect, Prevent

TABLE F9: FUTURE HAZARD MITIGATION ACTIVITIES - HUDSON						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
Medium	Continue Tree Trimming and Inspection Program/Policy.	Hailstorm, Thunderstorm& Lightning, Windstorm, Severe Winter Storm	City (all departments)*, Utility Providers	Active, HMEU	Minimal to Low	Prevent, Maintain
Medium	Identify Bonded Contractors available for Affected Residents.	Hailstorm, Windstorm, Tornado	City (all departments)*, Black Hawk County	Active	Minimal	Restore, Educate
Low	Continue to Flood Proof Existing City-Owned Parcels, Equipment, and Utilities Located in 100-Year Floodplain.	River Flood	City Council*	Long Term	Low to High	Prevent, Maintain, Minimize
High	Identify and Remedy Sewer System Inflow and Infiltration Problems.	River Flood, Flash Flood	Public Works*, City Council	Active	Minimal to High	Prevent, Maintain, Minimize
High	Conduct Regular Inspections of Public Buildings and After a Fire to Ensure Structural Integrity.	Structural Failure	City (all departments)*	Active	Minimal	Maintain, Protect
High	Maintain Pre-Plans, Walk-Thru, and Drills with Businesses and Schools.	Structure Fire	City (all departments)*, Black Hawk County Emergency Management, Schools, Businesses	Long Term	Minimal	Protect, Prevent
High	Maintain Control and Protection of City Buildings and Utilities (Lockdown Policy, etc.).	Terrorism	City (all departments)*, City Council	Long Term	Minimal	Maintain, Protect
High	Continue to Work with Local Industries (Co-Op) and Businesses with Training and Developing Policies and Procedures for Chemicals.	Terrorism	City (all departments)*, Black Hawk County Emergency Management, Industries	Long Term	Minimal to Low	Protect, Educate, Collaborate
High	Regulatory Update and Maintain Firewall Protection Software, Viral Security Software, and Password Protected Encryption for System Users for all City Computers.	Terrorism	City (all departments)*, City Council	Active	Minimal	Maintain
Medium	Ensure Local Schools, Businesses, Industries, and the City have Terrorism/Crisis Response Plan in Place.	Terrorism	Black Hawk County Emergency Management*, City Council, School	Long Term	Minimal	Educate, Collaborate

TABLE F9: FUTURE HAZARD MITIGATION ACTIVITIES - HUDSON						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
Medium	Identify At-Risk Residents who May Need Emergency Medical Assistance and/or Transportation and Develop and Maintain Procedures to Assist and Contact.	Thunderstorm & Lighting, Windstorm, Tornado, Hailstorm, Severe Winter Storm, Extreme Heat	City (all departments)*, Black Hawk County Emergency Management, Hawkeye Valley Area Agency of Aging	Active, Fire Department	Minimal	Protect
High	Update Local Ordinances and Regulations to Require Utilities for New Construction is Buried.	Thunderstorm & Lightning, Tornado, Severe Winter Storm	City Council*	Active, HMEU	Minimal	Prevent, Minimize
High	Recruit and Train Volunteer Storm Watchers and Spotters.	Thunderstorms & Lightning, Tornado	Fire Department*, City Council, City (all departments), Black Hawk County Emergency Management	Active, Fire Department	Minimal	Protect
High	Encourage the Schools to Re-Evaluate Safe Tornado Shelters/Rooms.	Tornado	City Council*, Black Hawk County Emergency Management, Schools	Long Term	Minimal to High	Protect, Collaborate
High	Maintain List of Contractors for Hazardous Spills, etc.	Transportation	City (all departments)*, Black Hawk County Emergency Management	Active, Fire Department	Minimal	Restore, Minimize
High	Maintain Proper Agency Contact Information for Proper Disposal of Radiological Materials.	Transportation-HAZMAT or Radiological	City (all departments)*, City Council	Active, Fire Department	Minimal	Protect, Prevent
High	Develop, Enforce, and Maintain Debris, Rubbish, and Brush Disposal Program (includes temporary sites for disposal).	Windstorm, Tornado, Hailstorm	City Council*, City (all departments), Black Hawk County	Active	Minimal to Low	Maintain
High	Identify a Building for use as a Public Safe Shelter / Tornado Safe Room.	Windstorm, Tornado, Hailstorm	Black Hawk County Emergency Management*, Red Cross, City (all depts), Schools	Long Term	Minimal	Protect

APPENDIX G: CITY OF LA PORTE CITY

COMMUNITY PROFILE

Location

La Porte City is located in the southeast quadrant of Black Hawk County. The elevation of the community is approximately 830 feet above sea level. Wolf Creek, a tributary of the Cedar River, bisects the community from northeast to southwest. In addition to being located on Wolf Creek, La Porte City is located on US Highway 218. The city is bordered in all directions by farmland. Benton County, Iowa is located immediately south of La Porte City.

Natural Environment

The entire incorporated area of La Porte City lies within the Wolf Creek drainage basin. This drainage basin is a small part of the Middle Cedar Watershed. Trees, shrubs, weeds, and grass are prevalent in the undeveloped portions of the community. In some areas, where development has not occurred there are row crops that are planted in the spring and harvested in the fall. The primary row crops in the city are usually either corn or soybeans. Soils in the La Porte City area are typical of those found in central Iowa. These soils are not known to have any unusual characteristics that would have a substantial impact on flooding in the community.

Transportation

La Porte City maintains 34 lane miles of paved roadway. Standard maintenance on the streets is the responsibility of the local Public Works Department. Along with US Highway 218, other major roads in La Porte City include Main Street and 8th Street.

The Iowa Northern Railroad Company owns the rail line that passes through the northeast portion of the community. Although owned by the Iowa Northern Railroad Company, the tracking rights have been granted to the Union Pacific Railroad Company. The rail line operates between the communities of Cedar Rapids and Manly, Iowa – approximately 120 miles apart.

The nearest airport to La Porte City is the Waterloo Regional Airport, 21 miles north-northeast of the city. Of all the incorporated cities in Black Hawk County, La Porte City also happens to be the closest to the Eastern Iowa Airport in Cedar Rapids, 52 miles southeast of the city.

Community Services

The water utility in La Porte City is municipally owned. La Porte City residents are currently supplied water through two wells, namely Well #4 and Well #5. Well #4 was drilled in 1972 at 1,400 feet deep with an approximate capacity of 500 gallons per minute (gpm). Well #5 was drilled in 2011 at a depth of 1,400 feet with an approximate capacity of 475 gpm.

Wells #1, #2, and #3 are no longer in use and have been abandoned. Well #1 was constructed in 1941 at 257 feet deep and had a capacity of 90 gpm. Well #2 was constructed in 1948 at 250 feet deep and had a capacity of 225 gpm. Well #3 was drilled in 1961 at 280 feet deep and had a capacity of 150 gpm.

Water from both Wells #4 and #5 are treated at La Porte City's zeolite softening water treatment plant, which was upgraded in 2013. Water is stored in a 400,000 gallon elevated water storage tank, constructed in 2011. The City's average daily water use is approximately 200,000 gallons per day. The city has 922 water user accounts on the system (825 residential, 90 commercial, 6 municipal, and 1 utility).

The sewage treatment facility in La Porte City is engineered to have a design capacity of 554,000 gallons/day. The average daily load is approximated to be 250,000 gallons. While there are a few septic tanks located in the community, it is estimated that 98 percent of the community is served by the municipal sanitary sewer system. The city estimates that there are 962 active sanitary sewer hookups in the community.

TABLE G1: UTILITY PROVIDERS – LA PORTE CITY

Utility	Provider
Electric / Water	La Porte City Utilities
Gas	Black Hills Energy
Sewer	City
Telephone/Internet	LPC Connect, Mediacom
Cable TV	LPC Connect, Mediacom, LPC Telephone

The City of La Porte City has a power plant that was originally built in 1935 and has had numerous updates since that time. The most recent update included a $1.2 million expenditure. The city purchases electricity from Resale Power Group of Iowa, a group formed of municipalities who purchase their electricity together in order to garner a more competitive rate. Resale Power Group of Iowa is a Mid-American Company Holdings Company.

In addition to providing backup generation services to the City of La Porte City, the municipal power plant is required to provide some energy to the grid, especially during times of peak use.

Demographics

Table G2 provides a summary of La Porte City's demographics.

TABLE G2: CITY OF LA PORTE CITY DEMOGRAPHICS					
General Population, 2013-2017 ACS	Total Population	2,496	***Economic Char, 2013-2017 ACS 5-Year Estimates***	Population In Labor Force	1,259
	Total Males	1,204		Population in Civilian Labor Force	1,259
	Total Females	1,292		Persons Employed	1,230
	Median Age	44.7		Persons Unemployed	29
	At-Risk Population, under 18	675		Persons in Armed Forces	0
	At-Risk Population, 65 and over	436		Mean Travel Time to Work in Minutes, 16 and over	23.2
	One Race: White	2,469		Persons Employed in Management, Business, Science, and Arts Occupations	371
	One Race: Black or African American	0		Persons Employed in Service Occupations	200
	One Race: American Indian and Alaska Native	5		Persons Employed in Sales and Office Occupations	268
	One Race: Asian	9		Persons Employed in Natural Resources, Construction, and Maintenance Occupations	163
	One Race: Native Hawaiian and Other Pacific Islander	0		Persons Employed in Production, Transportation, and Material Moving Occupations	228
	Two or More Races	9		Median Household Income	52,083
	Hispanic or Latino (of any race)	9		Median Family Income	72,206
				Per Capita Personal Income	25,752
Households by Type, 2010 Census	Total Population in Households	2,238		All People below Poverty Level	9.7%
	Total Population in Group Quarters	46			
	Total Households	915			
	Total Family Households	601			
	Total Family Households with own children under 18	306	***Social Characteristics, 2013-2017 ACS 5-Year Estimates***		
	Male Householder, no wife present, with own children under 18	21		Total School Enrollment, 3 and over	703
	Female Householder, no husband present, with own children under 18	58		Population Enrolled in Nursery School, Preschool	52
	Householder living alone	274		Population Enrolled in Kindergarten and Elementary School, grades K-8	420
	Households with individuals under 18 years of age.	316		Population Enrolled in High School, grades 9-12	161
	Households with individuals 65 and over	278		Population Enrolled in College or Graduate School	70
	Average household size / Average Family Size	2.45 / 3.04		Total Population, 25 and over	1,662
				Persons with Less than 9th Grade Education	24
Housing Characteristics, 2013-2017 ACS	Total Housing Units	1,013		Persons with 9th to 12th Grade Education, No Diploma	59
	Occupied Housing Units	957		Persons with High School Degree or Equivalency	653
	Vacant Housing Units	56		Persons with Some College Education, No Degree	339
	Owner-Occupied Housing Units	773		Persons with Associate Degree	230
	Population in Owner-Occupied Housing Units	2,064		Persons with Bachelor's Degree	204
	Rental-Occupied Housing Units	184		Persons with Graduate or Higher Degree	153
	Population in Rental-Occupied Housing Units	383		Total Civilian Noninstitutionalized Population with a Disability	254
	Mobile Homes	13			
	3+ Units in Structure	136			

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of La Porte City evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. La Porte City's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions included: Historical Occurrence, Probability, Magnitude/Severity, Warning Time, and Duration. Due to recent disasters and events that have impacted the planning area, La Porte City determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table G3 is the analysis scores for the City of La Porte City. As seen in Table G3, the top three hazards are Tornado/Windstorm, Thunderstorm/Lightning/Hail and Flash Flood.

The tables below identify the scoring criteria utilized by the Committee to evaluate each hazard. Further descriptions are provided in Section 3.

PROBABILITY		
Score	**Description**	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2	Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3	Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33% or the event is likely to occur.
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.

MAGNITUDE / SEVERITY		
Rating	**Description**	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least two weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

DURATION	
Score	**Description**
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

TABLE G3: HAZARD RISK ASSESSMENT FOR LA PORTE CITY					
Hazard	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Total**
Tornado/Windstorm	3	3	4	1	2.95
Thunderstorm/Lighting/Hail	4	2	3	1	2.95
Flash Flood	3	2	3	3	2.7
HAZMAT Incident	2	2	4	3	2.4
Infrastructure Failure	2	2	4	3	2.4
Severe Winter Storm	3	2	2	1	2.35
Extreme Heat	3	1	2	3	2.25
Grass/Wild Fire	2	2	4	1	2.2
River Flooding	2	2	2	3	2.1
Human Disease	2	2	1	4	2.05
Radiological Incident	1	2	4	3	1.95
Drought	2	1	1	4	1.75
Earthquake	1	2	4	1	1.75
Terrorism	1	2	4	1	1.75
Landslide	1	2	3	1	1.6
Expansive Soils	1	1	4	2	1.55
Dam / Levee Failure	1	1	3	3	1.5
Sinkholes	1	1	4	1	1.45
Animal/Plant/Crop Disease	1	1	1	4	1.3
Transportation Incident	1	1	4	1	1.45

Vulnerability – Identifying Assets (Critical Facilities) & Social Asset Populations

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the community's historical occurrences of tornados this hazard was added to the assessment. The following discussion only considers the assets in the community of La Porte City.

TABLE G4: SHELTERS IN LA PORTE CITY

La Porte City Community Center (50 person capacity)	Union School (500 person capacity) (Not officially identified as a shelter)

Source: Community

Critical Facilities

Identifying the location of critical facilities is important in order to assess their vulnerability to hazards, since these facilities are important to the community's operations, quality of life, and economic sector. These include but are not limited to schools, hospitals, libraries, police and fire stations, water towers, sirens, and lift stations. *Map 60* shows the locations of these critical facilities throughout La Porte City.

Table G4 identifies the locations identified as shelters in La Porte City. While these locations have been identified for use if deemed necessary, there may also be hazard events which require residents to shelter themselves "in place". Therefore, any location could potentially become a makeshift shelter for purposes of disaster response.

Homes In Hazardous Areas

As of 2019 La Porte City had approximately 917 parcels, representing 1,128 acres of identified floodplain within its city limits. This accounts for approximately 67.3 percent of the city's total area. The total value (combined land, building, and dwelling value) of the 940 properties located within the floodplain in La Porte City is $74,439,210. Maps 22 & 23 identify flood plains and flood plain scenarios. See Table G5 for parcels within the floodplain.

TABLE G5: FLOODPLAIN PARCELS WITHIN LAPORTE CITY

	# of Parcels	Total Land Value	Total Building Value	Total Dwelling Value	Multi-Residential Land	Total Value	Percent of City Damaged
City Floodway Property Values	74	$1,482,270	$511,530	$2,841,320	$5,050	$4,840,170	8.91%
City 1% Annual Chance Floodplain Property Values	313	$4,761,720	$6,177,640	$15,602,990	$0	$26,542,350	48.87%
City 0.2% Annual Chance Floodplain Property Values	530	$6,582,699	$4,653,593	$31,743,057	$77,341	$43,056,690	79.28%

Source: Flood overlay shows the 2011 floodplain designations in Black Hawk County, Iowa. The digital flood layer was obtained from FEMA's current Digital Flood Insurance Rate Map. The incorporated boundaries were current as of 5/5/19.

In addition, persons living in mobile homes (also known as manufactured housing) may also be at risk from tornadoes or high winds. According to the 2013-2017 American Community Survey 5-Year Estimates, there are an estimated 13 mobile homes in La Porte City. Using the average persons per households of 2.45, there are approximately 32 persons living in mobile homes in La Porte City.

Finally, persons living in some multi-family units may also be at risk due to the lack of a proper tornado shelter. According to the 2013-2017 American Community Survey 5-Year Estimates, there were an estimated 136 housing units in buildings with at least three units. Therefore, there are approximately 333 persons living in multi-family housing units at risk during a tornado event.

Vulnerability – Identifying Social Asset Populations

The social vulnerability assessment also identified how the hazards affect the population of La Porte City, and it is assumed that the identified populations are more likely to require assistance during times of disaster and are therefore, generally speaking, more at-risk than the remaining population. The at-risk population must be identified and targeted in successful mitigation efforts.

According to 2017 U.S. Census data, approximately 436 residents of La Porte City are 65 years or older, representing 17.4% of the population. Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young people often are not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2017, approximately 675 residents of La Porte City were under the age of 18, representing 27.0% of the population. As mentioned previously, persons living in mobile homes and persons living in multi-family housing units are also considered at risk. There are approximately 32 persons living in mobile homes and 333 persons living in multi-family housing units in La Porte City.

Map 45 and *Map 46* illustrate the impact of a hypothetical tornado event in La Porte City. According to data from the Black Hawk County Assessor's Office, there are a total of 1,065 structures in the community with a total value of $132,014,900. Table G6 illustrates the degree of impact that hypothetical tornado scenarios of various strengths would have on La Porte City.

TABLE G6: LA PORTE CITY TORNADO SCENARIO

Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential	Total Structure Value	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	149	$2,233,370	$3,808,842	$9,010,138	$16,030	$12,835,010	$3,208,753	10.18%
EF1	150 Meters	492 Feet	292	$4,187,010	$5,362,795	$18,967,095	$21,540	$24,351,430	$6,087,858	19.32%
EF2	250 Meters	820 Feet	420	$6,178,098	$6,049,350	$29,349,530	$63,622	$35,462,502	$17,731,251	28.13%
EF3	500 Meters	1640 Feet	675	$9,732,758	$9,063,480	$46,251,470	$76,722	$55,391,672	$27,695,836	43.94%
EF4	900 Meters	2953 Feet	1011	$14,386,602	$12,957,686	$67,530,354	$214,888	$80,702,928	$80,702,928	64.02%
EF5	1100 Meters	3609 Feet	1126	$16,309,242	$15,484,796	$74,969,934	$265,908	$90,720,638	$90,720,638	71.96%

Parcel value information is current as of 09/25/2018. Source: BHC MIS Department.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. Table G7 lists all of the structure valuations for the City of La Porte City. Since 100% of the city is at risk of some kind of hazard event, the entire city is considered to be in the hazard area. This data was used in the Vulnerability discussion in each of the Hazard Profiles in Section 3.

This information was made available from the Black Hawk County Assessor's office. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE G7: ASSET INVENTORY – BUILDING /DWELLING VALUES IN LA PORTE CITY

Class	Land Value	Building Value	Dwelling Value	MR Land	Building Count
Agricultural	1,230,500	184,570	745,320	0	7
Cities	628,860	2,251,690	70,780	0	19
Commercial/Dual Class	1,400,582	10,794,056	371,124	53,498	131
County	86,890	163,940	0	0	2
Multi-residential	0	0	719,860	50,710	8
Religious/Non-Profit	294,330	2,774,620	624,930	0	13
Residential	16,102,290	0	89,024,580	0	878
Schools	543,450	3,721,990	0	0	4
State	37,890	0	0	0	0
Utilities	48,120	90,320	0	0	3
Totals	**$20,372,912**	**$19,981,186**	**$91,556,594**	**$104,208**	**1,065**

Source: Black Hawk County Assessor 2019 Values

*- Please note that the assessed value for tax-exempt structures may not adequately reflect their fair market rate value, which may be significantly higher than the assessed value. Accordingly, the values listed above should not be regarded as accurate for any purpose.

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced no losses in a 10-year period in which each loss is $1,000 or more. According to available FEMA data (as of 5/31/09), La Porte City participates in the National Flood Insurance Program and has 15 repetitive loss properties. Table 45 in Section 3 lists data from each city regarding the National Flood Insurance Program.

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The updated (non-revised) hazard mitigation plan goals for the City of La Porte City are:

1. **PROTECT**: Protect the health and safety of residents, visitors, staff and emergency personnel during and after hazard events.
2. **PREVENT**: Prevent avoidable disasters.
3. **MINIMIZE**: Minimize losses to existing and future structures in hazard areas, especially critical facilities.
4. **MAINTAIN**: Maintain local services and infrastructure in order to reduce community, economic and environmental disruption during and after hazard events.
5. **RESTORE**: Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
6. **EDUCATE**: Educate the public about hazards and resources available.
7. **ACCOUNTABILITY**: Use public funds in an efficient, cost effective and fair manner.
8. **COLLABORATE**: Incorporate each jurisdiction into the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan.

Current Mitigation Actions

Prevention Mitigation Actions

The community adopted a land use plan update in 1993 prior to establishing a Zoning Ordinance. The original plan was drafted in the late 1960's and an update was completed in 1975. In the plan, it stresses the importance of not developing in the identified floodplain and includes a floodplain map.

The Zoning Ordinance was introduced to the community in the 1980's and was updated in 1996. Floodplain control has been a key element that the Planning and Zoning Commission and the Zoning Administrator have had to deal with over the past decade. The Zoning Code recognizes Residential, Multi-Unit Residential, Commercial, Manufacturing, Agricultural and Unclassified areas. Unclassified areas are predominately no-build floodplain areas.

The City of La Porte City currently has a Code of Ordinances that includes a Development Ordinance. The Development Ordinance incorporates both zoning and sub-division regulations for the community.

Building codes are considered to be a very beneficial mitigating effort for a number of the hazards identified in this plan. By having and enforcing building codes, the community reduces the risk of fire, damage from high wind events, damage from earthquake, damage from heavy snow loads, and reduces the amount of energy necessary to heat and cool a structure in addition to many other examples. The City of La Porte City has adopted and enforces the following building codes: the 2017 National Electric Code, the 2015 International Building Code, and the 2015 International Residential Code.

Property Protection Mitigation Actions

The City of La Porte City has implemented a variety of property protection projects. Elevations of critical facilities, such as the wastewater treatment facility have been undertaken. Flash flooding has on occasion caused damage in the community; therefore, the City has installed a substantial amount of storm sewer infrastructure throughout the community.

After La Porte City was flooded again in May-June 2008, the city submitted an application for buyout program funding from FEMA. An application to buyout 13 properties was approved by FEMA in May 2009. The city received buyout funding from FEMA totaling $1,165,326.00. The city has since completed the buyout mitigation program by acquiring 11 properties altogether.

One of the most important documents pertaining to the flood hazards in the City La Porte City became official in July 1980. It was a Flood Insurance Study conducted by the Federal Emergency Management Agency. The Flood Insurance Study was a preliminary requirement necessary for initial participation in the National Flood Insurance Program. As a result of the completion of the flood study an official FIRM (Flood Insurance Rate Map) was issued to the city.
In addition to the Flood Insurance Study, there have been a number of documents that have been prepared by the U.S. Army Corps of Engineers as well as Brice, Petrides, & Associates which studied either the Cedar River and/or Wolf Creek.

Public Education and Awareness Mitigation Actions

A new statewide reverse 911 system known as Alert Iowa was implemented by implemented by Iowa Homeland Security and Emergency Management in 2014. Citizens have the ability to "opt in" to receive weather alerts and enter a cell phone, work phone, and other additional alternative phone numbers.

Radio, television, cellular telephones, landline telephones, newspapers, warning sirens, NOAA Radio Service and the internet are available to the public at large. The City has developed a website in order to keep its citizens, and other interested parties, aware of local and government affairs. The website address is www.lpcia.com.

Emergency Services Mitigation Actions

Black Hawk County Emergency Management Agency

The Black Hawk County Emergency Management Agency is governed by a board of eleven commissioners comprised of the Mayors from each incorporated jurisdiction in the County or their designated delegate, a representative of the Black Hawk County Sheriff's Department, and the Chairperson of the Black Hawk County Board of Supervisors. The Emergency Management Agency works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. Furthermore, the agency is responsible for the monthly testing of all outdoor warning sirens in Black Hawk County.

Fire Department

La Porte City currently maintains a volunteer fire department, comprised of firefighters, EMTs and paramedics. As of 2019, the Department was comprised of 29 volunteers. The primary services provided by the department include fire protection, EMS transport, and rescue services. The primary response area of the department is approximately 110 square miles, an area which has a population of about 5,500 people. The department currently holds mutual aid agreements with all departments in Black Hawk County and Jesup, Mt. Auburn, Garrison, Dysart, Gilbertville, and Brandon. Major equipment currently owned by the department includes the following: two pumpers, two tankers, one grass/brush truck, two ambulances, one rescue truck, gator, grain bin rescue equipment, one boat and dry suits for water rescue. Also, the department maintains 30 sets of bunker gear, a Jaws of Life rescue extrication tool, and other miscellaneous rescue equipment.

Ideas for improved service and identified needs of the department include installing dry hydrants in the outlying primary response area to mitigate a potential loss of City water supply, consider having paid personnel sometime in the future, and acquiring additional technical rescue equipment. In order to implement these ideas the department will require funding for training, equipment, and volunteer incentives.

Medical Services

Although there are no hospitals located within La Porte City, Black Hawk County is presently home to a regional health care center. In addition to numerous

private clinics and practicing physicians, Black Hawk County has four major medical facilities, all of which are located in either Waterloo or Cedar Falls. Three of these facilities are considered Regional Hospitals, otherwise referred to as Level II. Mercy One Medical Center and Unity Point Hospital are located in Waterloo. Mercy One Medical Center has a second location in Cedar Falls. Another smaller facility, Peoples Community Health Clinic (Level IV), affiliated with Covenant Medical Center, is located in downtown Waterloo.

La Porte City has a full volunteer ambulance service which serves the city and surrounding townships, as part of the city's Fire Rescue Department. The department has two ambulance vehicles.

Police

24-hour police protection is provided by the La Porte City Police Department which employs 4 Police Officers. In addition, back up is provided by the Black Hawk County Sherriff's Department and the Iowa State Patrol.

Hazardous Materials

A regional Hazard Materials Team is on hand to assist the community with a Hazard Materials event or catastrophe. The Team is located within a short distance and is operated by Waterloo Fire Rescue Department. The city is also a partner in the Tri-County Drug Task Force. The group works with the City in the event of the discovery of a methamphetamine lab within the community.

Snow Removal

The NOAA estimates that approximately 70 percent of all deaths attributed to severe winter storms occur in an automobile. Therefore, the City of La Porte City views proper snow and ice removal from roadways to be essential in mitigating negative effects of these events. Snow removal and ice prevention techniques are practiced by city and state employees on the corresponding local and state roadways within the city limits.

Warning Systems

In the event of a tornado, there are three warning sirens strategically located throughout the community. Two of these sirens are administered by Black Hawk County Emergency Management Agency, which are tested on a monthly basis. The third siren, administered locally by the La Porte City Fire Rescue Department, is manually operated and does not have a battery backup.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the comprehensive efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit community residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

TABLE G8: STAPLEE ELEMENTS

S – Social	• Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the populations, • Actions do not cause relocation of lower income people, • Actions are compatible with the community's social and cultural values.
T- Technical	• Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	• Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	• Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	• It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	• Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E - Environmental	• Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, • Are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table G8) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each mitigation activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each of the proposed mitigation activity will occur. For instance, if the activity happens regularly (either daily, weekly, monthly, or annually) it was identified as On-Going activity; if it will occur within the next 1-5 years it was identified as Short-Term; if the activity would take 5-10 years to occur it was labeled as Mid-Term; and all activities that would take 10 or more years to occur were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The city will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.

- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).

- Moderate : Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.

- High : Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, identified the responsible party or parties for each activity, and finally related each activity to at least one of the Hazard Mitigation Plan Goals listed above. Table G8 below is La Porte City's Implementation Strategy.

TABLE G9 : FUTURE HAZARD MITIGATION ACTIVITIES - LA PORTE CITY						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
L	Cooperate with the Health Department and the State Veterinary Office for monitoring and responding to any perceived epidemic.	Animal/Plant/Crop Disease, Human Disease	City Hall personnel*, mentioned organizations	Ongoing	Minimal	Collaborate
H	Maintain the municipal swimming pool.	Extreme Heat	Pool manager*	Ongoing	Low	Maintain
H	Identify locations that can be used as cooling shelters.	Extreme Heat	American Red Cross, City Council*	Ongoing	Minimal	Protect
L	Identify service agencies that provide fans and air conditions to the underprivileged.	Extreme Heat	City Council*, Food Bank, Operation Threshold, some retail stores	Ongoing	Minimal	Protect
H	Improve the existing storm sewer system.	Flash Flood	City Council*, Planning and Zoning	Long Term	High	Maintain, Prevent, Minimize
H	Require new developments to account for any increased runoff (e.g. detention basins).	Flash Flood	City Council*, Planning and Zoning, Private Property Owners	Ongoing	Minimal	Maintain, Prevent, Minimize
L	Identify locations for buffer strips to be constructed and maintained; build terraces in areas surrounding the community.	Flash Flood, River Flood	City Council*, Planning and Zoning Private Property Owners	Medium Term	Minimal	Maintain, Prevent, Minimize, Protect
H	Enforce the local ordinance that prohibits swimming in Wolf Creek.	Flash Flood, River Flood	Police Dept*	Ongoing	Minimal	Educate, Prevent, Protect
H	Erect barricades near Wolf Creek during flood events.	Flash Flood, River Flood	Public Works*	Ongoing	Minimal	Protect, Prevent, Minimize
H	Maintain water rescue equipment and training.	Flash Flood, River Flood	Fire Dept*	Ongoing	Low	Maintain, Protect
L	Manage areas of heavy vegetation.	Grassfire/Wildfire	City Council*, Public Works	Ongoing	Minimal	Maintain

TABLE G9 : FUTURE HAZARD MITIGATION ACTIVITIES - LA PORTE CITY						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
M	Implement and enforce burn bans when severe drought occurs.	Grassfire/Wildfire, Drought	Fire Chief*, City Council, County EMA, State Fire Marshall	Ongoing	Minimal	Educate, Prevent
L	Encourage the local grain elevator to maintain its facility.	HAZMAT	Insurance companies, Fire Dept*	Ongoing	Minimal	Maintain
H	Practice storm water management.	HAZMAT	City Council*	Ongoing	Minimal	Protect, Prevent, Maintain
M	Foster regional cooperation to limit pollution into lakes, rivers, and creeks.	HAZMAT	City Council*	Short Term	Minimal	Collaborate
H	Ensure that MSDS forms are updated on a regular basis.	HAZMAT	Dept heads*	Ongoing	Minimal	Protect, Prevent
M	Develop and update as necessary City Emergency Plans.	HAZMAT	City Council*, Dept heads	Ongoing	Minimal	Collaborate
M	Provide flue, hepatitis A/B, and tetanus shots to city employees.	Human Disease	City Council*, Occupational Health	Ongoing	Minimal	Protect, Prevent
H	Maintain clean public facilities.	Human Disease	Respective Dept heads*	Ongoing	Minimal	Maintain
H	Ensure the fire department's needs are met.	Infrastructure Failure	City Council*, Fire Dept	Ongoing	Moderate	Maintain, Protect, Prevent
H	Encourage installation of smoke detectors in all structures in the community.	Infrastructure Failure	Fire Dept*	Ongoing	Minimal	Protect, Prevent
H	Purchase and install backup repeaters.	Infrastructure Failure	Black Hawk County 911 Service Board*	Short Term	Low	Protect, Minimize, Restore
H	Follow the National Incident Management System (NIMS) protocol.	Infrastructure Failure	City*, County EMA	Ongoing	Minimal	Protect, Minimize, Restore
H	Maintain generators at critical facilities throughout the community.	Infrastructure Failure	Public Works*, Utilities	Long Term	Moderate	Maintain, Restore

TABLE G9 : FUTURE HAZARD MITIGATION ACTIVITIES - LA PORTE CITY						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
H	Maintain and enforce local building and zoning codes.	Infrastructure Failure, Earthquake, Expansive Soils, Landslides	Building Dept*, City Council, Board of Adjustment	Ongoing	Minimal	Maintain, Protect, Prevent
H	Maintain the power plant.	Infrastructure Failure, Extreme Heat	Public Works*, Utilities, City Council	Ongoing	High	Maintain
H	Enforce, maintain, and update the fire codes as deemed necessary.	Infrastructure Failure, Grassfire/Wildfire	Fire Dept*, Building Dept, Police Dept, City Council	Ongoing	Minimal	Maintain Protect, Prevent
H	Maintain a well-trained and well-equipped fire department.	Infrastructure Failure, HAZMAT	City Council*, Fire Dept	Ongoing	High	Maintain, Educate, Protect, Prevent, Restore
L	Foster cooperation with neighboring land owners.	Landslides	City Council*	Ongoing	Minimal	Collaborate
H	Maintain membership in the National Flood Insurance Program (NFIP).	River Flood	City Council*, Building Dept	Ongoing	Minimal	Maintain, Minmize
H	Construct an elevated access to the sewer plant.	River Flood	City Council*	Short Term	Moderate	Prevent, Minimize, Maintain
H	Maintain the channel of Wolf Creek.	River Flood	City Council*, Private Property Owners	Long Term	High	Maintain
H	Continue to identify, purchase, and remove structures and populations in danger of being flooded; in addition to maintaining a list of properties that they deem as potential buyout candidates.	River Flood	City Council*, Public Works	Ongoing	High	Minimize
L	Elevate or relocate public structures in the floodplain, as needed.	River Flood	City Council*	Long Term	High	Minimize, Prevent

TABLE G9 : FUTURE HAZARD MITIGATION ACTIVITIES - LA PORTE CITY						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
H	Protect critical facilities.	River Flood, Terrorism	City Council*, Police Dept, Public Works, Utilities	Ongoing	Moderate	Maintain, Prevent, Protect
H	Consider purchase new radios for Public Works personnel so that they may communicate with first responder agencies.	Severe Winter Storm	City Council*, Dept heads	Short Term	Low	Restore, Collaborate
L	Monitor water mains to guard against freezing.	Severe Winter Storm	Utilities*	Ongoing	Minimal	Maintain
H	Maintain a well-trained and well-staffed Public Works department.	Severe Winter Storm, Transportation Incident	City Council*, Public Works, INRCOG	Ongoing	High	Maintain, Protect, Prevent, Restore
L	Ensure that proper warning signage is placed around sinkholes.	Sinkholes	DNR, Fire Dept, Public Works*	Ongoing	Minimal	Protect, Prevent
H	Evaluate communications system with the local school system.	Terrorism	School Board*	Short Term	Minimal	Collaborate
H	Ensure the local schools have Emergency Response Plans in place.	Terrorism	School Board*	Ongoing	Minimal	Protect, Restore
H	Ensure that local public safety personnel receive anti-terrorism training.	Terrorism	City Council*, Police Dept	Ongoing	Minimal	Educate, Protect, Prevent, Restore
L	Enforce curfew for minors.	Terrorism	Police Dept*	Ongoing	Minimal	Protect, Prevent
H	Place lightning arrestors on all lift stations.	Thunderstorm/Lightning	Public Works*	Ongoing	Minimal	Prevent, Maintain
H	Improve storm water systems in areas deemed to be currently inadequate.	Thunderstorm/Lightning	City Council*, Street Superintendent	Long Term	High	Maintain
H	Continue tree trimming/maintenance procedures.	Tornado/Windstorm	Public Works*, Utilities	Ongoing	Minimal	Maintain

TABLE G9 : FUTURE HAZARD MITIGATION ACTIVITIES - LA PORTE CITY						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
H	Place all utility lines underground.	Tornado/Windstorm	Utilities*	Long Term	High	Prevent
M	Construct public tornado safe rooms in areas the city determines to be appropriate.	Tornado/Windstorm	City Council*	Long Term	Moderate	Protect
H	Educate the public.	All	Local Schools, Media, American Red Cross, County EMA*	Ongoing	Minimal	Educate, Protect, Prevent
H	Maintain and improve outdoor warning siren network.	Tornado/Windstorm, Infrastructure Failure	Public Works*, Utilities, County EMA	Ongoing	Low	Maintain, Protect
M	Identify areas to construct public tornado shelters or safe rooms.	Tornado/Windstorm, Severe Winter Storm	City Council*, Building Department	Medium Term	Minimal	Protect
L	Ensure that proper signage is in place and in working order at all railroad crossings.	Transportation Incident	Railroad, Public Works*	Ongoing	Minimal	Educate, Protect, Prevent
L	Encourage improving safety at all railroad crossings.	Transportation Incident	City Council*	Ongoing	Minimal	Educate, Maintain, Protect
M	Consider drafting a local evacuation plan.	Transportation Incident, HAZMAT	City*, Public Works	Medium Term	Minimal	Protect
H	Maintain viable first responder agencies to ensure an effective and efficient response.	Transportation Incident, HAZMAT	Townships, City Council*, Police Dept, Fire Dept, EMS Dept	Ongoing	Moderate	Maintain, Protect, Restore
M	Use fuel tanks that are specifically designed to withstand impacts of collisions.	Transportation Incident, HAZMAT	Public Works*	Ongoing	Moderate	Maintain, Prevent, Minimize
M	Install warning alarms on tanks containing explosive materials.	Transportation Incident, HAZMAT	Public Works*	Short Term	Low	Protect, Minimize
H	Maintain mutual aid agreements for HAZMAT response with the NEI Response Group.	Transportation Incident, HAZMAT, Radiological	City Council*	Ongoing	Minimal	Maintain, Collaborate
H	Maintain a well-trained and well-equipped law enforcement agency.	Transportation Incident, HAZMAT, Terrorism	City Council*, Police Dept	Ongoing	Moderate	Maintain, Protect, Prevent, Restore

APPENDIX H: CITY OF RAYMOND

COMMUNITY PROFILE

Location

The City of Raymond is located just four miles east of the center-point of Black Hawk County. The elevation of the community is approximately 909 feet above sea level. Poyner Creek, a tributary of the Cedar River, cuts through the southeastern corner of the city and runs from northeast to southwest. The main roads in Raymond are State Highway 297/S 3rd Street, Plaza Drive/Lafayette Road, and Dubuque Road. Interstate 380/US Highway 20 is also very accessible to the city. The interchange at Exit 68 in Evansdale is less than one mile southwest of the Raymond city boundary. Motorists must pass through Elk Run Heights for a half-mile on Plaza Drive before continuing into Evansdale and onto Interstate 380/US Highway 20. The City of Raymond is bordered to the West by Elk Run Heights and in all other directions by farmland. BMC Aggregates LC operates a quarry approximately one mile east-southeast from the city.

Natural Environment

Originally, the land surrounding and including Raymond was covered with deciduous forest; this vegetation is now predominant only along the banks and flood plains of watercourses. The original cover has been reduced to make room for additional cropland and construction of houses and businesses in suitable areas. Tree cover can also be found throughout the community in residential areas, and parks. These remaining trees contribute to the aesthetics of the community and are viewed as an asset.

According to the Black Hawk County Soil Survey conducted in 1995 by the United States Department of Agriculture Soil Conservation Service, the majority of soils in Raymond are of the Finchford Series. The Finchford Series "consists of nearly level to moderately sloping, excessively drained soils on high alluvial terraces and adjacent escarpments. These soils have very low available water capacity and very rapid permeability". Slopes range from 0-2 percent. Some of the soils in Raymond may be subject to flooding. It should be noted that much of Black Hawk County, including Raymond, contains valuable agricultural soils that are capable of sustaining development. Further, if the city is to experience development, it is anticipated that some of these valuable soils will be lost.

Transportation

As mentioned, the major transportation route affecting the City of Raymond is Interstate 380/US Highway 20. The major rail line in Raymond is the Canadian National Railway Company rail line that runs just south of the city. This railroad operates 6,400 miles of track in the United States, with 558 miles located in Iowa. Trains running on the track occasionally carry chemicals and other farm products that could cause a hazard if spilled or leaked into the environment. The Waterloo Regional Airport, located approximately 15 miles from Raymond, is the closest airport to the city. Bus service is available for some populations through the Waterloo Metropolitan Transit Authority Paratransit service.

The City of Raymond is not currently connected to the metropolitan area's trail network. Only roads connect Raymond to the trail network. The closest access point to the trail network is in Evansdale, approximately three miles west.

Community Services

Raymond does not have its own water system. Instead, the City relies on the City of Waterloo, i.e. Waterloo Waterworks, for water service and the City of Elk Run Heights for wastewater treatment. Wastewater is transported to the facility with the assistance of three waste water lift stations. Table H1 lists the utility providers in the city.

Demographics

Table H2 provides a summary of Raymond's demographics.

TABLE H1: UTILITY PROVIDERS – RAYMOND

Utility	Provider
Electric	Mid-American Energy
Gas	Mid-American Energy
Water	Waterloo Waterworks
Sewer	City of Elk Run Heights
Telephone/Internet	CenturyLink, Mediacom
Cable TV	Mediacom
Sanitation	Waste Management

TABLE H2: CITY OF RAYMOND DEMOGRAPHICS					
General Population, 2013-2017 ACS	Total Population	763	***Economic Char, 2013-2017 ACS 5-Year Estimates***	Population In Labor Force	396
	Total Males	326		Population in Civilian Labor Force	396
	Total Females	437		Persons Employed	386
	Median Age	38.3		Persons Unemployed	10
	At-Risk Population, under 18	214		Persons in Armed Forces	0
	At-Risk Population, 65 and over	106		Mean Travel Time to Work in Minutes, 16 and over	20.7
	One Race: White	745		Persons Employed in Management, Business, Science, and Arts Occupations	118
	One Race: Black or African American	0		Persons Employed in Service Occupations	39
	One Race: American Indian and Alaska Native	0		Persons Employed in Sales and Office Occupations	119
	One Race: Asian	0		Persons Employed in Natural Resources, Construction, and Maintenance Occupations	39
	One Race: Native Hawaiian and Other Pacific Islander	0		Persons Employed in Production, Transportation, and Material Moving Occupations	71
	Two or More Races	18		Median Household Income	69,625
	Hispanic or Latino (of any race)	10		Median Family Income	83,611
				Per Capita Personal Income	29,718
Households by Type, 2010 Census	Total Population in Households	788		All People below Poverty Level	6.2%
	Total Population in Group Quarters	0			
	Total Households	313			
	Total Family Households	238			
	Total Family Households with own children under 18	95	***Social Characteristics, 2013-2017 ACS 5-Year Estimates***		
	Male Householder, no wife present, with own children under 18	4		Total School Enrollment, 3 and over	199
	Female Householder, no husband present, with own children under 18	8		Population Enrolled in Nursery School, Preschool	22
	Householder living alone	65		Population Enrolled in Kindergarten and Elementary School, grades K-8	110
	Households with individuals under 18 years of age.	103		Population Enrolled in High School, grades 9-12	24
	Households with individuals 65 and over	76		Population Enrolled in College or Graduate School	43
	Average household size / Average Family Size	2.52 / 2.91		Total Population, 25 and over	504
				Persons with Less than 9th Grade Education	4
Housing Characteristics, 2013-2017 ACS	Total Housing Units	304		Persons with 9th to 12th Grade Education, No Diploma	18
	Occupied Housing Units	287		Persons with High School Degree or Equivalency	208
	Vacant Housing Units	17		Persons with Some College Education, No Degree	114
	Owner-Occupied Housing Units	266		Persons with Associate Degree	55
	Population in Owner-Occupied Housing Units	726		Persons with Bachelor's Degree	92
	Rental-Occupied Housing Units	21		Persons with Graduate or Higher Degree	13
	Population in Rental-Occupied Housing Units	37		Total Civilian Noninstitutionalized Population with a Disability	71
	Mobile Homes	0			
	3+ Units in Structure	12			

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Raymond evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. The City of Raymond's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions included: Historical Occurrence, Probability, Magnitude/Severity, Warning Time, and Duration. Due to recent disasters and events that have impacted the planning area, the City determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table H3 is the analysis scores for the City of Raymond. As seen in Table H3, the top three natural hazards are Severe Winter Storms, Tornado/Windstorms, and Transportation Incidents.

The tables below identify the scoring criteria utilized by the Committee to evaluate each hazard. Further descriptions are provided in Section 3.

PROBABILITY		
Score	**Description**	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2	Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3	Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33% or the event is likely to occur.
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.

MAGNITUDE / SEVERITY		
Rating	**Description**	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least two weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

DURATION	
Score	**Description**
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

TABLE H3: HAZARD RISK ASSESSMENT FOR RAYMOND					
Hazard	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Total**
Severe Winter Storm	4	2	4	2	3.2
Tornado/Windstorm	4	2	4	1	3.1
Transportation Incident	4	2	4	1	3.1
Thunderstorm/Lighting/Hail	4	2	3	1	2.95
Drought	4	2	1	4	2.95
Flash Flood	4	1	4	1	2.8
Grass/Wild Fire	3	2	4	1	2.65
Sinkholes	2	2	4	4	2.5
HAZMAT Incident	2	1	4	2	2
Earthquake	2	1	4	1	1.9
Terrorism	1	1	4	4	1.75
Infrastructure Failure	1	1	4	1	1.45
Radiological Incident	1	1	4	1	1.45
Landslide	1	1	4	1	1.45
Expansive Soils	1	1	4	1	1.45
Dam / Levee Failure	1	1	4	1	1.45
Animal/Plant/Crop Disease	2	1	1	1	1.45
Extreme Heat	1	1	1	4	1.3
River Flooding	1	1	1	4	1.3
Human Disease	1	1	1	1	1

Vulnerability – Identifying Assets (Critical Facilities) & Social Asset Populations

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the community's historical occurrences of tornados this hazard was added to the assessment. The following discussion only considers the assets in the community of Raymond.

TABLE H4: SHELTERS IN RAYMOND
None identified
Source: Community

Critical Facilities

Identifying the location of critical facilities is important in order to assess their vulnerability to hazards, since these facilities are important to the community's operations, quality of life, and economic sector. These include but are not limited to schools, hospitals, libraries, police and fire stations, water towers, sirens, and lift stations. *Map 61* shows the locations of these critical facilities throughout Raymond.

Currently, there are no structures identified for use as a shelter in Raymond. During a tornado event, residents are advised to seek shelter in a pre-designated shelter, such as a basement, or the lowest floor of a sturdy nearby building as soon as possible.

Homes In Hazardous Areas

The City of Raymond is not affected by flooding. According to FEMA's flood insurance rate map, there are no houses in the 100-year floodplain in Raymond. According to the National Flood Insurance Program's flood loss statistics, the City of Raymond had only two flood loss claims between 1978 and 2009.

TABLE H5: FLOODPLAIN PARCELS WITHIN RAYMOND							
	# of Parcels	**Total Land Value**	**Total Building Value**	**Total Dwelling Value**	**Multi-Residential Land**	**Total Value**	**Percent of City Damaged**
City Floodway Property Values	0	$0	$0	$0	$0	$0	0.00%
City 1% Annual Chance Floodplain Property Values	13	$654,110	$30	$380,700	$0	$1,034,840	1.85%
City 0.2% Annual Chance Floodplain Property Values	0	$0	$0	$0	$0	$0	0.00%
Source: Flood overlay shows the 2011 floodplain designations in Black Hawk County, Iowa. The digital flood layer was obtained from FEMA's current Digital Flood Insurance Rate Map. The incorporated boundaries were current as of 5/5/19.							

Persons living in mobile homes may also be at risk from a number of hazards. According to the 2013-2017 ACS, there are no mobile homes in Raymond. Persons living in some multi-family housing units may be at risk, due to the lack of a proper tornado shelter. In 2017, there were an estimated 12 housing units in buildings with three or more units. Using the average household size of 2.52, there are approximately 30 persons living in multi-family housing units who may be at a greater risk during a tornado event.

Vulnerability – Identifying Social Asset Populations

The social vulnerability assessment identified how the hazards affect the population of Raymond, and it is assumed that the identified populations are more likely to require assistance during times of disaster and are therefore, more at-risk than the remaining population. The at-risk population must be identified and targeted in successful mitigation efforts.

According to 2017 ACS Census data, approximately 106 persons in the City of Raymond are 65 years or older, representing approximately 13.9% of the population. Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young people often are not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2017, approximately 214 persons in the City of Raymond were under 18 years of age, representing approximately 28.1% of the population.

As mentioned previously, persons living in mobile homes and persons living in multi-family housing units are also considered at risk. There are approximately zero persons living in mobile homes and 30 persons living in multi-family housing units in Raymond.

Map 47 and *Map 48* illustrate the impact of a hypothetical tornado event in Raymond. According to data from the Black Hawk County Assessor's Office, there are a total of 343 structures in the community with a total value of $58,520,320 Table H6 illustrates the degree of impact that hypothetical tornado scenarios of various strengths would have on Raymond.

TABLE H6: RAYMOND TORNADO SCENARIO

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural Values	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	149	$2,233,370	$3,808,842	$9,010,138	$16,030	$12,835,010	$3,208,753	10.18%
EF1	150 Meters	492 Feet	292	$4,187,010	$5,362,795	$18,967,095	$21,540	$24,351,430	$6,087,858	19.32%
EF2	250 Meters	820 Feet	420	$6,178,098	$6,049,350	$29,349,530	$63,622	$35,462,502	$17,731,251	28.13%
EF3	500 Meters	1640 Feet	675	$9,732,758	$9,063,480	$46,251,470	$76,722	$55,391,672	$27,695,836	43.94%
EF4	900 Meters	2953 Feet	1011	$14,386,602	$12,957,686	$67,530,354	$214,888	$80,702,928	$80,702,928	64.02%
EF5	1100 Meters	3609 Feet	1126	$16,309,242	$15,484,796	$74,969,934	$265,908	$90,720,638	$90,720,638	71.96%

Parcel value information is current as of 09/25/2018. The source is the Black Hawk County MIS Department.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. Table H7 lists all of the structure valuations for the City of Raymond. Since 100% of the city is at risk of some kind of hazard event, the entire city is considered to be in the hazard area. This data was used in the Vulnerability discussion in each of the Hazard Profiles in Section 3.

This information was made available from the Black Hawk County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE H7: ASSET INVENTORY – BUILDING /DWELLING VALUES IN RAYMOND

Class	Land Value	Building Value	Dwelling Value	MR Land	Building Count
Agricultural	858,960	6,720	760,310	0	8
Cities	309,410	125,330	0	0	5
Commercial/Dual Class	306,763	1,149,263	38,637	18,647	20
County	32,700	0	0	0	0
Multi-residential	0	0	67,710	14,210	2
Religious/Non-Profit	154,930	324,780	0	0	2
Residential	7,727,520	0	46,624,430	0	306
Total	**$9,390,283**	**$1,606,093**	**$47,491,087**	**$32,857**	**343**

Source: Black Hawk County Assessor 2019 Values

*- Please note that the assessed value for tax-exempt structures may not adequately reflect their fair market rate value, which may be significantly higher than the assessed value. Accordingly, the values listed above should not be regarded as accurate for any purpose.

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and

local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced no losses in a 10-year period in which each loss is $1,000 or more. According to available FEMA data (as of 09/30/19), the City of Raymond participates in the National Flood Insurance Program and has no repetitive loss properties. Table 45 in Section 3 lists data from each city regarding the National Flood Insurance Program.

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The updated (non-revised) hazard mitigation plan goals for the City of Raymond are:

1. **PROTECT**: Protect the health and safety of residents, visitors, staff and emergency personnel during and after hazard events.
2. **PREVENT**: Prevent avoidable disasters.
3. **MINIMIZE**: Minimize losses to existing and future structures in hazard areas, especially critical facilities.
4. **MAINTAIN**: Maintain local services and infrastructure in order to reduce community, economic and environmental disruption during and after hazard events.
5. **RESTORE**: Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
6. **EDUCATE**: Educate the public about hazards and resources available.
7. **ACCOUNTABILITY**: Use public funds in an efficient, cost effective and fair manner.
8. **COLLABORATE**: Incorporate each jurisdiction into the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan.

Current Mitigation Actions

Prevention Mitigation Actions

On July 11, 1978 the City of Raymond became active members in the National Flood Insurance Program (NFIP) by adopting its initial floodplain ordinance. The Federal Insurance Administration manages the insurance component of the NFIP, and works closely with FEMA's Mitigation Directorate, which oversees the floodplain management aspect of the program.

The Floodplain Ordinance is a portion of the city's Zoning Ordinance. The ordinance requires that all development within the special flood hazard areas outlined in the National Flood Insurance Rate Map shall: (a.) "be consistent with the need to minimize flood damage."; (b.) "use construction methods and practices that will minimize flood damage"; (c) "Use construction materials and utility equipment that are resistant to flood damage"; and (d.) " Obtain all necessary permits from Federal, State and local governmental agencies including approval when required from the Iowa Department of Natural Resources". There have been no known property acquisitions or demolitions in the City of Raymond for the purpose of flood hazard mitigation.

The City also has a building permit process. Any new structure or remodel/repair work completed over a $1,000 value, requires a permit. This includes electrical, building, plumbing, and heating.

Property Protection Mitigation Actions

As stated in the last section, the city has a zoning ordinance as well as a building permit process.

Public Education and Awareness Mitigation Actions

A new statewide reverse 911 system known as Alert Iowa was implemented by implemented by Iowa Homeland Security and Emergency Management in 2014. Citizens have the ability to "opt in" to receive weather alerts and enter a cell phone, work phone, and other additional alternative phone numbers. Radio, television, cellular telephones, landline telephones, newspapers, warning sirens, NOAA Radio Service and the internet are available to the public at large. The City has developed a website in order to keep its citizens, and other interested parties, aware of local and government affairs. The website address is www.raymondia.us.

Emergency Services Mitigation Actions

Black Hawk County Emergency Management Agency

The Black Hawk County Emergency Management Agency is governed by a board of eleven commissioners comprised of the Mayors from each incorporated jurisdiction in the County or their designated delegate, a representative of the Black Hawk County Sheriff's Department, and the Chairperson of the Black Hawk County Board of Supervisors. The Emergency Management Agency works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. Furthermore, the agency is responsible for the monthly testing of all outdoor warning sirens in Black Hawk County.

Fire Department

Fire and rescue services are provided by volunteers including firefighters, EMTs and paramedics. As of 2014, the Raymond Volunteer Fire Department had 25 members who provide fire protection to the residents of Raymond and the surrounding area. Members meet once per month for training and business matters. As of 2009, the department had three trucks, one trailer, and two pick-up trucks.

Medical Services

There are no hospitals located in Raymond. The City is served by the four major medical facilities in Black Hawk County. Three of these facilities are considered Regional Hospitals, otherwise referred to as Level II. Mercy One Medical Center and Unity Point Health are located in Waterloo. Mercy One Hospital is located in Cedar Falls. Another smaller facility, Peoples Community Health Clinic (Level IV), is located in downtown Waterloo.

Police

The City of Raymond has one full time officer. The City is within the jurisdiction of the Black Hawk County Sheriff's Office as well as the Iowa State Patrol.

Hazardous Materials

A regional Hazard Materials Team is on hand to assist the community with a Hazard Materials event or catastrophe. The Team is located within a short distance and is operated by Waterloo Fire Rescue Department. The city is also a partner in the Tri-County Drug Task Force.

Snow Removal

The NOAA estimates that approximately 70 percent of all deaths attributed to winter storms occur in an automobile. Therefore, the City of Raymond views proper snow and ice removal from roadways to be essential in mitigating negative effects of these events. The City of Raymond has approximately 11 miles of roads within the city limits. The City contracts for snow removal services for all 11 miles in the winter and the streets are cleaned once a year during the spring. Other maintenance is performed as needed.

Warning Systems

The City of Raymond has an outdoor warning siren. The Fire Department and City Council are currently looking at various funding sources to replace the existing siren.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the comprehensive efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit community residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

TABLE H8: STAPLEE ELEMENTS

S – Social	• Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the populations, • Actions do not cause relocation of lower income people, • Actions are compatible with the community's social and cultural values.
T- Technical	• Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	• Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	• Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	• It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	• Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E - Environmental	• Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, • Are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table H8) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each mitigation activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each of the proposed mitigation activity will occur. For instance, if the activity happens regularly (either daily, weekly, monthly, or annually) it was identified as On-Going activity; if it will occur within the next 1-5 years it was identified as Short-Term; if the activity would take 5-10 years to occur it was labeled as Mid-Term; and all activities that would take 10 or more years to occur were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The city will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate : Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High : Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, identified the responsible party or parties for each activity, and finally related each activity to at least one of the Hazard Mitigation Plan Goals listed above. Table H8 below is the City of Raymond's Implementation Strategy.

TABLE H9: FUTURE HAZARD MITIGATION ACTIVITIES - RAYMOND						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
N/A	Develop a Continuity of Operations Plan.	All	Fire Dept*, County Sherriff's Dept, City Council	Short term	Minimal	Protect, Restore
H	Conserve water when needed.	Drought	City Council*	Long term	Low	Protect, Restore
L	Develop the proper steps to be taken in the event of an earthquake. Communicate these procedures to the public.	Earthquake	County EMA*	Ongoing	Minimal	Restore, Protect, Educate
M	Establish local "Cooling Sites" for at risk populations such as the elderly and/or disabled.	Extreme Heat	City Council*	Long term	Minimal	Protect
H	Continue Participation in the National Flood Insurance Program.	Flash Flood, River Flood	City Council*	Ongoing	Minimal	Minimize
H	Maintain, enforce, and update Zoning and Floodplain Ordinances as needed.	Flash Flood, River Flood	City Council*	Ongoing	Minimal	Maintain, Prevent
M	Continue to address inflow and infiltration issues.	Flash Flood, River Flood	City Council*	Long term	Minimal to High	Protect, Prevent, Maintain
H	Conduct periodic hydrant inspections.	Grassfire/Wildfire	City Council*, Fire Dept	Ongoing	Minimal	Maintain, Protect
H	Enforce burn bans when necessary.	Grassfire/Wildfire, Drought	County Sherriff's Dept*, City Council, Fire Dept	Ongoing	Minimal	Protect
M	Provide hazardous materials education.	HAZMAT	Fire Dept*, County EMA	Ongoing	Minimal	Educate
H	Conduct regular inspections.	HAZMAT	County EMC*	Ongoing	Minimal	Prevent
H	Identify/update evacuation procedures/plans.	HAZMAT	City Council*, Fire Dept, County EMC	Long term	Minimal	Protect, Minimize, Restore
H	Follow monitoring requirements set forth by the Iowa Department of Natural Resources.	HAZMAT	City Council*	Ongoing	Low	Protect, Maintain
L	Begin looking at water quality from a regional level.	HAZMAT	Iowa DNR, City Council*, County Conservation	Long term	Minimal	Protect, Maintain, Collaborate

TABLE H9: FUTURE HAZARD MITIGATION ACTIVITIES - RAYMOND						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
H	Maintain existing agreements with surrounding communities for mutual aid assistance.	HAZMAT, Transportation Incident, Infrastructure Failure, Grassfire/Wildfire, Terrorism	City Council*, County Fire Association, County Police, Hospitals	Ongoing	Minimal	Protect, Maintain, Restore, Collaborate
H	Continue to provide necessary education/certification/training to Fire Department personnel and first responders.	HAZMAT, Transportation Incident, Terrorism, Grassfire/Wildfire, Human Disease, Animal/Plant/Crop Disease	Fire Dept*, First Responders, City Council, County Sherriff's Dept, County Fire Association	Ongoing	Minimal	Protect, Prevent, Restore, Collaborate, Educate
H	Regularly review and amend Fire, Medical, and Hazardous Material response standard operating procedures.	Infrastructure Failure	Fire Dept*, First Responders, City Council	Ongoing	Minimal	Protect, Prevent, Restore, Collaborate, Educate
H	Enhance coordination of disaster plans in the community.	Infrastructure Failure	City Staff*, Fire Dept, County EMA	Ongoing	Minimal	Collaboration
H	Identify alternative water sources.	Infrastructure Failure, Grassfire/Wildfire	City Council*, Fire Dept, County Sherriff's Dept	Long Term	Minimal	Protect, Restore
L	Discourage the clearing of trees and shrubbery from cliffs and steep sloping hills.	Landslides	City Council*, City Engineer	Ongoing	Minimal	Prevent, Maintain
H	Monitor the transportation of radioactive chemicals, to the best of city's ability.	Radiological	Fire Dept*, County Sherriff's Dept, County EMA	Ongoing	Minimal	Protect, Prevent
H	Evaluate, maintain, and update emergency equipment and personnel capacity.	Radiological, Human Disease, Animal/Plant/Crop Disease	Fire Dept*, City Council	Ongoing	Low to Moderate	Maintain
M	Evaluate current terrorism mitigation efforts.	Terrorism	City Council*, Public Works, Fire Dept, County Sherriff's Dept, County EMA	Ongoing	Minimal	Protect
H	Increase measures taken to protect and secure the city's critical infrastructure.	Terrorism	City Council*	Ongoing	Minimal to High	Protect, Maintain

TABLE H9: FUTURE HAZARD MITIGATION ACTIVITIES - RAYMOND						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
L	Create community awareness for "cyber terrorism".	Terrorism	City Council*	Ongoing	Minimal	Educate
H	Continue to recruit volunteer first responders and fire volunteers, and market opportunities.	Thunderstorm/Lightning, Infrastructure Failure, Grassfire/Wildfire	Fire Dept*, County EMA	Long Term	Minimal	Protect, Maintain
M	Identify evacuation/rescue procedures.	Tornado/High Wind	City Council*, Fire Dept, County EMC	Long Term	Minimal	Protect, Minimize, Restore
H	Develop/renew agreements for temporary emergency shelter/safe room locations.	Tornado/High Wind, Radiological, Thunderstorm/Lightning	City Council*, County EMA	Long term	Minimal	Protect
M	Encourage participation in emergency notification systems	Tornado/High Wind, Thunderstorm/Lightning	County EMA*, Police Dept, City Council	Statewide Emergency Notification System to be ready by 2015	Minimal	Protect, Educate
H	Systematically review, make necessary updates to, and enforce building code requirements.	Tornado/High Wind, Thunderstorm/Lightning, Earthquake	City Council*, Developers	Ongoing	Minimal	Maintain
H	Educate the public	Tornado/High Wind, Winter Storm, Infrastructure Failure, Transportation Incident, Grassfire/Wildfire, Drought, Expansive Soils, Sinkholes, Landslides, Dam Failure, Levee Failure, Human Disease, Animal/Plant/Crop Disease	City Council*, City Staff, County Conservation, DNR, County Health Dept, Dept heads, Citizens	Ongoing	Minimal	Educate, Protect, Prevent
H	Enforce existing laws.	Transportation Incident	County Sherriff's Dept*	Ongoing	Low	Educate, Maintain

TABLE H9: FUTURE HAZARD MITIGATION ACTIVITIES - RAYMOND						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goal**
L	Incorporate the use of GPS systems in emergency vehicles.	Transportation incident	Fire Dept*, Police Dept, City Council	Long term	Minimal	Protect
M	Continue enforcement of snow ordinance.	Winter Storm	City Council*	Ongoing	Minimal	Protect
M	Purchase and maintain backup generators to provide emergency power in times of need (including portable generators).	Winter Storm, Thunderstorm/Lightning, Infrastructure Failure, Drought	City Council*	Long Term	Low	Protect, Minimize, Maintain, Restore

APPENDIX I: CITY OF WATERLOO / WATERLOO COMMUNITY SCHOOL DISTRICT

COMMUNITY PROFILE

Location

The City of Waterloo is located on the center point of Black Hawk County, though most of the city is to the north and west of this point. The exact center point of Black Hawk County is near the Waste Management facility (3505 Easton Ave) where solid waste, recycling, and storm water is processed. The elevation of the community is approximately 883 feet above sea level. The Cedar River runs northwest to southeast and splits the city into two segments, commonly referred to as East Waterloo and West Waterloo. In addition to being located on the Cedar River, the City of Waterloo is located on Interstate 380, US Highway 20 (Iowa State Highway 27), US Highway 63, US Highway 218, Iowa State Highway 21 (Hawkeye Road), and University Avenue.

The city is bordered to the north and northeast by unincorporated farmland, to the east mostly by farmland but also the City of Evansdale, to the southeast and south by more unincorporated farmland, to the southwest by the City of Hudson, and to the west by the City of Cedar Falls.

Natural Environment

The Cedar River is the main body of water in the City of Waterloo. In addition to the Cedar River, there are a number of creeks, small streams, and drainage ways throughout the community that have historically had flood occurrences. Several of these drain primarily rural areas. According to the 1985 Waterloo Flood Insurance Study these streams include Crossroads Creek, Prescotts Creek, Sink Creek, and unnamed streams referred to as 13, 36, 37, and 39. Other streams, including Dry Run Creek Blowers Creek, Maywood Branch, City View Branch, Black Hawk Creek, and Virden Creek have mostly urban drainage basins. The drainage areas for these streams are smaller than for the Cedar River, thus making them more susceptible to flash flooding caused by localized heavy rainfall events.

The City of Waterloo is located in the Middle Cedar Watershed. This watershed is but a segment of the larger Cedar River Watershed, which eventually acts as a tributary to the Iowa River. At the Waterloo river gauge, it is estimated that the drainage area for the watershed is 5,146 square miles. Also measuring from this gauge, the distance from the mouth of the Cedar River is approximately 200 miles.

The soil types that exist within the city of Waterloo are primarily classified as the Kenyon-Clyde-Floyd, Sparta-Olin-Dickinson, and Loamy Alluvial Land Associations. One soil factor that is used as a standardized measure of agricultural value is Corn Suitability Rating (CSR). Incidentally, CSR is an evaluative scoring system where ratings range between 5 and 100 that classify soils by their ability to support corn production. After reviewing the county soil survey, the CSR of the primary soils within the city range from 63 to 95, which are valuable for agricultural purposes.

Transportation

Over the past couple decades, much of the city's street transportation system has been improved, thanks in large part to the Interstate Substitution program and the local option sales tax. The Avenue of the Saints, which includes parts of Interstate 380 along with Highways 218 and 58, was developed northward through the Waterloo-Cedar Falls metropolitan area to the City of Waverly and beyond. Together, with the direct access to Interstate 380 and U.S. Highways 20, 63, and 218, the City of Waterloo enjoys access to several multi-lane highway facilities that form the backbone of the metropolitan area's transportation network. In addition, the city has made major investments to automate and synchronize traffic signalization throughout the community.

The Waterloo Municipal Airport is located on Airport Boulevard, near the northern edge of the Waterloo-Cedar Falls metropolitan area. The Waterloo Regional Airport (ALO) is a non-hub, primary commercial service airport serving Waterloo-Cedar Falls and a ten-county market area and has a Metropolitan Service Area (MSA) population of 162,435. American Airlines provides daily round-trip service to Chicago for connecting flights to over 154 cities worldwide. Waterloo Regional Airport has an Air Traffic Control Tower (ATCT) and General Aviation (GA) facilities, including hangar rentals and a full-service Fixed Base Operator (FBO), Livingston Aviation. In addition, the Army National Guard has assigned helicopter and fixed-wing aircraft using the Airport to support its flight operations. An Airport Advisory Board consisting of seven members who are appointed by the Mayor of Waterloo and approved by the Waterloo City Council oversees the Waterloo Regional Airport. The Airport Board works closely with Airport Administration and recommends policies and actions to the City Council. The Airport has approximately 110 based aircraft and 25,000 annual aircraft operations.

There are currently three railroads operating in the Waterloo-Cedar Falls metropolitan area: The Union Pacific, Canadian National, and Iowa Northern. The Rail Division of the U.S. Department of Transportation, formerly the Interstate Commerce Commission, has classified the three carriers in the following ways. Note that the carriers are classified by the annual amount of operating revenues they generate. The Union Pacific is a Class I railroad that operates over 32,012 miles of rail nationwide. The Canadian National Railroad is a Class I railroad that operates 641 miles of track in Iowa. The Iowa Northern Railway Company is a Class III railroad operating 147 miles of rail in Iowa. As may be the case with many rail operators in Iowa, the above carriers depend on the transport of bulk commodities such as grain, coal, chemicals, fertilizer, stone, and some food products for their well-being. However, we note that these rail carriers also transport intermediate and finished manufactured products, such as those for John Deere and Company.

The Cedar River bisects the city from northwest to southeast. Currently, the river is shallow and is subdivided by dams and spillways throughout the region. As a result of the intensive upstream agricultural practices and damming, the river has experienced silting that threatens the ecological life and navigability of river. The river is not capable of supporting any commercial or industrial barge traffic; therefore the vast majority of transportation to occur on the river is recreational. Efforts have recently made by the city, in cooperation with the Army Corps of Engineers to determine what options the city has, and how feasible it would be to improve the navigability of the river.

Collectively, along with the Cities of Cedar Falls, Evansdale, and Hudson, the Waterloo metropolitan area has over 100 miles of paved trails.

Community Services

The Waterloo Water Works is located at 325 Sycamore Street in downtown Waterloo. Water is provided to residents through a series of wells and three water towers, which are located on Linden Avenue, Kimball Avenue, and University Avenue.

Statistically, the city's water system has the ability to provide 50,400,000 gallons per day to its residents. In comparison to the city's capacity, the latest available figure on average daily water consumption is 13,000,000 gallons and a peak daily use of 28,800,000 gallons, which indicates that the city has a significant level of unused capacity to meet future demand. The Water Works serviced 26,211 meters and pumped 4,243,527,000 total gallons of water during the 2019 calendar year.

The City of Waterloo manages wastewater though the Easton Avenue Water Pollution Control Facility and a Satellite Treatment Facility. The city renovated and updated the sewer treatment plant extensively over the past decade, spending several million dollars on improvements. The plant was originally constructed in 1939. Under normal operations and conditions, the facility treats an average daily load of 14.0 million gallons per day (MGD). Under these same conditions, the design capacity of the service is 36.5 MGD.

TABLE I1: UTILITY PROVIDERS – WATERLOO

Utility	Provider
Electric	Mid-American Energy
Gas	Mid-American Energy
Water/Sewer	Waterloo Waterworks (City)
Telephone/Internet	CenturyLink, Mediacom
Cable TV	Mediacom

The sanitary sewer collection system includes over 800 miles of sanitary and storm sewers including force mains, 7,000 manholes, 25 sanitary lift stations and 21 storm sewer lift stations. The City of Waterloo sanitary sewer system provides service to an estimated population of 70,000 residents.

Table I1 lists the companies that are currently provide utilities to the City of Waterloo.

Demographics - Table I2 provides a summary of Waterloo's demographics.

TABLE I2: CITY OF WATERLOO DEMOGRAPHICS					
General Population, 2013-2017 ACS	Total Population	68,146	***Economic Char, 2013-2017 ACS 5-Year Estimates***	Population In Labor Force	35,456
	Total Males	33,674		Population in Civilian Labor Force	35,398
	Total Females	34,472		Persons Employed	32,953
	Median Age	36.6		Persons Unemployed	2,445
	At-Risk Population, under 18	16,083		Persons in Armed Forces	28
	At-Risk Population, 65 and over	10,437		Mean Travel Time to Work in Minutes, 16 and over	15.5
	One Race: White	51,638		Persons Employed in Management, Business, Science, and Arts Occupations	9,035
	One Race: Black or African American	10,600		Persons Employed in Service Occupations	6,190
	One Race: American Indian and Alaska Native	296		Persons Employed in Sales and Office Occupations	7,523
	One Race: Asian	1,451		Persons Employed in Natural Resources, Construction, and Maintenance Occupations	2,321
	One Race: Native Hawaiian and Other Pacific Islander	271		Persons Employed in Production, Transportation, and Material Moving Occupations	7,884
	Two or More Races	2,176		Median Household Income	44,429
	Hispanic or Latino (of any race)	4,311		Median Family Income	56,327
				Per Capita Personal Income	25,149
Households by Type, 2010 Census	Total Population in Households	67,241		All People below Poverty Level	11,721
	Total Population in Group Quarters	984			
	Total Households	28,607			
	Total Family Households	17,233			
	Total Family Households with own children under 18	7,580	***Social Characteristics, 2013-2017 ACS 5-Year Estimates***		
	Male Householder, no wife present, with own children under 18	808		Total School Enrollment, 3 and over	16,250
	Female Householder, no husband present, with own children under 18	2,653		Population Enrolled in Nursery School, Preschool	774
	Householder living alone	9,029		Population Enrolled in Kindergarten and Elementary School, grades K-8	8,212
	Households with individuals under 18 years of age.	8,546		Population Enrolled in High School, grades 9-12	3,295
	Households with individuals 65 and over	6,985		Population Enrolled in College or Graduate School	3,969
	Average household size / Average Family Size	2.35/ 2.95		Total Population, 25 and over	45,153
				Persons with Less than 9th Grade Education	2,041
Housing Characteristics, 2013-2017 ACS	Total Housing Units	31,365		Persons with 9th to 12th Grade Education, No Diploma	3,421
	Occupied Housing Units	28,468		Persons with High School Degree or Equivalency	15,310
	Vacant Housing Units	2,897		Persons with Some College Education, No Degree	9,553
	Owner-Occupied Housing Units	17,736		Persons with Associate Degree	4,966
	Population in Owner-Occupied Housing Units	42,744		Persons with Bachelor's Degree	6,939
	Rental-Occupied Housing Units	10,732		Persons with Graduate or Higher Degree	2,926
	Population in Rental-Occupied Housing Units	24,469		Total Civilian Noninstitutionalized Population with a Disability	8,744
	Mobile Homes	1,172			
	3+ Units in Structure	6,423			

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Waterloo evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. The City of Waterloo's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions included: Historical Occurrence, Probability, Magnitude/Severity, Warning Time, and Duration. Due to recent disasters and events that have impacted the planning area, the City determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table I3 is the analysis scores for the City of Waterloo. As seen in Table I3, the top two hazards are Flash Floods, Tornados/Windstorms, and Thunderstorms/Lightning/Hail. The City of Waterloo had additional hazards identified earlier in the 2015 Plan (Watershed Health and Violent/Riot Demonstrations) which were found to still be relevant for the 2020 Plan.

The tables below identify the scoring criteria utilized by the Committee to evaluate each hazard. Further descriptions are provided in Section 3.

PROBABILITY		
Score	**Description**	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2	Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3	Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33% or the event is likely to occur.
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.

MAGNITUDE / SEVERITY		
Rating	**Description**	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least two weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

DURATION	
Score	**Description**
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

TABLE I3: HAZARD RISK ASSESSMENT FOR WATERLOO					
Hazard	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Total**
Flash Flood	4	3	4	2	**3.5**
Tornado/Windstorm	4	3	3	1	**3.25**
Thunderstorm/Lighting/Hail	4	3	2	1	**3.1**
HAZMAT Incident	4	2	4	1	**3.1**
Severe Winter Storm	4	2	4	1	**3.1**
River Flooding	3	3	2	4	**2.95**
Watershed Health	4	3	3	2	**2.9**
Transportation Incident	4	1	4	1	**2.8**
Human Disease	3	3	2	2	**2.75**
Dam / Levee Failure	1	4	4	4	**2.65**
Infrastructure Failure	2	3	4	2	**2.6**
Earthquake	1	4	4	1	**2.35**
Expansive Soils	3	1	4	1	**2.35**
Terrorism	2	2	4	1	**2.2**
Extreme Heat	3	1	1	3	**2.1**
Drought	2	2	1	4	**2.05**
Radiological Incident	1	3	4	1	**2.05**
Grass/Wild Fire	1	2	3	1	**1.6**
Landslide	1	1	3	1	**1.3**
Sinkholes	1	1	3	1	**1.3**
Riot/Violent Demonstrations	1	1	3	1	**1.3**
Animal/Plant/Crop Disease	1	1	1	1	**1**

Vulnerability – Identifying Assets (Critical Facilities) & Social Asset Populations

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the community's historical occurrences of tornados this hazard was added to the assessment. The following discussion only considers the assets in the community of Waterloo.

Critical Facilities

Identifying the location of critical facilities is important in order to assess their vulnerability to hazards, since these facilities are important to the community's operations, quality of life, and economic sector. These include but are not limited to schools, hospitals, libraries, police and fire stations, water towers, sirens, and lift stations. *Map 62* illustrates the locations of critical sites throughout Waterloo.

TABLE I4: SHELTERS IN WATERLOO	
George Washington Carver Academy	Expo Alternative High School
Orange Elementary	Veteran's Memorial Hall
Queen of Peace	Antioch Baptist Church
Columbus High School	Calvary United Methodist Church
Military (Marine) Reserve Center	Jesse Cosby Center
First Congregational Church	Kimball Ridge Center
Payne Memorial Church	
St Paul's United Methodist Church	** Source: Community*

Table I4 shows the locations identified as shelters in Waterloo. While these locations have been identified for use if deemed necessary, there may also be hazard events which require residents to shelter themselves "in place". Therefore, any location could potentially become a makeshift shelter for purposes of disaster response.

Homes In Hazardous Areas

The City of Waterloo has 8,943 parcels, representing 12,606 acres of land, located in the floodplain (100 and 500 year). This accounts for approximately 31 percent of the total area encompassed by the city, with property valued at $1,102,395,110. Table I5, below identifies the number, type, and value of floodplain parcels within the city limits.

TABLE I5: FLOODPLAIN PARCELS WITHIN WATERLOO							
	# of Parcels	**Total Land Value**	**Total Building Value**	**Total Dwelling Value**	**Multi-Residential Land**	**Total Value**	**Percent of City Damaged**
City Floodway Property Values	1096	$47,159,480	$187,793,740	$17,948,430	$2,226,280	$255,127,930	6.35%
City 1% Annual Chance Floodplain Property Values	1485	$53,632,704	$86,475,972	$60,357,278	$799,246	$201,265,200	5.01%
City 1% Annual Chance Protected by Levee	6127	$83,523,314	$292,483,538	$190,270,262	$749,186	$567,026,300	14.11%
City 0.2% Annual Chance Floodplain Property Values	235	$21,126,440	$48,525,330	$9,323,910	$0	$78,975,680	1.97%
Source: Flood overlay shows the 2011 floodplain designations in Black Hawk County, Iowa. The digital flood layer was obtained from FEMA's current Digital Flood Insurance Rate Map. The incorporated boundaries were current as of 5/5/19.							

According to 2010 Census data, the average household size in Waterloo is 2.35 people. An estimated 2,221 of the 2,852 structures in the floodplain are residential. This means an estimated 5,219 people currently reside within the floodplain in Waterloo.

People living in mobile homes are at greater risk of a variety of hazard events. According to the 2013-2017 American Community Survey, there are an estimated 1,172 mobile homes in Waterloo. Using the average household size of 2.35, it can be assumed that there are approximately 2,754 persons living in mobile homes.

People living in multi-family buildings may also be at a greater risk during a tornado event. According to the 2013-2017 American Community Survey, there are an estimated 6,384 housing units in multi-family buildings with three or more units. Using the average household size of 2.35, it can be assumed that there are approximately 15,002 people living in multi-family buildings with three or more units in Waterloo.

Vulnerability – Identifying Social Asset Populations

The social vulnerability assessment also identified how the hazards affect the population of Waterloo, and it is assumed that the identified populations are more likely to require assistance during times of disaster and are therefore, generally speaking, more at-risk than the remaining population. The at-risk population must be identified and targeted in successful mitigation efforts.

According to 2017 ACS data, 15.3% of 68,146 residents, or approximately 10,437 persons, are 65 years or older. Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young people often are not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2017, 23.6% of 68,146 residents, or

16,083 persons, were under the age of 18.

As mentioned previously, persons living in mobile homes and persons living in multi-family housing units are also considered at risk. There are approximately 2,164 persons living in mobile homes and 15,000 persons living in multi-family housing units in Waterloo.

Map 49 and *Map 50* illustrate the impact of a hypothetical tornado event in Waterloo. According to data from the Black Hawk County Assessor's Office, there are a total of 29,352 structures in the community with a total value of $4,582,828,350 (including land value). Table I5 illustrates the degree of impact that hypothetical tornado scenarios of various strengths would have on Waterloo.

TABLE I6: TORNADO SCENARIO FOR WATERLOO

Enhanced Fujita Scale	Tornado Width	Tornado Width Ft	# of Parcels	Land Value	Building Value	Dwelling Value	Multi Residential Value	Total Structural (Building Dwelling + MultiRes)	Damaged Value	Percent of City Damaged
EF0	50 Meters	164 Feet	520	$14,196,237	$36,133,974	$24,509,946	$186,523	$60,830,443	$15,207,611	1.51%
EF1	150 Meters	492 Feet	1062	$23,934,838	$46,880,113	$54,545,617	$269,932	$101,695,662	$25,423,916	2.53%
EF2	250 Meters	820 Feet	1594	$33,572,502	$53,963,323	$88,965,007	$522,138	$143,450,468	$71,725,234	3.57%
EF3	500 Meters	1640 Feet	3024	$56,006,495	$74,112,928	$175,739,422	$971,355	$250,823,705	$125,411,853	6.24%
EF4	900 Meters	2953 Feet	5260	$90,354,363	$107,978,551	$312,119,239	$1,311,097	$421,408,887	$421,408,887	10.49%
EF5	1100 Meters	3609 Feet	6489	$107,668,937	$115,411,695	$382,730,685	$1,500,843	$499,643,223	$499,643,223	12.43%

Parcel value information is current as of 09/25/2018. The source is the Black Hawk County MIS Department. This scenario shows a realistic damage level to buildings and land calculated at the following percentages: EF0-EF1 = 25%; EF2-EF3 = 50%; EF4-EF5 = 100%

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. Table I6 lists all of the structure valuations for the City of Waterloo. Since 100% of the city is at risk of some kind of hazard event, the entire city is considered to be in the hazard area. This data was used in the Vulnerability discussion in each of the Hazard Profiles in Section 3.

This information was made available from the Black Hawk County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE I7: ASSET INVENTORY – BUILDING /DWELLING VALUES IN WATERLOO

Class	Land Value	Building Value	Dwelling Value	MR Land	Building Count
Agricultural	17,620,560	1,147,050	7,835,300	0	69
Cities	37,223,960	49,400,310	666,770	40,150	154
Commercial/Dual Class	198,259,186	740,049,191	8,311,789	668,544	1,921
County	1,698,190	22,200,230	500,330	0	15
Federal	205,550	825,000	0	0	2
Industrial	20,532,420	173,085,690	0	0	193
Multi-residential	0	0	66,064,930	13,263,610	349
Religious/Non-Profit	29,765,102	295,953,801	38,728,759	1,034,248	376
Residential	399,086,270	0	2,293,081,610	0	26,213
Schools	7,318,550	92,217,690	0	0	27
State	11,449,340	50,511,260	0	0	30
UNI	0	1,179,440	0	0	1
Utilities	2,784,090	119,430	0	0	2
Total	**$725,943,218**	**$1,426,689,092**	**$2,415,189,488**	**$15,006,552**	**29,352**

Source: Black Hawk County Assessor 2019 Values

*- Please note that the assessed value for tax-exempt structures may not adequately reflect their fair market rate value, which may be significantly higher than the assessed value. Accordingly, the values listed above should not be regarded as accurate for any purpose.

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced no losses in a 10-year period in which each loss is $1,000 or more. According to available FEMA data, the City of Waterloo participates in the National Flood Insurance Program and has 14 repetitive loss properties. Table 45 in Section 3 lists data from each city regarding the National Flood Insurance Program.

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The updated (non-revised) hazard mitigation plan goals for the City of Waterloo are:

1. **PROTECT**: Protect the health and safety of residents, visitors, staff and emergency personnel during and after hazard events.
2. **PREVENT**: Prevent avoidable disasters.
3. **MINIMIZE**: Minimize losses to existing and future structures in hazard areas, especially critical facilities.
4. **MAINTAIN**: Maintain local services and infrastructure in order to reduce community, economic and environmental disruption during and after hazard events.
5. **RESTORE**: Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
6. **EDUCATE**: Educate the public about hazards and resources available.
7. **ACCOUNTABILITY**: Use public funds in an efficient, cost effective and fair manner.
8. **COLLABORATE**: Incorporate each jurisdiction into the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan.

Current Mitigation Actions

Prevention Mitigation Actions

The City of Waterloo currently has and enforces a Zoning Ordinance, a Subdivision Ordinance, and a Floodplain Ordinance. These three ordinances in particular are tools that are integral to hazard mitigation and the city continually monitors these ordinances for possible updating and consistency with other city plans and governmental regulations.

Building codes are considered to be a very beneficial mitigating effort for a number of the hazards identified in this plan. By having and enforcing building codes, the community reduces the risk of fire, damage from high wind events, damage from earthquake, damage from heavy snow loads, and reduces the amount of energy necessary to heat and cool a structure in addition to many other examples. The City of Waterloo has adopted and enforces the following building codes: 2017 National Electric Code, 2015 International Building Code, 2015 International Fire Code, 2015 Uniform Plumbing Code, 2015 Uniform Mechanical Code, 2015 International Existing Building Code, and 2012 Energy Code.

Property Protection Mitigation Actions

The City of Waterloo constructed seven new storm water lift stations, and rebuilt one as result of the 2008 flood recovery efforts. The Iowa Department of Transportation recently added one new, and rehabilitated another storm water lift station for the Highway 63 corridor as part of that corridor redevelopment.

The City of Waterloo has a long history of making efforts to protect the community from hazards. One of the most recognizable efforts is the Waterloo Flood Protection System, which was constructed as a direct result of the Flood Control Act of 1965. The system protects Waterloo against flooding from the Cedar River, Black Hawk Creek, Virden Creek, and Blowers Creek. The flood control system consists of 18.2 miles of earthen levees and 1.9 miles of concrete floodwalls along the Cedar River and Black Hawk Creek. Within the levees and floodwalls are 103 sewer gatewells and 53 closure structures. The system also includes an earthen levee on Virden Creek and 25 lift stations at various locations in the city. The system is designed to withstand a flood that has a one percent probability of occurring in any given year. A flood of this magnitude is commonly called a 100-year flood. In April 1993, Waterloo experienced a flood with a 20.5-foot crest. Then in June 2008 the river crested at 25.39 feet, at 500-year flood levels. This flood was the highest since the levees were constructed and proved the system's effectiveness in preventing flood damage.

The U.S. Army Corps of Engineers and the city have a large investment in this system. To date, the Corps has contributed $43 million and the city has invested $22 million to build the system. Construction on the system began in August 1972, and the last work was completed along Blowers Creek in December 1991. Maintenance of the levee system is a cooperative effort between various city departments. The Engineering Department works with Water Pollution/ Flood Control, Park, Street and Traffic Operations Departments to keep the levee system in good condition. Maintenance is an extensive and continual job, which involves mowing levees, controlling tree growth, repairing pumps and structures and many other operations. In addition to maintenance, the city periodically holds training sessions to ensure that the system will function properly during flood events (Source: Waterloo Engineering Department).

The city filed a buyout application with FEMA after the extensive June 2008 flooding. The west side of downtown was flooded, but no commercial or industrial properties were acquired with buyout funds. The City did acquire some flooded buildings for redevelopment with local funds. The aforementioned stormwater lift stations should work to protect the redeveloped areas.

One of the most important documents pertaining to the flood hazards in the City Waterloo became official in January 1985. It was a Flood Insurance Study conducted by the Federal Emergency Management Agency. The Flood Insurance Study was a preliminary requirement necessary for initial participation in the National Flood Insurance Program. The scope of the study was the entire incorporated area of the City of Waterloo, Black Hawk County, IA. The study identified through the use of hydrologic analyses the peak discharge-frequency relationships for each of the 10-, 50-, 100-, and 500-year flood event. As a result of the completion of the flood study an official FIRM (Flood Insurance Rate Map) was issued to the city. It is this map, which is actually a series of maps that the City uses to administer and regulate their local Flood Plain Ordinance.

In addition to the Flood Insurance Study there have been a number of documents that have been prepared by a variety of agencies which studied either the Cedar River and/or other tributaries in Black Hawk County that pose a potential flood risk to the City of Waterloo. In addition, other flood studies completed by Black & Veatch Special Project Corporation, Kansas City Division and the U.S. Army Corps of Engineers, Rock Island District have been conducted in Black Hawk County for purposes of updating existing Flood Hazard Boundary Maps and Flood Insurance Rate Maps throughout the County. In 2011, the City adopted the new FIRMs issued by FEMA. Updated, preliminary maps are currently under review by FEMA.

In the wake of the June 2008 floods, researchers at the University of Iowa who had collected and analyzed data during the flooding, were assembled to form the Iowa Flood Center (IFC) in April 2009 when the state legislature approved funding for their continuing research. Based in Iowa City, IA on the University of Iowa campus, the central issue for the researchers of the IFC that led to their eventual formation was that there was no formal research center dedicated to advanced flood analysis and studies in the entire country. The IFC is now actively engaged in research studies for several Iowa communities, producing hydrologic flood models and flood forecasting. The purpose and responsibilities of the IFC are defined in Iowa Code Section 466C.1.

The City of Waterloo has and enforces a Floodplain Ordinance. Staff of Waterloo Community Planning and Development Office enforces the ordinance. In accordance with NFIP guidelines, the ordinance does not allow for new construction within the floodway. In addition, it requires those structures within the floodway fringe to: (a.) “be adequately anchored to prevent flotation, collapse or lateral movement of the structure”; (b.) “use construction methods and practices that will minimize flood damage” and; (c) “use construction materials and utility equipment that are resistant to flood damage.”

The Federal Insurance Administration manages the insurance component of the NFIP, and works closely with FEMA’s Mitigation Directorate, which oversees the floodplain management aspect of the program. Waterloo remains in good standing with the National Flood Insurance Program.

Public Education and Awareness Mitigation Actions

Until just recently, residents of the City of Waterloo could opt to receive emergency notifications in the event of an impending hazard event. This service was available through CodeRED until July 2012, and then through Everbridge Alerts until May 2014. A new statewide reverse 911 system, Alert Iowa, is currently operating.

Radio, television, cellular telephones, landline telephones, newspapers, warning sirens, NOAA Radio Service and the internet are available to the public at large. The City has developed a website in order to keep its citizens, and other interested parties, aware of local and government affairs. The website address is www.cityofwaterlooiowa.com.

Emergency Services Mitigation Actions

Black Hawk County Emergency Management Agency

The Black Hawk County Emergency Management Agency is governed by a board of eleven commissioners comprised of the Mayors from each incorporated jurisdiction in the County or their designated delegate, a representative of the Black Hawk County Sheriff's Department, and the Chairperson of the Black Hawk County Board of Supervisors. The Emergency Management Agency works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. Furthermore, the agency is responsible for the monthly testing of all outdoor warning sirens in Black Hawk County.

Fire Department

Waterloo Fire Rescue provides professional emergency response to the citizens of Waterloo. Some of the services provided include fire suppression, extrication, carbon monoxide detection, water rescue, ice rescue, confined space rescue, trench rescue, and rope rescue. These services are accomplished with 21 front line units which include aerial ladders, ambulances and rescue boats. The Department is staffed by an average of 34 firefighters per shift at six different fire stations. The Emergency Medical Services (EMS) division of department maintains a fleet of ACLS ambulances and AED's on all pumper trucks to provide the citizens of Waterloo and surrounding areas advanced emergency care.

Waterloo Fire Rescue ambulances made 9,103 EMS calls in 2019, and there were 5,471 Engine Company responses that same year. In addition to emergency response, Waterloo Fire Rescue Community Services Division plays an important role in implementing education programs throughout the community, in coordination with various community partners.

Police

Police protection is provided by the Waterloo Police Department. The Black Hawk County Sheriff's Department, and the Iowa State Patrol provide additional law enforcement for the City of Waterloo. Currently, there are approximately 116 sworn police officers and ten full-time civilian employees serving throughout the Police Department. The police department also maintains an additional force of approximately 17 Reserve Police Officers.

The Police Department was created as an executive branch of the City Government by way of City Ordinance. The department is organized into the following departments: administration, patrol division, and investigations division. The Chief of Police oversees these divisions and answers to the Mayor, City Council and the Citizens of Waterloo. The police headquarters is located in Waterloo City Hall.

Medical Services

The City of Waterloo is fortunate to have two Regional Hospitals, as categorized by the level of trauma care that they are capable of providing. Only nine hospitals in the State of Iowa are assigned that designation. Unity Point Hospital is a 200+ bed hospital located on the north side of Waterloo. Well known for their proficiency at heart care, Unity Point surgeons perform close to 300 open-heart surgeries each year. Mercy One Medical Center is a 366 bed, full-service, multi-specialty hospital that provides acute, subacute, and outpatient health care.

A full complement of facilities and services are available to support the community's health care needs, including intensive care, operating and recovery rooms for both inpatient and ambulatory surgery, emergency helicopter transportation, a Hospice unit to provide acute care to the terminally ill, skilled nursing, diagnostic radiology services such as X-ray, magnetic resonance imaging, CT scanning, and mammography, laboratory, respiratory therapy, electrocardiology, and pharmacy.

AirCare Emergency Transport, a service of the University of Iowa Hospitals and Clinics, is an emergency air medical program in Iowa, that provides emergency medical care to the people of Iowa and surrounding states. It recently relocated to the Waterloo Regional Airport for continued emergency air services to serve the City of Waterloo and surrounding communities.

Building Department

The Building Department is responsible for housing code enforcement on Waterloo's residential properties. The purpose of this code is to protect the health, safety and welfare of the occupants. Systematic inspections are made on all rental properties and on a complaint basis for all residential properties. Vacant, dilapidated housing is inspected and ordered to be repaired or demolished depending on the condition of the dwelling. The inspections made by the Building Department require the maintenance and improvement of the City's existing housing to protect values and maintain the appearance and stability of the Community and neighborhoods within the Community.

Hazardous Materials

A regional Hazard Materials Team is on hand to assist the community with a Hazard Materials event or catastrophe. The Team is located within a short distance and is operated by Waterloo Fire Rescue Department. The city is also a partner in the Tri-County Drug Task Force. The group works with the City in the event of the discovery of a methamphetamine lab within the community.

Snow Removal

The NOAA estimates that approximately 70 percent of all deaths attributed to winter storms occur in an automobile. Therefore, the City of Waterloo views proper snow and ice removal from roadways to be essential in mitigating negative effects of these events. Snow removal and ice prevention techniques are practiced by city and state employees on the corresponding local and state roadways within the city limits.

Warning Systems

In the event of a tornado the City of Waterloo has an extensive network of outdoor warning sirens that, given enough time, allow people to search for suitable shelter. Currently, there are twenty outdoor warning sirens strategically located throughout the community. On duty police officers and a network of volunteer storm spotters are activated when conditions are favorable for severe weather. In the event that a tornado is spotted, a designated official of the Black Hawk County Emergency Management Agency is then responsible for sounding all of the sirens in the County. Needed improvements, additions, and upgrades have been identified for the system. Many of the sirens do not have battery backup and would fail to operate if there were a power outage. Black Hawk County Emergency Management Agency tests the sirens on a monthly basis.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the comprehensive efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit community residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community.

The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

TABLE I8: STAPLEE ELEMENTS

S – Social	• Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the populations, • Actions do not cause relocation of lower income people, • Actions are compatible with the community's social and cultural values.
T- Technical	• Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A - Administrative	• Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P - Political	• Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L - Legal	• It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E - Economic	• Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E - Environmental	• Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, • Are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table I8) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each mitigation activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each of the proposed mitigation activity will occur. For instance, if the activity happens regularly (either daily, weekly, monthly, or annually) it was identified as On-Going activity; if it will occur within the next 1-5 years it was identified as Short-Term; if the activity would take 5-10 years to occur it was labeled as Mid-Term; and all activities that would take 10 or more years to occur were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The city will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.

- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).

- Moderate : Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.

- High : Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, identified the responsible party or parties for each activity, and finally related each activity to at least one of the Hazard Mitigation Plan Goals listed above. Table I9 below is the City of Waterloo's Implementation Strategy.

TABLE I9: FUTURE HAZARD MITIGATION ACTIVITIES: CITY OF WATERLOO						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals**
H	Maintain and improve outdoor warning siren system.	Tornado/Windstorm, Infrastructure Failure	Sign and Traffic Dept*, County EMA	Active	Low	Maintain, Protect, Prevent.
H	Educate the public.	Tornado/Windstorm, Thunderstorm/Lightning, Human Disease, Animal/Plant/Crop Disease, Infrastructure Failure, Flash Flood, River Flood, Hailstorms, Terrorism, Earthquake, Radiological, Extreme Heat, Grassfire/Wildfire, Landslides	Depends on hazard addressed: Fire Dept, Police Dept, County EMA, Schools, Public Safety, Planning and Development, Leisure Services, Health Dept, American Red Cross, private property owners	Active	Minimal to Low	Educate, Protect, Prevent, Restore, Collaborate.
M	Encourage construction of tornado safe rooms in homes, businesses, etc.	Tornado/Windstorm	City Council*, Private property owners	Long Term	Minimal	Protect, Prevent.
M	Encourage the public to sign up for emergency alerts services.	Tornado/Windstorm, Infrastructure Failure	Fire Dept, Police Dept, County EMA*	Active	Minimal	Educate.
M	Consider the adoption of local ordinances requiring local tornado shelters in new mobile home parks and multifamily units.	Tornado/Windstorm	City Council*, Planning and Development	Long Term	Minimal	Protect, Prevent.
M	Maintain tree-trimming policies to reduce the likelihood of falling branches.	Tornado/Windstorm, Winter Storm, Hailstorm	Public Works*, Utility companies, Leisure Services Dept, Private property owners	Active	Minimal to Low	Maintain, Protect, Prevent.
M	Continue to recruit and train individuals in the proper storm watching techniques in order to increase potential warning time.	Tornado/Windstorm	County EMA*, REACT, CB Clubs	Active	Minimal	Educate, Collaborate, Protect, Prevent.
M	Review building code and consider adding more protective requirements.	Tornado/Windstorm, Earthquake	Building Inspections	Active	Minimal	Maintain, Protect.

TABLE I9: FUTURE HAZARD MITIGATION ACTIVITIES: CITY OF WATERLOO						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals**
M	Purchase and maintain backup generators to be used during a hazard event, as needed.	Tornado/Windstorm, Thunderstorm/Lightning, Winter Storm, Infrastructure Failure, Extreme Heat	City Council*, Dept, Fire Dept, Engineering, Streets Dept, Building Maintenance	Active	Low to Medium	Protect, Restore.
M	Bury utility lines to avoid damage from falling branches, etc.	Tornado/Windstorm, Thunderstorm/Lightning	Private property owners, Building Maintenance Dept*, Utility companies	Pending	Low to High	Prevent.
M	Encourage new buildings without basements to design for compact, interior spaces that can serve as possible shelter areas.	Tornado/Windstorm	Planning and Building Dept*	Active	Minimal	Protect.
M	Continue program zone maintenance for sidewalks and tree trimming.	Tornado/Windstorm	Engineering, Public Works*	Active, annual	Minimal to Low	Prevent.
M	Maintain a list of potential storm sewer improvement project to mitigate potential flash flooding associated with a heavy rain event.	Thunderstorm/Lightning, Flash Flood	Public Works*, Engineering, Planning and Development, City Council	Active	High	Prevent, Protect.
M	Placement of lightning arrestors on power lines.	Thunderstorm/Lightning	City Council*, Mid-American Energy, private property owners	Long Term	Minimal to High	Prevent.
M	Protect critical electronic equipment with surge protection devices.	Thunderstorm/Lightning	Building Maintenance Dept	Active	Minimal	Protect.
H	Evaluate designated snow routes on a regular basis to ensure effectiveness.	Winter Storm	Public Works	Active	Minimal	Protect, Prevent.
H	Continue to support (equipment, finances, personnel, etc) Public Works Department.	Winter Storm	City Council*, Public Works	Active	Medium to High	Maintain, Protect, Collaborate.
H	Identify shelters that can be used in the event of a winter storm.	Winter Storm	City Council*	Active	Minimal	Protect.
H	Continue to cooperate with local medical facilities and Health Department officials to increase the likelihood of detection and proper response.	Human Disease, Animal/Plant/Crop Disease	County Health Dept*, Local Hospitals, County EMA	Active	Minimal	Prevent, Protect.

TABLE I9: FUTURE HAZARD MITIGATION ACTIVITIES: CITY OF WATERLOO						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals**
M	Continue to test local drinking water supply in order to monitor water quality.	Human Disease	Waterloo Waterworks*	Active	N/A	Protect.
H	Train employees to maintain continuity of government operations through a continuity of operations plan.	Human Disease	City Dept heads*, County EMA	Active	Minimal	Protect, Restore, Collaborate
H	Educate and encourage enrollment in emergency notification systems.	Infrastructure Failure	Fire Dept*, Police Dept, County EMA	Active	Minimal	Educate
H	Ensure that all first responders are properly equipped and trained in the Incident Command procedures.	Infrastructure Failure, Terrorism, HAZMAT, Transportation Incident	All first responder organizations (hospitals, Fire dept, Police Dept)*, County EMA, Local Emergency Planning Commission	Active	High	Educate, Protect, Prevent.
M	Maintain standard operating procedures for a Public Information officer in the event of a disaster.	Infrastructure Failure	County EMA*, City Dept heads, Mayor's office	Long Term	Minimal	Maintain
M	Recognize that language barriers may exist and develop policies and train personnel in ways to overcome these challenges.	Infrastructure Failure	County EMA*	Active	Minimal to Low	Educate
M	Consider establishing redundancy in T1 lines.	Infrastructure Failure	County EMA*, City	Long Term	Minimal to Medium	Protect, Restore, Prevent, Maintain.
H	Maintain communications for proper traffic signal timing.	Infrastructure Failure	City, Public Works*	Active	Minimal	Maintain.
M	Provide smoke detectors to property owners who are low income and critical populations, as funding is available.	Infrastructure Failure	Fire Dept*, City	Active	Minimal	Protect, Prevent.
M	Maintain inspection and enforcement of applicable fire codes.	Infrastructure Failure	Fire Dept*, City Council	Active	N/A	Protect, Prevent, Educate.

TABLE I9: FUTURE HAZARD MITIGATION ACTIVITIES: CITY OF WATERLOO						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals**
M	Require sprinkler systems in structures of certain size.	Infrastructure Failure	Fire Dept*, City Council, Building Dept, private property owners	Active	N/A	Prevent, Protect.
H	Maintain a well-equipped and well-trained fire department capable of appropriate and effective response.	Infrastructure Failure, Terrorism	Fire Dept*, City Council	Active	High	Protect, Prevent, Maintain.
M	Encourage the public to use and maintain smoke detectors and, when appropriate, sprinkler systems.	Infrastructure Failure	Fire Dept*, Building Dept, City Council, private property owners	Active	Minimal	Educate, Protect, Prevent.
H	Elevate and/or flood proof structures in the floodplain.	Flash Flood, River Flood	City Council*, Private property owners	Long Term	N/A	Prevent.
M	Construct detention basins in areas deemed beneficial to the community.	Flash Flood, River Flood	Engineering*, Planning and Development, local developers	Active (long term)	TBD	Prevent. Protect.
M	Maintain, enforce, and update the local Floodplain Ordinance as necessary.	Flash Flood, River Flood	Planning and Development*	Active	Minimal	Prevent, Protect.
H	Continue membership in the National Flood Insurance Program (NFIP).	Flash Flood, River Flood	Planning and Development*, City Council	Active	Minimal	Protect, Restore.
M	Clear brush and debris from creeks in order to ensure proper flow of streams.	Flash Flood, River Flood	Engineering* , Leisure Services	Active	Low	Prevent, Protect, Maintain.
L	Identify areas in the community, along stream banks, that need some type of bank stabilization, such as rip-rap, in order to reduce the amount of debris entering the stream (i.e. trees, brush, etc.).	Flash Flood, River Flood, Landslides	Iowa DNR, Army Corps of Engineers*, private property owners	Long Term	TBD	Prevent, Protect, Maintain.
H	Continue to evaluate critical public utilities (e.g. lift stations, wells) for ways they can be further flood proofed.	Flash Flood, River Flood	Waste Management Services, Engineering Dept*	Long Term	TBD	Prevent, Protect.
M	Require the installation of back flow valves in structures in order to reduce the risk of sewer backup damage.	Flash Flood, River Flood	Waste Management Services, Building and inspection Dept*	Active	Minimal to Low	Protect, Prevent.

TABLE I9: FUTURE HAZARD MITIGATION ACTIVITIES: CITY OF WATERLOO						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals**
L	Consider areas where buffer strips can be placed in order to control release of runoff and capture debris.	Flash Flood, River Flood, HAZMAT	Planning and Development*, Engineering, NRCS, Iowa DNR	Long Term	TBD	Protect, Prevent.
H	Encourage residents to follow public directives, such as warnings and evacuations.	Flash Flood, River Flood, Levee Failure, Grassfire/Wildfire, Human Disease.	City Council*, County EMA	Active	Minimal	Educate.
H	Increase the number and capacity of pumping stations at critical points along Black Hawk Creek and the Cedar River.	River Flood	Engineering*, Planning and Development	Long Term	High	Protect, Prevent, Maintain.
H	Continue to identify, purchase, and remove structures and populations in danger of being flooded.	River Flood	Planning and Development*, private property owners	Pending	Low to High	Protect, Prevent.
L	Maintain the city's sandbagging machine to expedite the filling of sandbags during a flood event.	River Flood	Public Works	Active	Minimal	Protect, prevent.
M	Explore alternative to sandbagging machines such as Hesco barriers and water bladder devices.	River Flood	Engineering, Public Works	Long Term	High	Protect, Prevent.
M	Continue to have a local supply of sandbags on hand for future flood events.	River Flood	Public Works Dept*, Engineering Dept, Waste Management Services	Active	Minimal to Low	Protect, Prevent.
L	Evaluate flood gates for permanent closure.	River Flood	Engineering*, Planning and Development	Long Term	Minimal	Maintain, Protect, Prevent.
M	Retrofit flood gates and lift stations (storm water pumping lift stations).	River Flood	Engineering*, Planning and Development	Long Term	N/A	Maintain, Protect, Prevent.
L	Combine gate wells.	River Flood	Engineering*, Planning and Development	Long Term	High	Protect, Prevent.
L	Retrofit gate wells with automated closures.	River Flood	Engineering*, Waste Management Services	Long Term	N/A	Protect, Prevent.

TABLE I9: FUTURE HAZARD MITIGATION ACTIVITIES: CITY OF WATERLOO						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals**
M	Protect against theft and vandalism of flood control infrastructure.	River Flood	Engineering*, Waste Management Services	Long Term	N/A	Protect, Prevent, Maintain.
M	Increase flood protection of sewer treatment plant.	River Flood	Engineering*, Waste Management Services	Long Term	High	Protect, Prevent.
M	Consider bridge replacements in order to increase flow capacity.	River Flood	Engineering*, Public Works Dept	Long Term	High	Maintain.
M	Maintain flood response operations manuals for Black Hawk Creek and the Cedar River.	River Flood	Engineering*, Waste Management Services	Active	Low	Maintain.
M	Repair and/or replace downtown floodwalls.	River Flood	Planning and Development*, Engineering	Long Term	High	Maintain, Protect, Prevent.
M	Maintain annual Army Corps of Engineers Inspection Program.	River Flood	Engineering Dept*, Waste Management Services, Army Corps of Engineers	Active	Medium	Maintain.
H	Maintain a well-trained and well-equipped law enforcement agency in order to identify and respond to potential threats and events.	Terrorism, Transportation Incident	City Council*, Police Dept, Iowa DOT, Iowa State Patrol	Active	High	Maintain, Collaborate.
M	Encourage the public to purchase or develop disaster supply kits to be used in the event of a terrorist attack.	Terrorism	Police Dept*, Fire Dept	Active	Minimal	Educate, Protect, Prevent, Restore.
M	Purchase, install, and maintain security cameras at critical locations around the community.	Terrorism	Police Dept*, Leisure Services Dept, Waterloo Waterworks, City Engineer, Waste Management Services	Active	Low	Prevent, Restore, Maintain.
M	Consider locking down critical facilities when threat level is elevated.	Terrorism	City dept heads*, City Facilities Maintenance Dept , County EMA, Utility companies	Pending	Minimal	Prevent, Protect, Restore, Maintain.

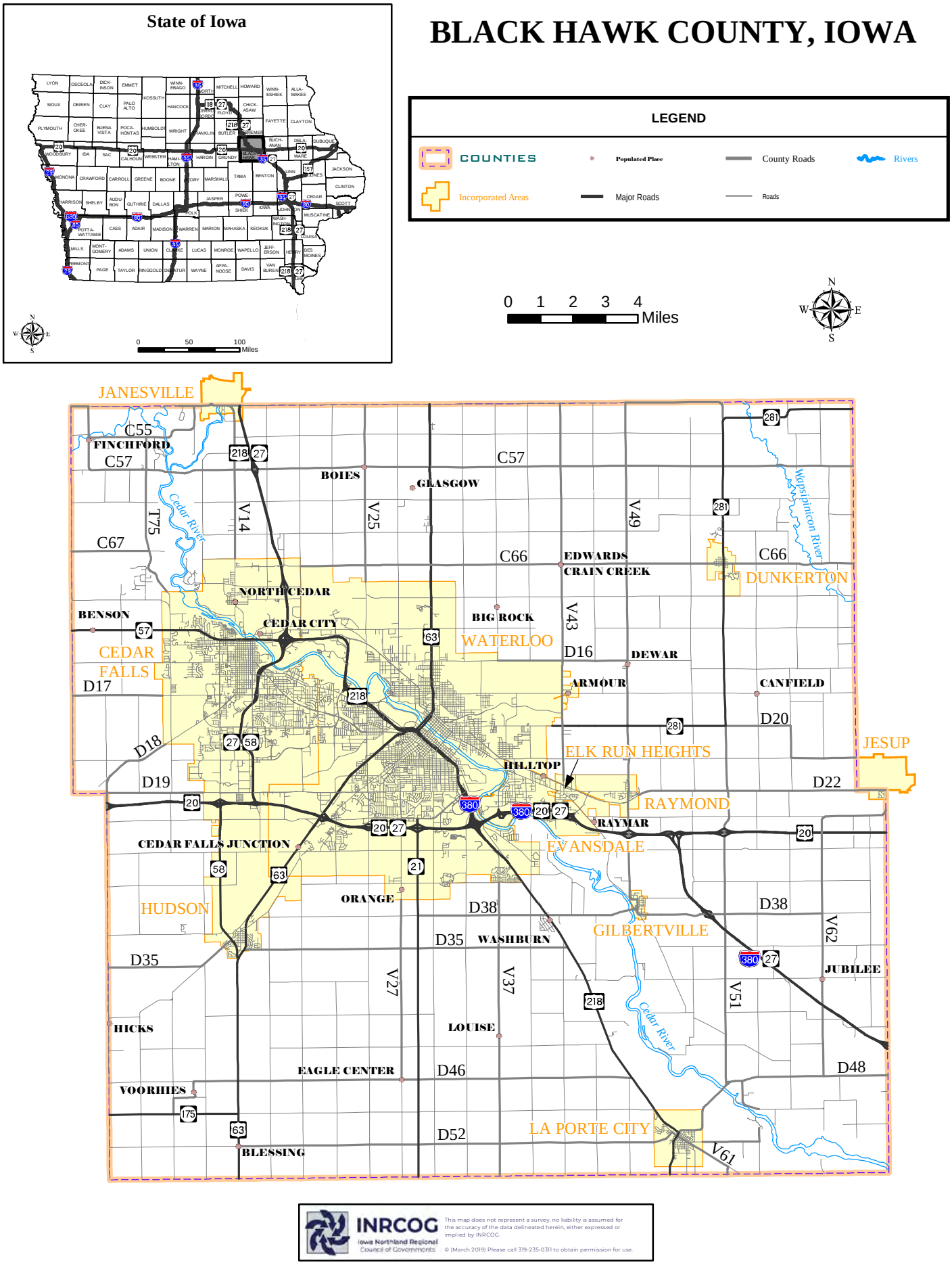
TABLE I9: FUTURE HAZARD MITIGATION ACTIVITIES: CITY OF WATERLOO						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals**
M	Place automatic locks on critical facilities.	Terrorism	City Facilities Maintenance Dept*	Long Term	Low to Medium	Protect, Prevent.
M	Purchase and install motion detectors at critical locations in the city.	Terrorism	City Facilities Maintenance Dept*	Long Term	Minimal to Medium	Protect, Prevent, Maintain.
M	Support local schools to regularly review terrorism response plans.	Terrorism	Waterloo School District*	Long Term, (TBD by school district)	Minimal	Protect, Prevent, Educate.
M	Maintain the mass casualty trailer.	Terrorism	Fire Dept*, Police Dept	Active	Minimal	Maintain.
H	Consider installing exterior security improvements (e.g. fences, walls, bollards, barbed wire) at critical facilities.	Terrorism	Fire Dept*, Police Dept, City	Active	TBD	Protect.
M	Maintain 28E (mutual aid) agreements.	HAZMAT	Fire Dept*	Long Term	Minimal	Maintain, Collaborate.
M	Work with Black Hawk County EMA to ensure that local Tier II Reports are being filed.	HAZMAT	Fir Dept*, County EMA, Iowa DNR	Active	Minimal	Maintain.
M	Periodically review and update MSDS forms.	HAZMAT	Fire Dept*, Police Dept, City	Active	Minimal	Maintain.
M	Review and update the policy on proper methods of household hazardous waste disposal.	HAZMAT	Fire Dept*, Police Dept, City	Active	Minimal	Educate, Maintain.
M	Continue to implement storm water management program.	HAZMAT	Engineering Dept*	Active	Low to Medium	Protect, Prevent.
M	Identify potential areas of pollution sites and pursue cleanup efforts.	HAZMAT	Iowa DNR, Planning and Zoning*, Waste Management Services	Pending, as properties are identified	TBD	Protect, Prevent, Restore.
M	Consider regulation of geothermal heating systems.	HAZMAT	Waterloo Waterworks*, Iowa DNR, City	Long Term	Minimal	Maintain.
M	Encourage public to not overuse fertilizer and/or pesticides, in order to protect the health of the general public.	HAZMAT	Local suppliers, Iowa DNR, Leisure Services*	Active	Minimal	Educate.

TABLE I9: FUTURE HAZARD MITIGATION ACTIVITIES: CITY OF WATERLOO						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals**
M	Ensure that proper signage is in place to facilitate a controlled flow of traffic.	Transportation Incident	Traffic Operations*, Iowa DOT	Active	N/A	Educate, Restore.
M	Continue to purchase and maintain backup batteries for traffic signals, red light cameras, opticom equipment, and solar and battery-operated warning signs and signal timing devices.	Transportation Incident	Public Works	Active	Low to High	Maintain.
M	Update the metropolitan evacuation plan as needed.	Transportation Incident	Black Hawk County EMA*	Active	Minimal	Maintain.
L	Consider developing and maintaining a list of fallout shelters.	Radiological	Black Hawk County EMA*	Active	Minimal	Protect, Prevent.
L	Restrict water usage as necessary in time of severe drought in order to maintain water supply.	Drought	Waterloo Waterworks*	Implemented as necessary	TBD	Prevent, Educate.
L	Put in place, as necessary, burning bans during severe drought.	Drought	State Fire Marshal, Fire Dept*	Implemented as necessary	Minimal	Educate. Protect.
H	Maintain a list of sites that could be used as cooling shelters for the public during extreme heat events.	Extreme Heat	City Council*, American Red Cross	Implemented as necessary	Minimal	Maintain, Protect, Prevent, Collaborate.
L	Consult the National Resources Conservation Service (NRCS) soil survey for the locations of expansive soils.	Expansive Soils	Engineering*, Planning and Zoning	Active	Minimal	Educate, Prevent.
L	Continue to repair roads that have been deteriorated from expanding soils underneath.	Expansive Soils	Public Works*	Active	TBD	Maintain.
M	Maintain and perform annual Army Corps of Engineers Inspection program.	Levee Failure	City, Public Works*	Active	Low	Maintain, Prevent.
H	Notify residents of a levee break via an Emergency Notification System.	Levee Failure	City, County EMA*	Implemented as necessary	Minimal	Educate.

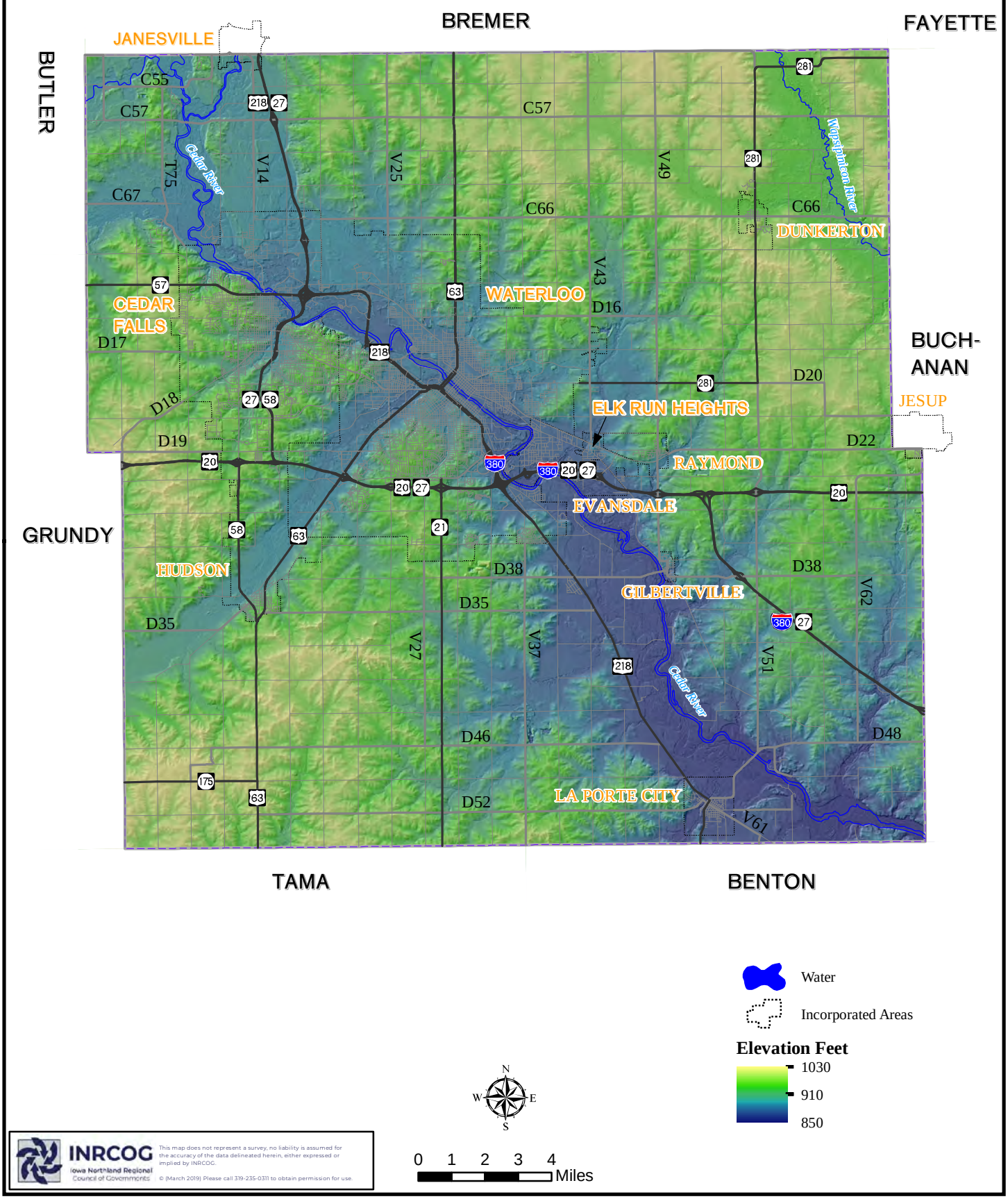
TABLE I9: FUTURE HAZARD MITIGATION ACTIVITIES: CITY OF WATERLOO						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible**	**Timeline**	**Est. Cost**	**Goals**
M	Continue to inspect all local dams for stability, including the Virden Creek Dam north of Waterloo, maintaining the annual inspections program.	Dam Failure	City, Public Works*	Active	Low	Maintain, Protect, Prevent.
H	Notify the treatment plant, Cedar Terrace, Cedar View, and the City of Evansdale in the event the Cedar River dam fails.	Dam Failure	City, County EMA*	Implemented as necessary	Minimal	Educate. Protect, Restore.
H	Encourage residents to notify the fire department before engaging in a controlled burn.	Grassfire/Wildfire	Fire Dept*	Active	Minimal	Educate, Prevent.
H	Identify any sinkholes that develop with proper warning signage.	Sinkholes	City, Public Works*	Active	Minimal	Educate.
H	Encourage residents to fill and cap old septic tanks to prevent sinkholes.	Sinkholes	City, Public Works*, private property owners	Active	Minimal	Educate, Prevent.
M	Maintain National Incident Management System (NIMS) compliance.	All	City, County EMA*	Active	Minimal to Low	Maintain.

TABLE I10: FUTURE HAZARD MITIGATION ACTIVITIES - WATERLOO COMMUNITY SCHOOL DISTRICT						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Agencies Responsible for Implementation (*denotes Primary)**	**Timeline**	**Est. Cost**	**Goal(s)**
H	Construct tornado safe rooms in schools.	Tornado/Windstorm	School Board	Long Term	Low to High	Prevent, Protect.
M	Ensure that local schools maintain terrorism response plans.	Terrorism	School Board	Active (short term)	Minimal	Protect, Prevent, Educate.
H	Ensure that schools can continue to meet the educational needs of students during times of unexpected or unforeseen closures.	Tornado/Windstorm; Human Disease/Pandemic; Fire; Terrorism	School Board	Implemented as Necessary	Moderate	Protect; Maintain.

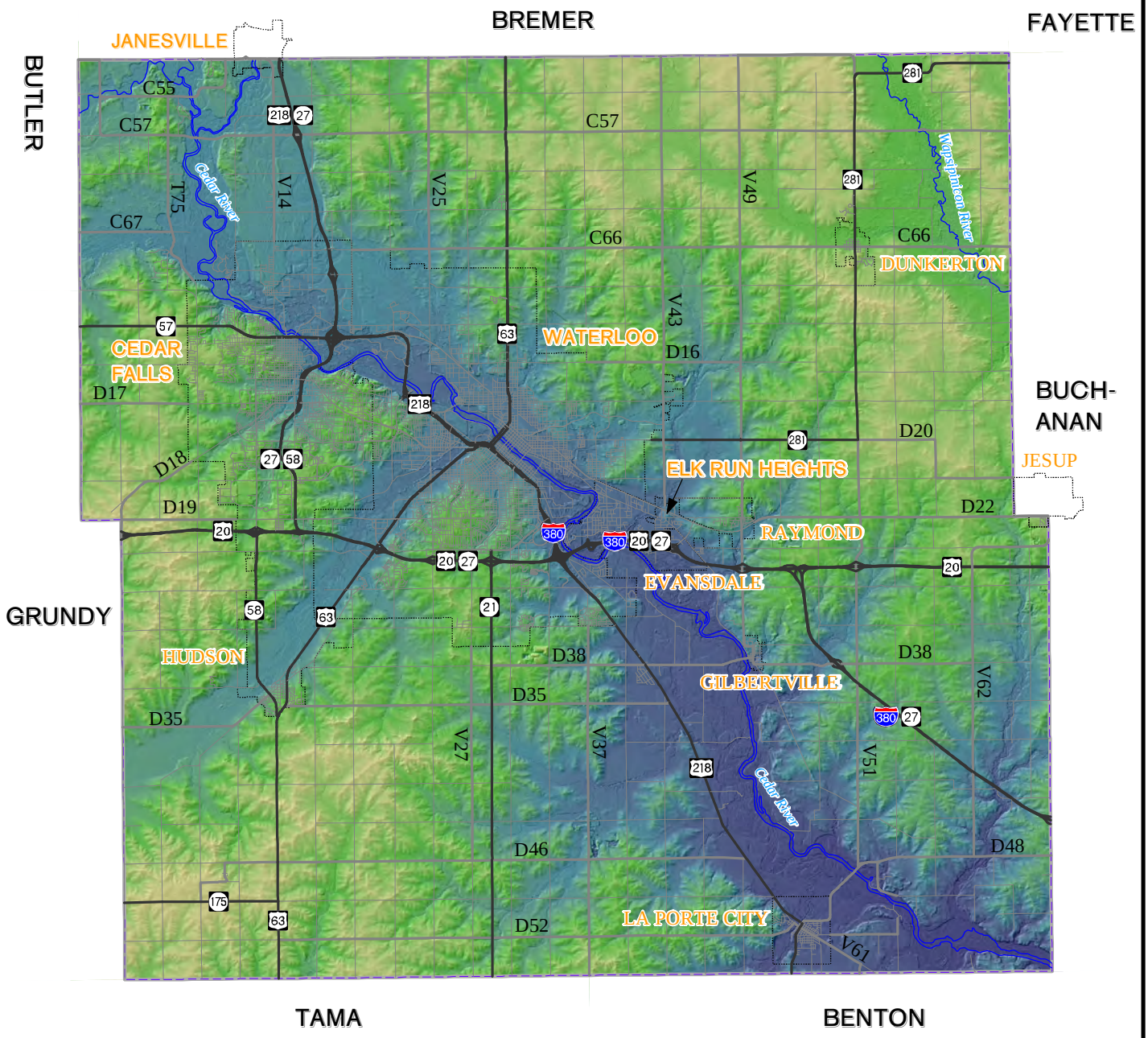
APPENDIX J: MAPS


State of Iowa
0 50 100 Miles
BLACK HAWK COUNTY, IOWA
LEGEND
COUNTIES
Populated Place
County Roads
Rivers
Incorporated Areas
Major Roads
Roads
0 1 2 3 4 Miles
JANESVILLE
FINCHFORD
BOIES
GLASGOW
EDWARDS
CRAIN CREEK
DUNKERTON
NORTH CEDAR
BENSON
CEDAR CITY
BIG ROCK
WATERLOO
CEDAR FALLS
DEWAR
ARMOUR
CANFIELD
ELK RUN HEIGHTS
JESUP
HILLTOP
RAYMOND
RAYMAR
CEDAR FALLS JUNCTION
EVANSDALE
HUDSON
ORANGE
GILBERTVILLE
WASHBURN
JUBILEE
HICKS
LOUISE
EAGLE CENTER
VOORHIES
LA PORTE CITY
BLESSING
Cedar River
Wapsipinicon River
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.

Black Hawk County, Iowa Topographic Map



Black Hawk County, Iowa Sinkhole Map



Sinkhole Data Source
Sinkhole Geographic Information Systems (GIS) data was obtained from the Iowa Department of Natural Resources in cooperation with the Iowa Geologic Survey. The date of publication for this data is: July 21, 2014 The title of the data is: Current and Historic Sinkhole and Depression locations in Iowa This edition was published on: December 14, 2017

INRCOG Iowa Northland Regional Council of Governments

There are currently no sinkholes within Black Hawk County.

N W E S

0 1 2 3 4 Miles

Water

Incorporated Areas

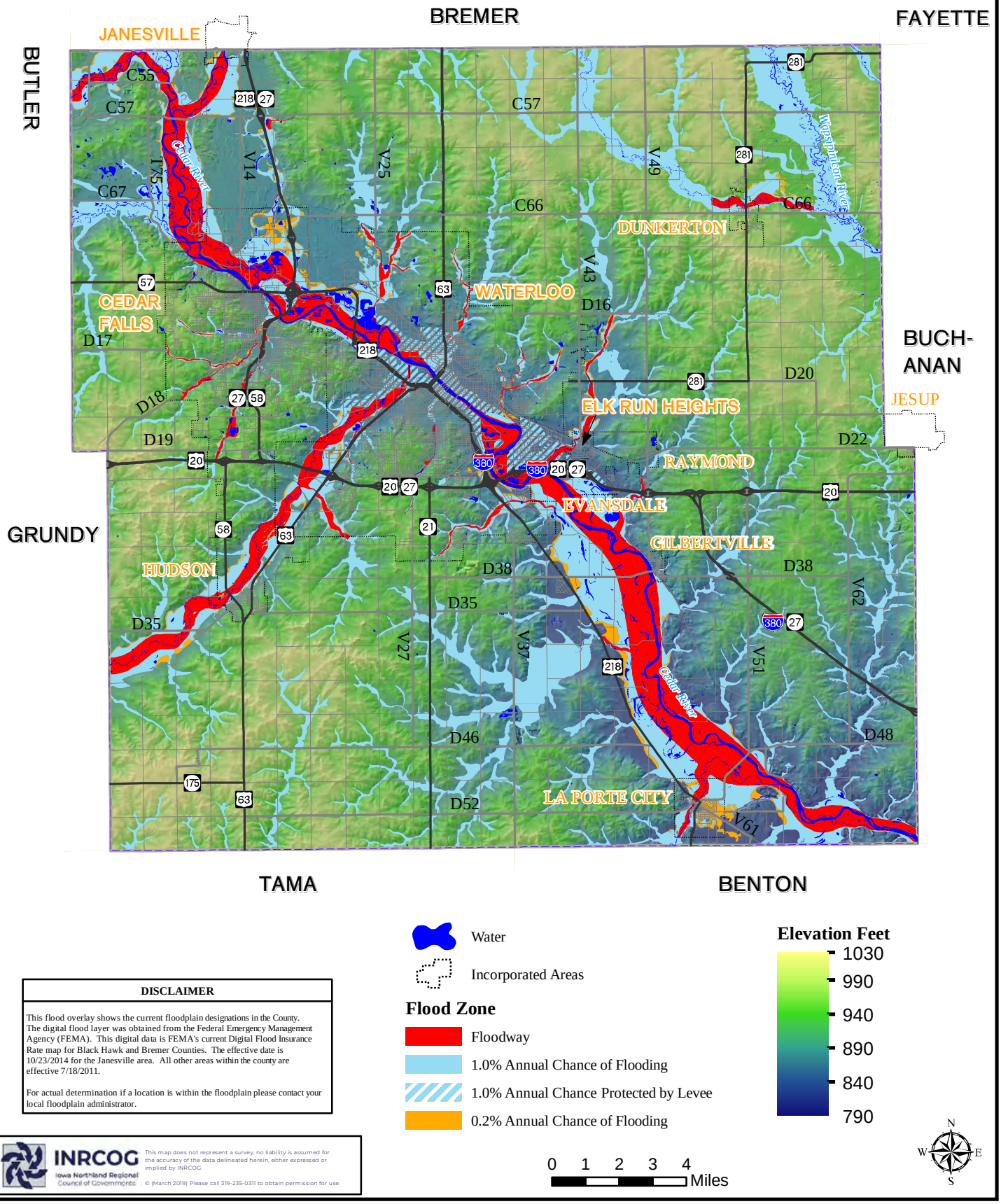
Elevation Feet

1030

910

850

Black Hawk County, Iowa Flood Plain Map



Water

Incorporated Areas

Flood Zone

Floodway

1.0% Annual Chance of Flooding

1.0% Annual Chance Protected by Levee

0.2% Annual Chance of Flooding

Elevation Feet

1030
990
940
890
840
790

0 1 2 3 4 Miles

N W E S

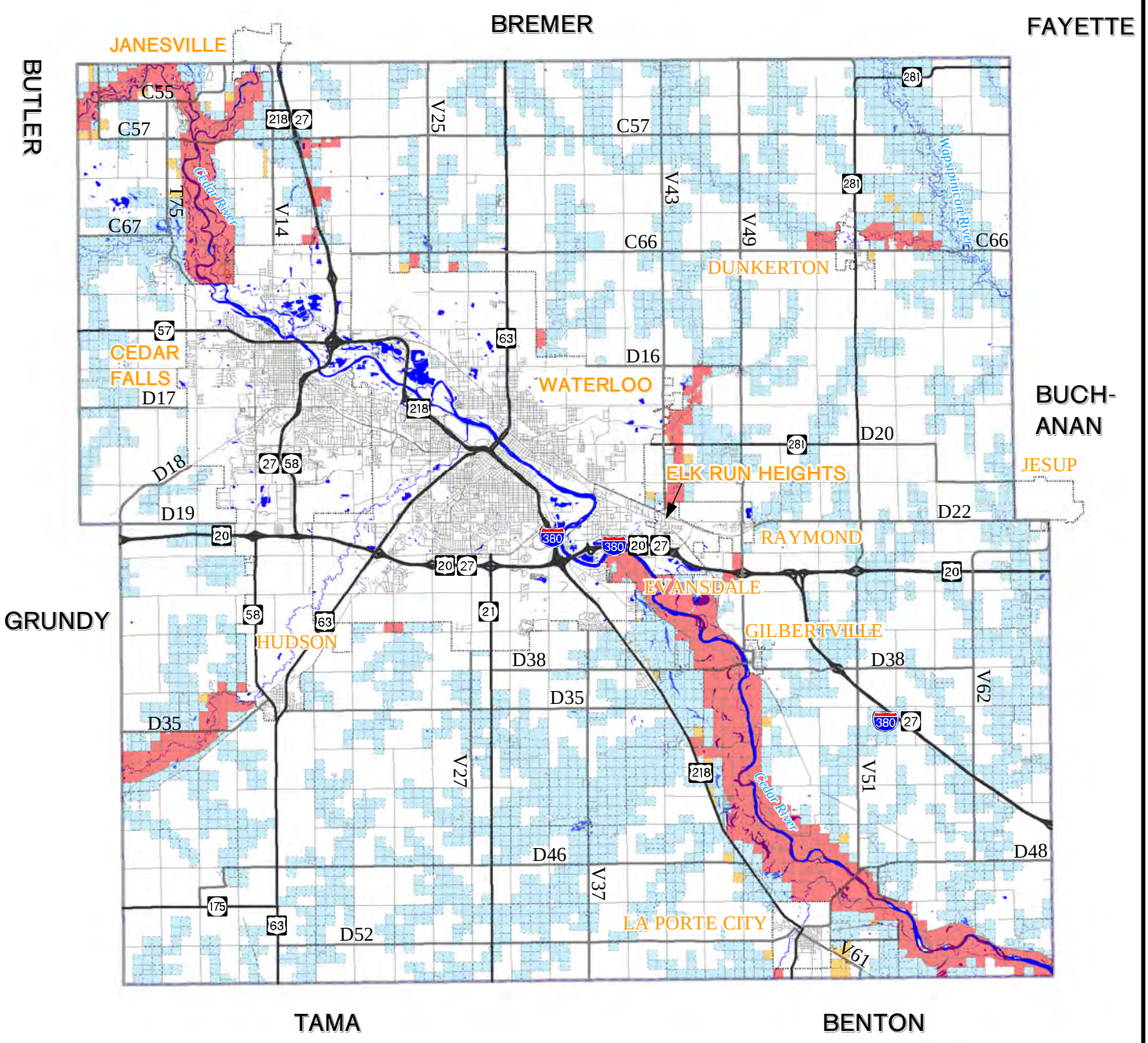
DISCLAIMER

This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk and Bremer Counties. The effective date is 10/23/2014 for the Janesville area. All other areas within the county are effective 7/18/2011.

For actual determination if a location is within the floodplain please contact your local floodplain administrator.

INRCOG Iowa Northland Regional Council of Governments

Black Hawk County, Iowa
Flood Scenario Map (Unincorporated Areas Only)



Water

Incorporated Areas

Flood Zone

- Floodway
- 1.0% Annual Chance of Flooding
- 1.0% Annual Chance Protected by Levee
- 0.2% Annual Chance of Flooding

Damage Estimates

Number of Parcels Impacted in the Floodway & 1.0% Annual Chance Floodplain - 1092

Number of Parcels Impacted in the 1.0% Annual Chance Floodplain - 4168

Number of Parcels Protected by the Levees - 10

Number of Parcels Impacted in the 0.2% Annual Chance Floodplain - 110

INRCOG Iowa Northland Regional Council of Governments

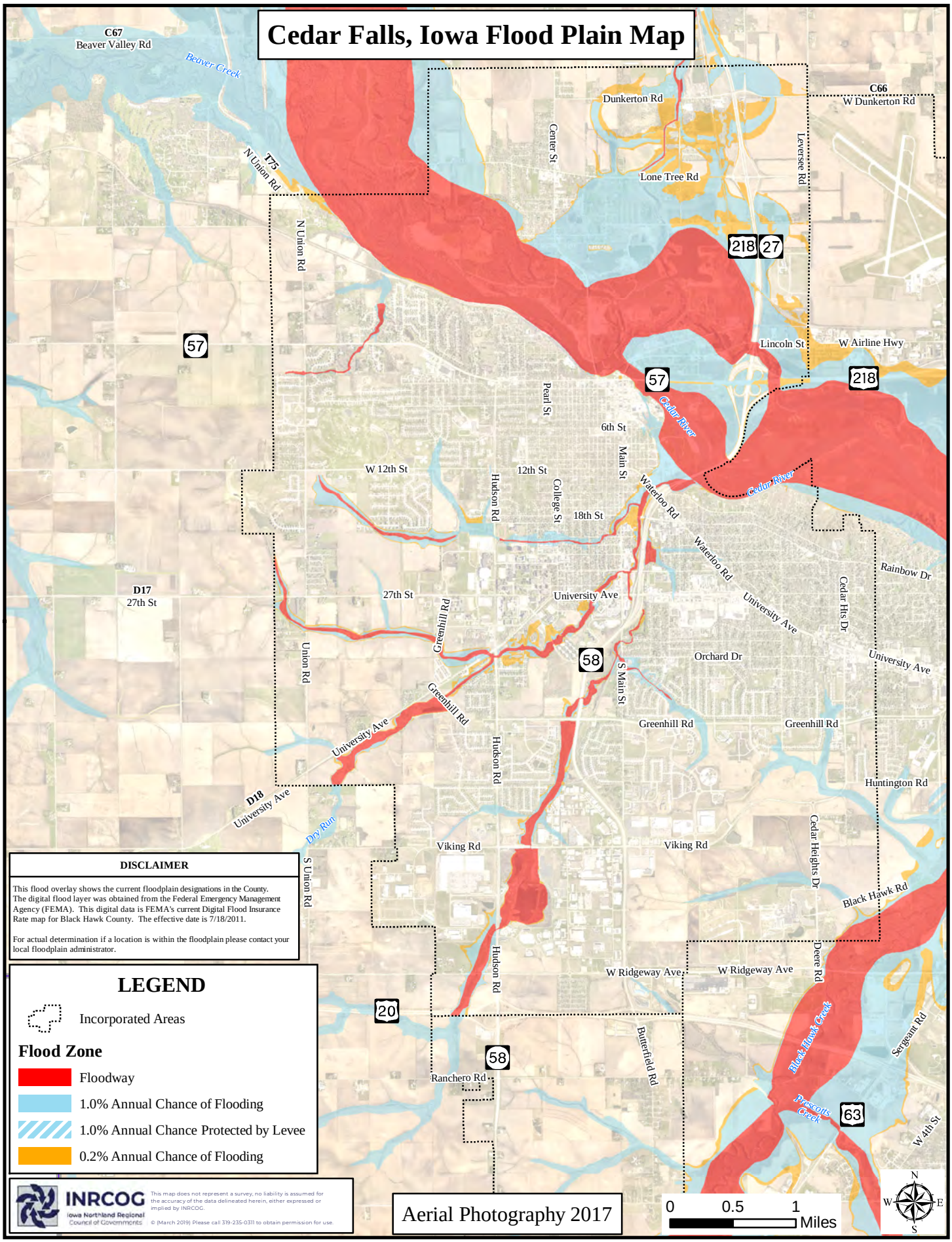
0 1 2 3 4 Miles

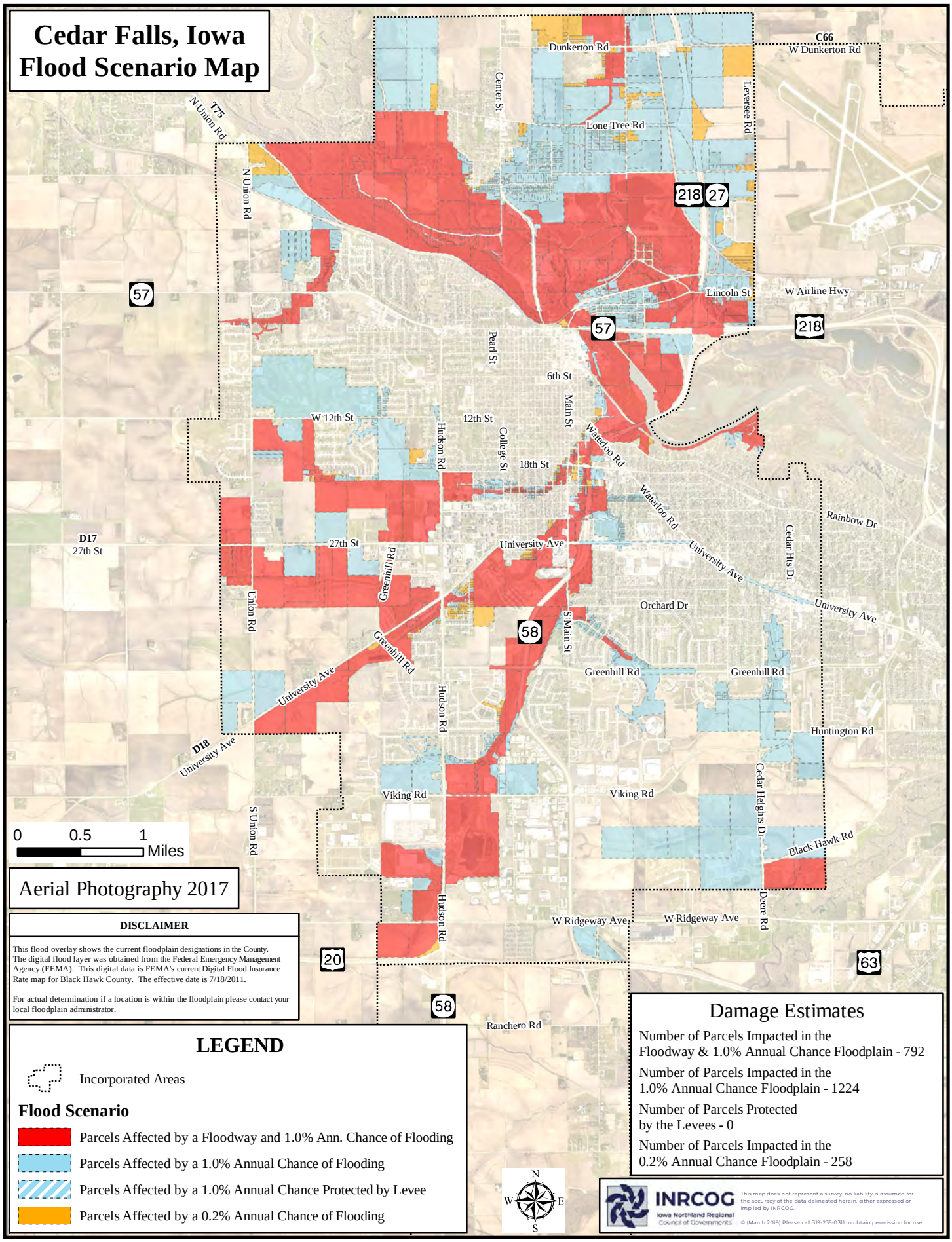
N W E S

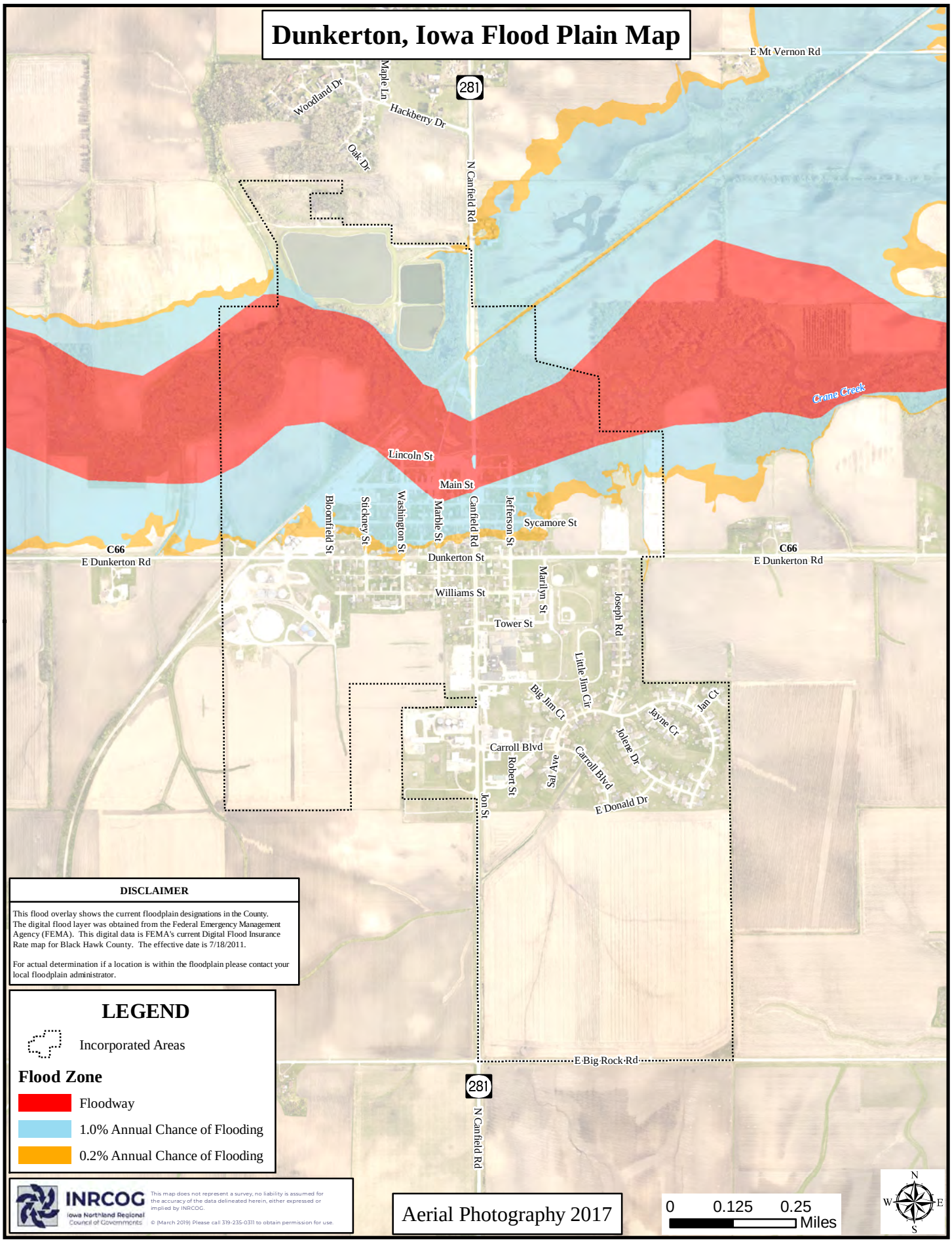
DISCLAIMER

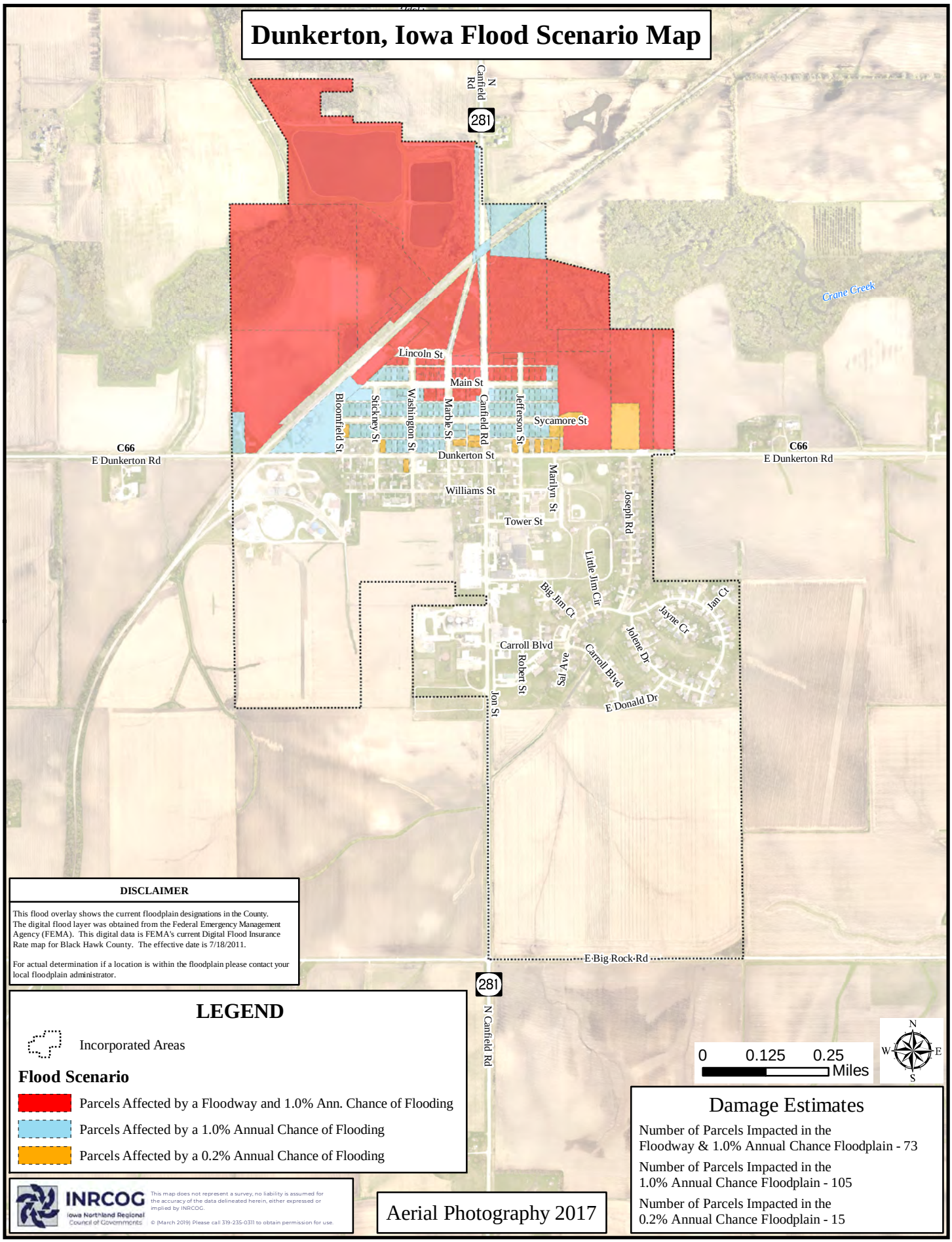
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk and Bremer Counties. The effective date is 10/23/2014 for the Janesville area. All other areas within the county are effective 7/18/2011.

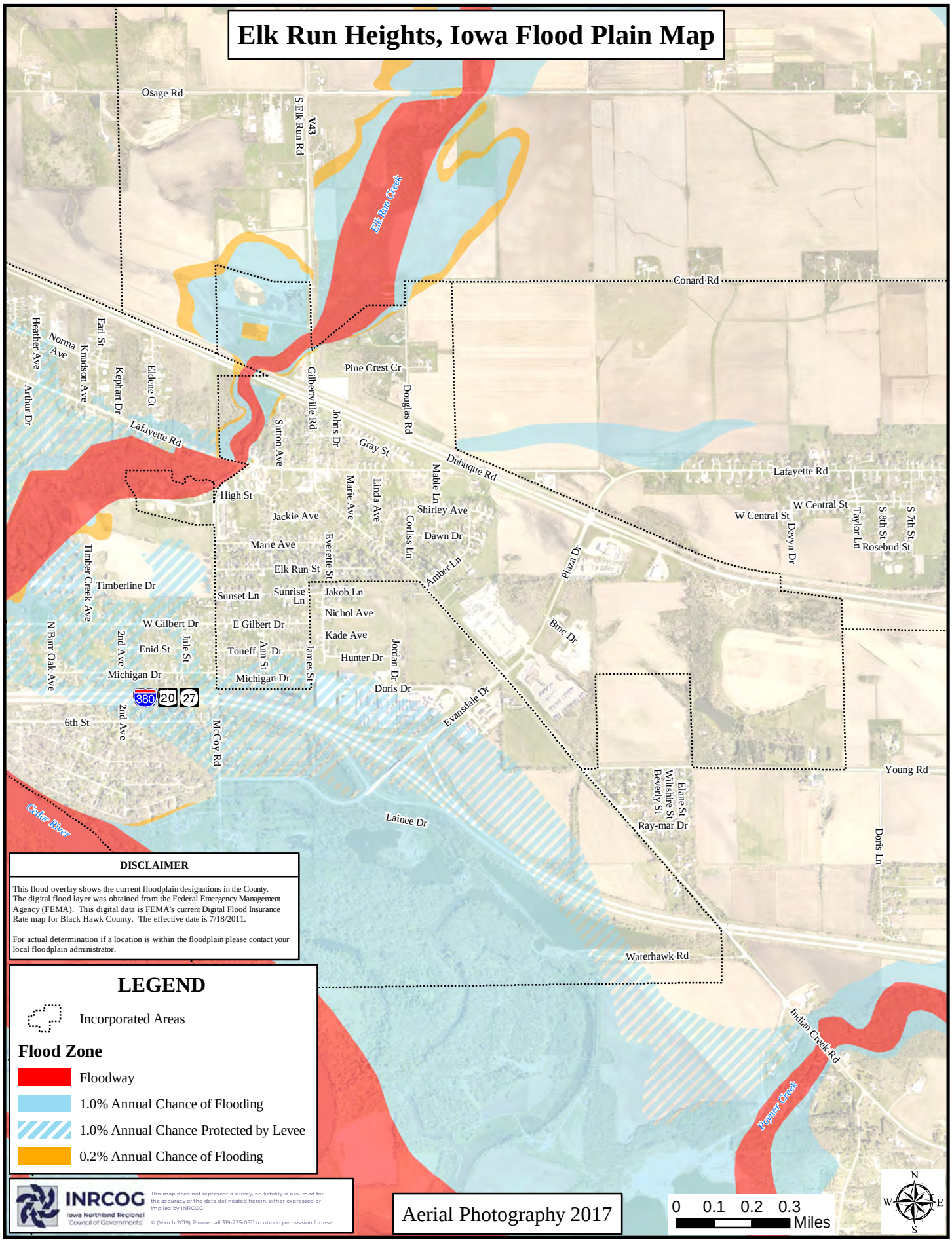
For actual determination if a location is within the floodplain please contact your local floodplain administrator.

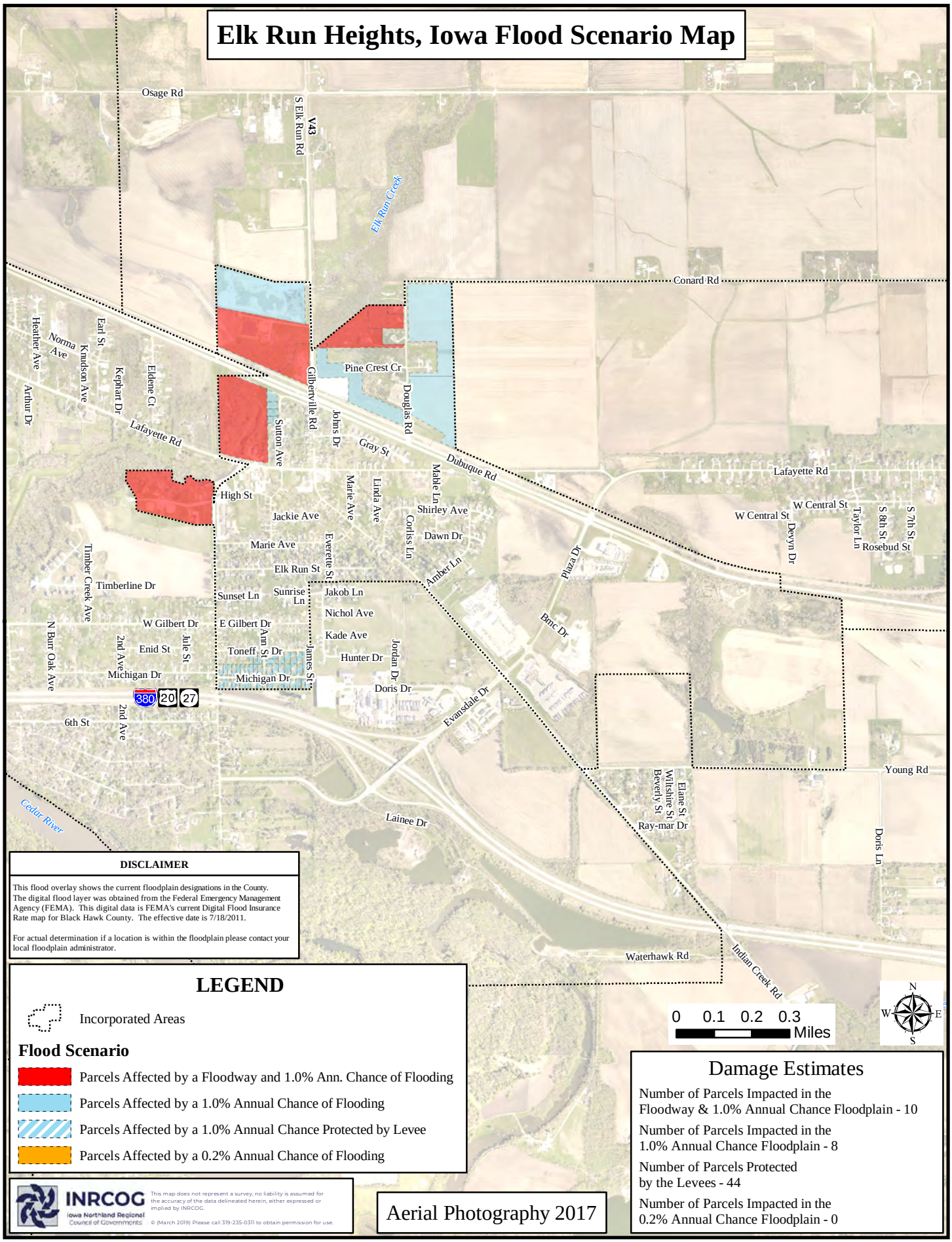

Cedar Falls, Iowa Flood Plain Map
C67
Beaver Valley Rd
Beaver Creek
C66
W Dunkerton Rd
Dunkerton Rd
Center St
Leversee Rd
Lone Tree Rd
T75
N Union Rd
218
27
57
Lincoln St
W Airline Hwy
Pearl St
6th St
Cedar River
W 12th St
12th St
Main St
Hudson Rd
College St
18th St
Waterloo Rd
Rainbow Dr
D17
27th St
University Ave
Greenhill Rd
Union Rd
Cedar Hts Dr
58
Orchard Dr
S Main St
Huntington Rd
D18
Dry Run
Viking Rd
Cedar Heights Dr
Black Hawk Rd
S Union Rd
Deere Rd
W Ridgeway Ave
20
Butterfield Rd
Black Hawk Creek
Sergeant Rd
Ranchero Rd
Prescotts Creek
63
W 4th St
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
LEGEND
Incorporated Areas
Flood Zone
Floodway
1.0% Annual Chance of Flooding
1.0% Annual Chance Protected by Levee
0.2% Annual Chance of Flooding
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
0 0.5 1 Miles
N
W
E
S

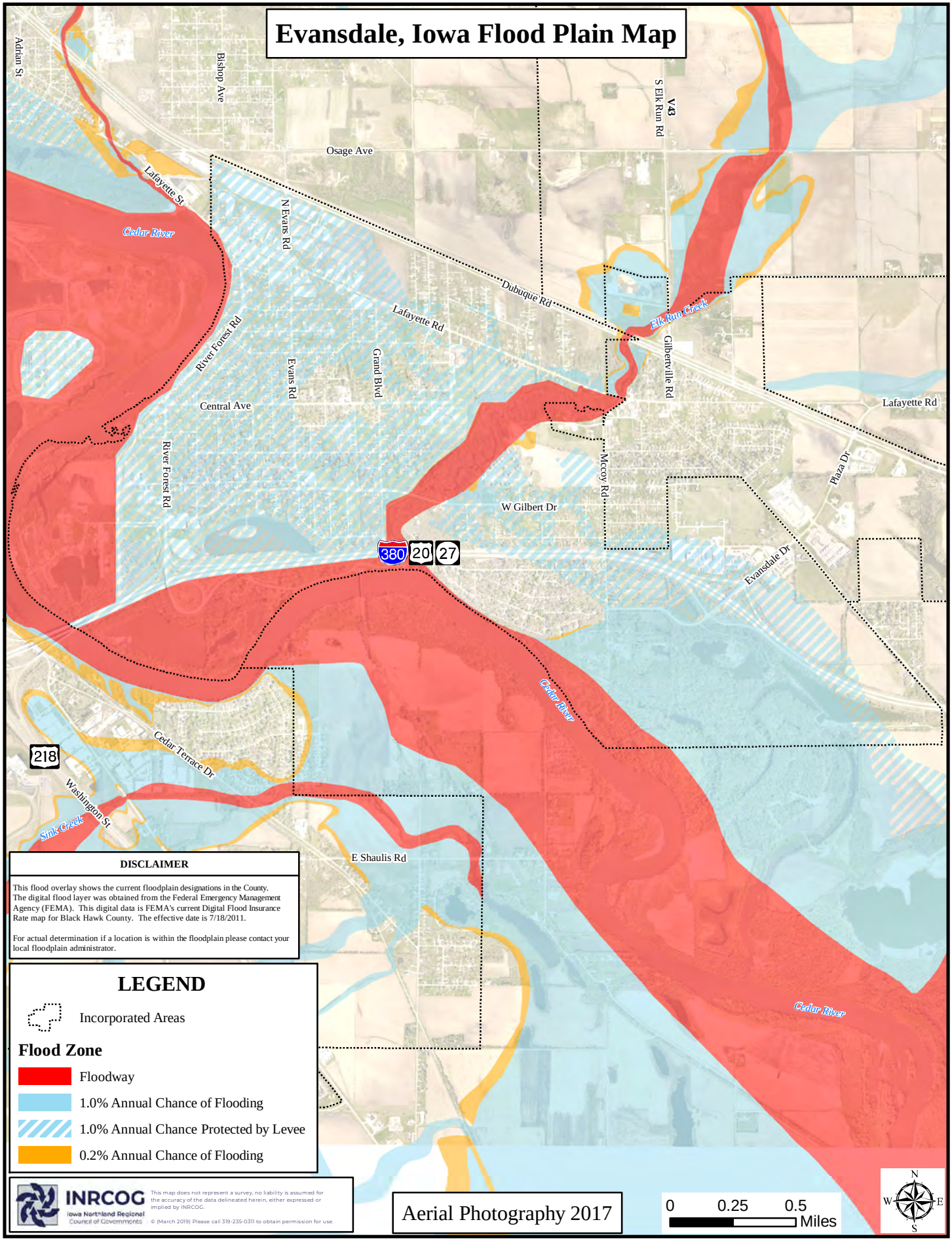

Cedar Falls, Iowa
Flood Scenario Map
Dunkerton Rd
C66
W Dunkerton Rd
Center St
Leversee Rd
Lone Tree Rd
T75
N Union Rd
218
27
57
Lincoln St
W Airline Hwy
218
Pearl St
6th St
Main St
W 12th St
12th St
Hudson Rd
College St
Waterloo Rd
18th St
Rainbow Dr
D17
27th St
27th St
University Ave
Greenhill Rd
Union Rd
Cedar Hts Dr
Orchard Dr
58
S Main St
Greenhill Rd
Greenhill Rd
Huntington Rd
D18
Viking Rd
Viking Rd
Cedar Heights Dr
S Union Rd
Black Hawk Rd
Deere Rd
W Ridgeway Ave
W Ridgeway Ave
20
63
58
Ranchero Rd
0 0.5 1
Miles
Aerial Photography 2017
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
LEGEND
Incorporated Areas
Flood Scenario
Parcels Affected by a Floodway and 1.0% Ann. Chance of Flooding
Parcels Affected by a 1.0% Annual Chance of Flooding
Parcels Affected by a 1.0% Annual Chance Protected by Levee
Parcels Affected by a 0.2% Annual Chance of Flooding
Damage Estimates
Number of Parcels Impacted in the Floodway & 1.0% Annual Chance Floodplain - 792
Number of Parcels Impacted in the 1.0% Annual Chance Floodplain - 1224
Number of Parcels Protected by the Levees - 0
Number of Parcels Impacted in the 0.2% Annual Chance Floodplain - 258
N
W
E
S
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.

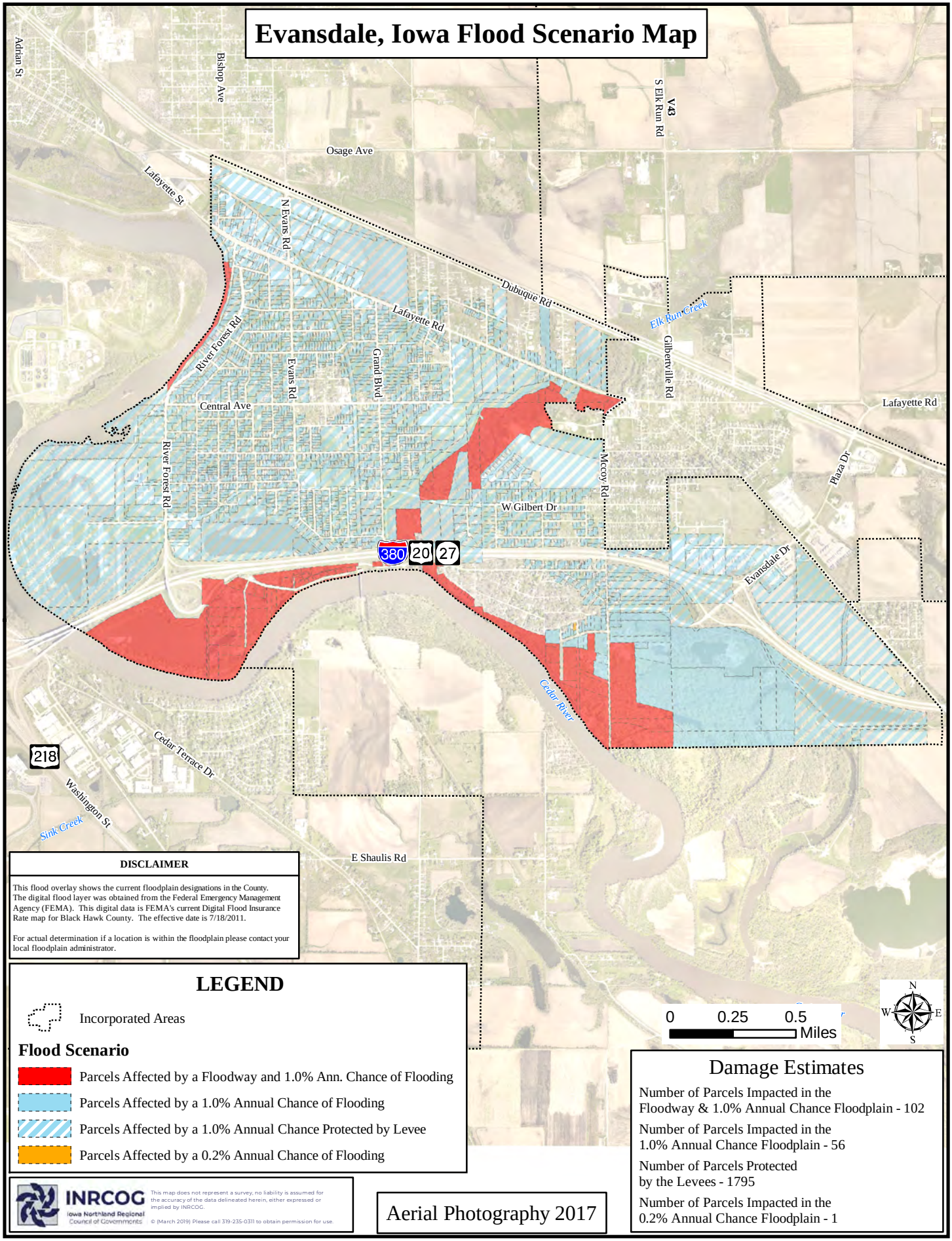

Dunkerton, Iowa Flood Plain Map
E Mt Vernon Rd
Maple Ln
Woodland Dr
Hackberry Dr
Oak Dr
281
N Canfield Rd
Crane Creek
Lincoln St
Main St
Bloomfield St
Stickney St
Washington St
Marble St
Canfield Rd
Jefferson St
Sycamore St
C66
E Dunkerton Rd
Dunkerton St
Williams St
Marilyn St
Joseph Rd
Tower St
Little Jim Cir
Big Jim Ct
Jan Ct
Jayne Ct
Jolene Dr
Carroll Blvd
Robert St
Sal Ave
E Donald Dr
Jon St
E Big Rock Rd
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
LEGEND
Incorporated Areas
Flood Zone
Floodway
1.0% Annual Chance of Flooding
0.2% Annual Chance of Flooding
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
0 0.125 0.25 Miles
N
W
E
S

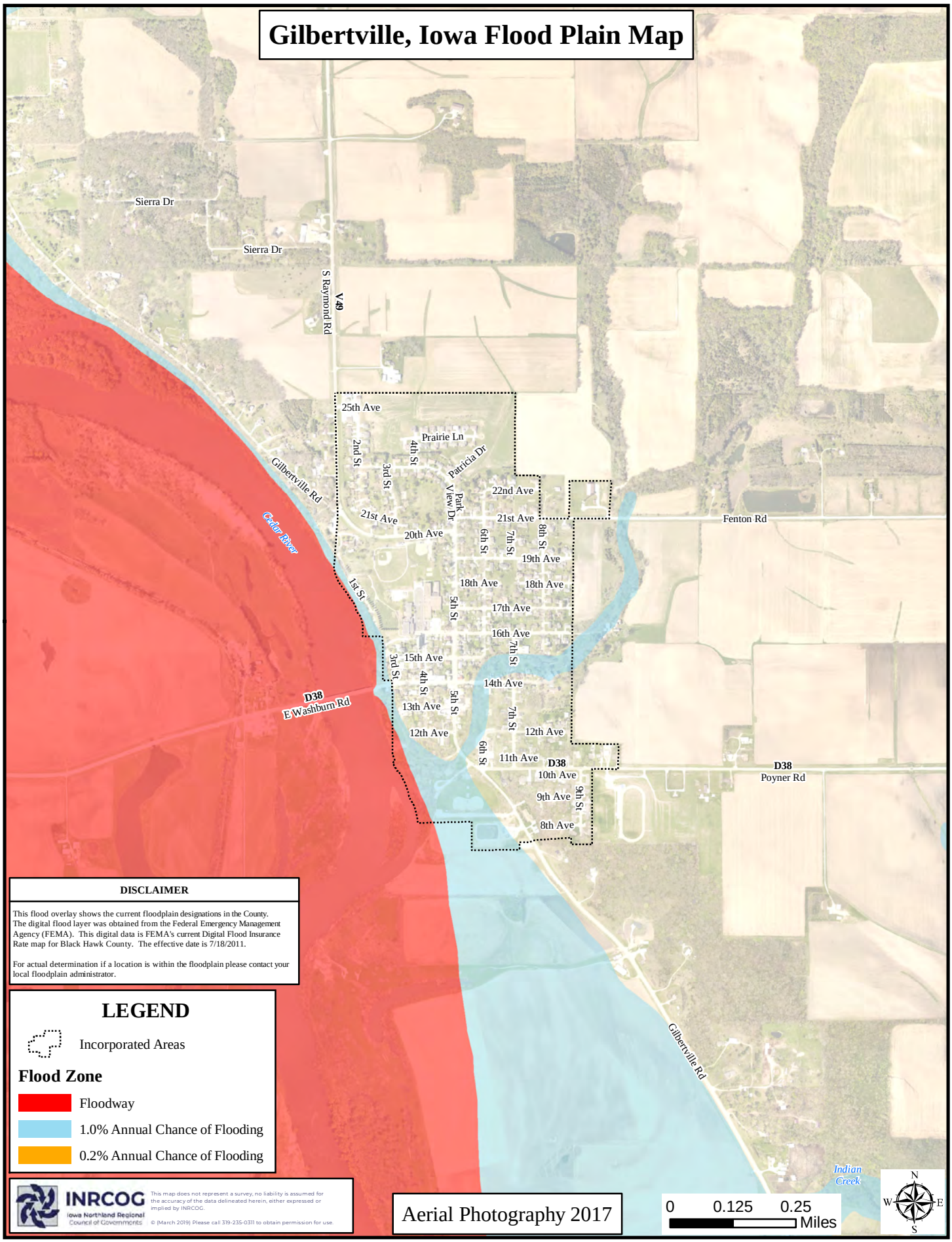

Dunkerton, Iowa Flood Scenario Map
N Canfield Rd
281
Crane Creek
Lincoln St
Main St
Bloomfield St
Stickney St
Washington St
Marble St
Canfield Rd
Jefferson St
Sycamore St
C66
E Dunkerton Rd
Dunkerton St
Williams St
Marilyn St
Joseph Rd
Tower St
Little Jim Cir
Big Jim Ct
Jan Ct
Jayne Ct
Jolene Dr
Carroll Blvd
Robert St
Sal Ave
Jon St
E Donald Dr
E Big Rock Rd
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
LEGEND
Incorporated Areas
Flood Scenario
Parcels Affected by a Floodway and 1.0% Ann. Chance of Flooding
Parcels Affected by a 1.0% Annual Chance of Flooding
Parcels Affected by a 0.2% Annual Chance of Flooding
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
0 0.125 0.25 Miles
N W E S
Damage Estimates
Number of Parcels Impacted in the Floodway & 1.0% Annual Chance Floodplain - 73
Number of Parcels Impacted in the 1.0% Annual Chance Floodplain - 105
Number of Parcels Impacted in the 0.2% Annual Chance Floodplain - 15


Elk Run Heights, Iowa Flood Plain Map
Osage Rd
S Elk Run Rd
V43
Elk Run Creek
Conard Rd
Heather Ave
Norma Ave
Earl St
Knudson Ave
Kephart Dr
Eldene Ct
Arthur Dr
Lafayette Rd
Pine Crest Cr
Gilbertville Rd
Douglas Rd
Johns Dr
Sutton Ave
Gray St
Dubuque Rd
Lafayette Rd
High St
Jackie Ave
Marie Ave
Linda Ave
Mable Ln
Shirley Ave
Corliss Ln
Dawn Dr
Everette St
Elk Run St
Amber Ln
Plaza Dr
W Central St
Devyn Dr
Taylor Ln
S 8th St
S 7th St
Rosebud St
Timber Creek Ave
Timberline Dr
Sunset Ln
Sunrise Ln
Jakob Ln
Nichol Ave
Kade Ave
Hunter Dr
Jordan Dr
Doris Dr
Bmc Dr
W Gilbert Dr
E Gilbert Dr
N Burr Oak Ave
2nd Ave
Enid St
Julie St
Toneff Dr
Ann St
James St
Michigan Dr
380
20
27
6th St
McCoy Rd
Evansdale Dr
Young Rd
Beverly St
Wilshire St
Elane St
Ray-mar Dr
Doris Ln
Cedar River
Lainee Dr
Waterhawk Rd
Indian Creek Rd
Poyner Creek
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
LEGEND
Incorporated Areas
Flood Zone
Floodway
1.0% Annual Chance of Flooding
1.0% Annual Chance Protected by Levee
0.2% Annual Chance of Flooding
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
0 0.1 0.2 0.3
Miles
N
W
E
S

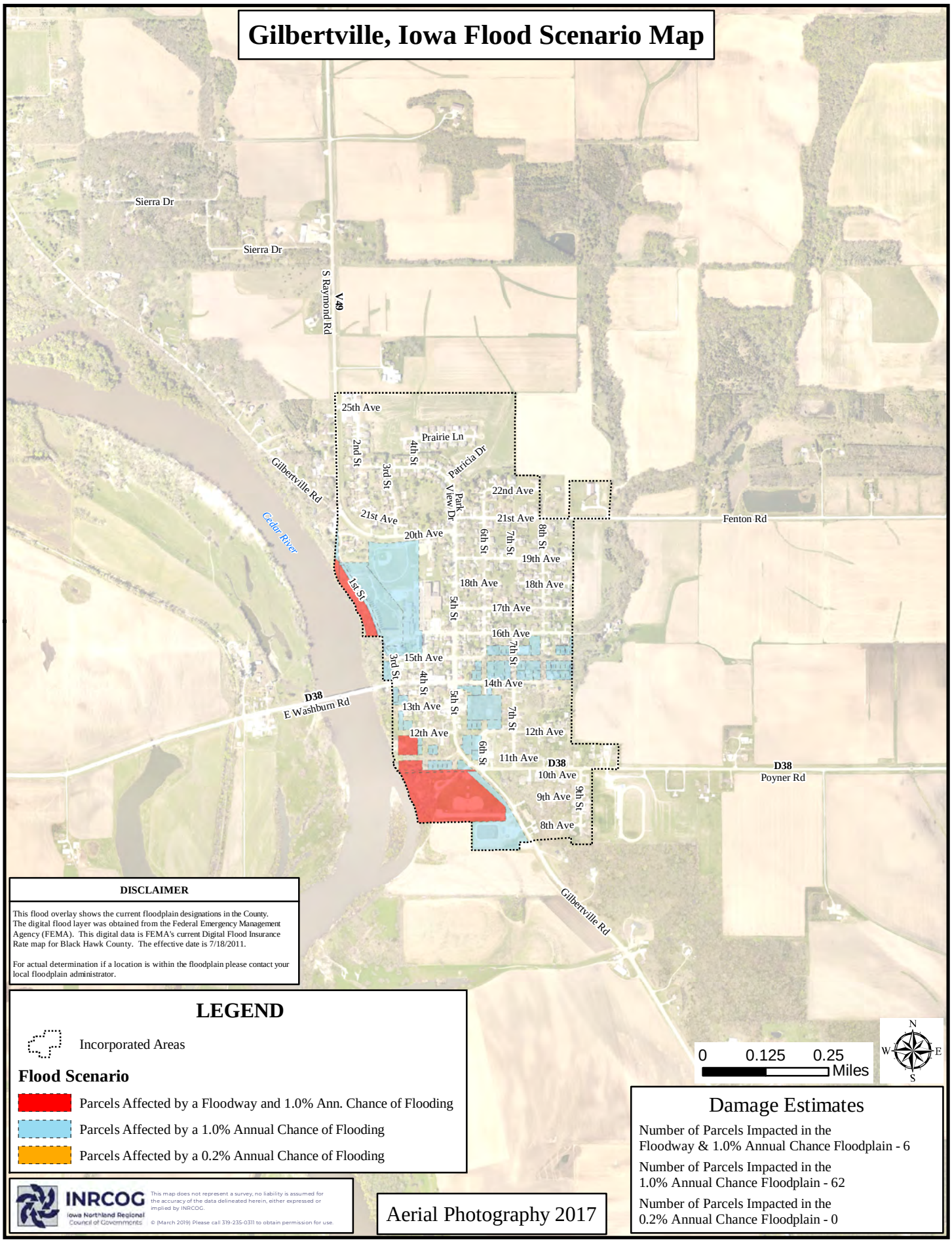

Elk Run Heights, Iowa Flood Scenario Map
Osage Rd
S Elk Run Rd
V43
Elk Run Creek
Conard Rd
Heather Ave
Norma Ave
Earl St
Knudson Ave
Kephart Dr
Eldene Ct
Arthur Dr
Lafayette Rd
Pine Crest Cr
Gilbertville Rd
Douglas Rd
Sutton Ave
Johns Dr
Gray St
Dubuque Rd
Lafayette Rd
High St
Jackie Ave
Marie Ave
Linda Ave
Mable Ln
Shirley Ave
Corliss Ln
Dawn Dr
Everette St
Elk Run St
Amber Ln
Plaza Dr
W Central St
Devyn Dr
Taylor Ln
S 8th St
S 7th St
Rosebud St
Timber Creek Ave
Timberline Dr
Sunset Ln
Sunrise Ln
Jakob Ln
Nichol Ave
Kade Ave
Hunter Dr
Jordan Dr
Doris Dr
Bmc Dr
W Gilbert Dr
E Gilbert Dr
Ann St
Toneff Dr
James St
Michigan Dr
N Burr Oak Ave
2nd Ave
Enid St
Jule St
380
20
27
6th St
Evansdale Dr
Young Rd
Beverly St
Wilshire St
Elane St
Ray-mar Dr
Doris Ln
Cedar River
Lainee Dr
Waterhawk Rd
Indian Creek Rd
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
LEGEND
Incorporated Areas
Flood Scenario
Parcels Affected by a Floodway and 1.0% Ann. Chance of Flooding
Parcels Affected by a 1.0% Annual Chance of Flooding
Parcels Affected by a 1.0% Annual Chance Protected by Levee
Parcels Affected by a 0.2% Annual Chance of Flooding
0 0.1 0.2 0.3 Miles
N
W
E
S
Damage Estimates
Number of Parcels Impacted in the Floodway & 1.0% Annual Chance Floodplain - 10
Number of Parcels Impacted in the 1.0% Annual Chance Floodplain - 8
Number of Parcels Protected by the Levees - 44
Number of Parcels Impacted in the 0.2% Annual Chance Floodplain - 0
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017


Evansdale, Iowa Flood Plain Map
Adrian St
Bishop Ave
S Elk Run Rd
V43
Osage Ave
Lafayette St
Cedar River
N Evans Rd
Dubuque Rd
Elk Run Creek
Lafayette Rd
River Forest Rd
Evans Rd
Grand Blvd
Gilbertville Rd
Central Ave
Lafayette Rd
River Forest Rd
Mccoy Rd
Plaza Dr
W Gilbert Dr
380
20
27
Evansdale Dr
Cedar River
Cedar Terrace Dr
218
Washington St
Sink Creek
E Shaulis Rd
Cedar River
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
LEGEND
Incorporated Areas
Flood Zone
Floodway
1.0% Annual Chance of Flooding
1.0% Annual Chance Protected by Levee
0.2% Annual Chance of Flooding
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
0 0.25 0.5
Miles
N
W
E
S


Evansdale, Iowa Flood Scenario Map
Adrian St
Bishop Ave
S Elk Run Rd
V43
Osage Ave
Lafayette St
N Evans Rd
Dubuque Rd
Elk Run Creek
Lafayette Rd
River Forest Rd
Evans Rd
Grand Blvd
Gilberville Rd
Central Ave
Lafayette Rd
River Forest Rd
Mccoy Rd
Plaza Dr
W Gilbert Dr
380
20
27
Evansdale Dr
Cedar River
218
Cedar Terrace Dr
Washington St
Sink Creek
E Shaulis Rd
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
LEGEND
Incorporated Areas
Flood Scenario
Parcels Affected by a Floodway and 1.0% Ann. Chance of Flooding
Parcels Affected by a 1.0% Annual Chance of Flooding
Parcels Affected by a 1.0% Annual Chance Protected by Levee
Parcels Affected by a 0.2% Annual Chance of Flooding
0 0.25 0.5 Miles
N W E S
Damage Estimates
Number of Parcels Impacted in the Floodway & 1.0% Annual Chance Floodplain - 102
Number of Parcels Impacted in the 1.0% Annual Chance Floodplain - 56
Number of Parcels Protected by the Levees - 1795
Number of Parcels Impacted in the 0.2% Annual Chance Floodplain - 1
INRCOG Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017


Gilbertville, Iowa Flood Plain Map
Sierra Dr
Sierra Dr
S Raymond Rd
V49
25th Ave
Prairie Ln
2nd St
4th St
3rd St
Patricia Dr
Park View Dr
Gilbertville Rd
Cedar River
22nd Ave
21st Ave
21st Ave
20th Ave
6th St
7th St
8th St
19th Ave
Fenton Rd
18th Ave
18th Ave
1st St
5th St
17th Ave
16th Ave
7th St
3rd St
15th Ave
4th St
14th Ave
D38
E Washburn Rd
5th St
13th Ave
7th St
12th Ave
12th Ave
6th St
11th Ave
D38
10th Ave
D38
Poyner Rd
9th Ave
9th St
8th Ave
Gilbertville Rd
Indian Creek
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
LEGEND
Incorporated Areas
Flood Zone
Floodway
1.0% Annual Chance of Flooding
0.2% Annual Chance of Flooding
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
0 0.125 0.25
Miles
N
W
E
S

Gilbertville, Iowa Flood Scenario Map



DISCLAIMER

This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.

For actual determination if a location is within the floodplain please contact your local floodplain administrator.

LEGEND

Incorporated Areas

Flood Scenario

- Parcels Affected by a Floodway and 1.0% Ann. Chance of Flooding
- Parcels Affected by a 1.0% Annual Chance of Flooding
- Parcels Affected by a 0.2% Annual Chance of Flooding

0 0.125 0.25 Miles

N W E S

Damage Estimates

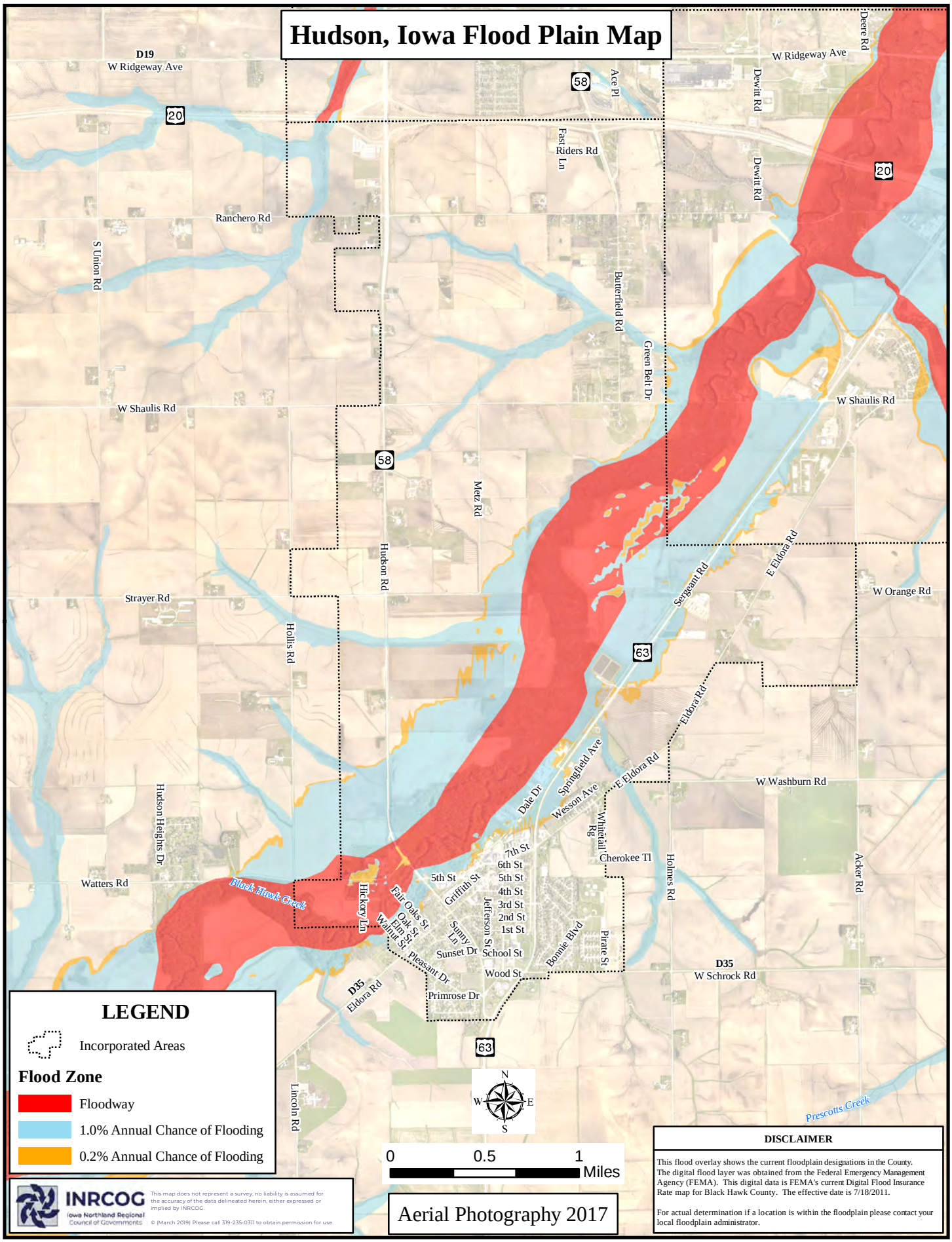
Number of Parcels Impacted in the Floodway & 1.0% Annual Chance Floodplain - 6

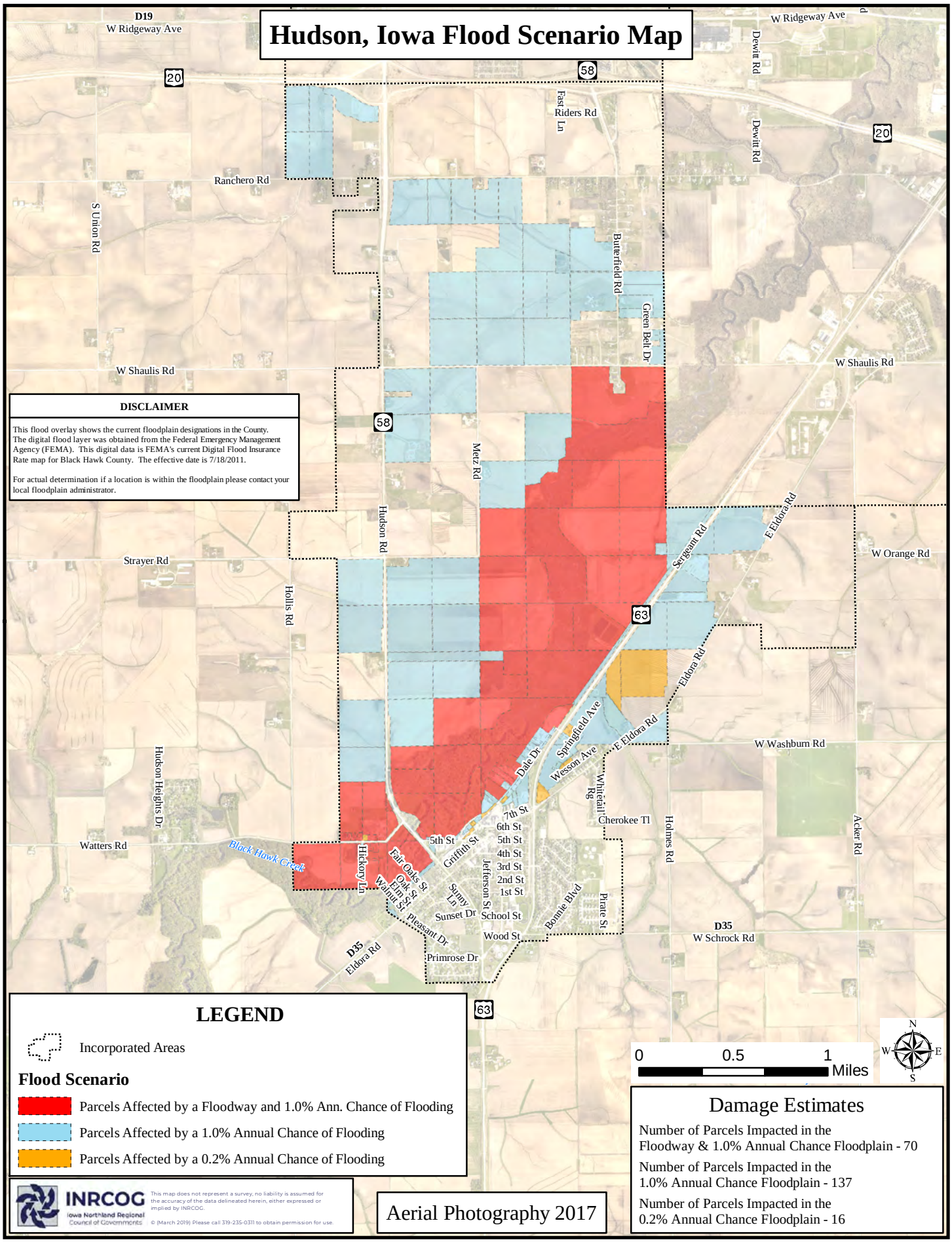
Number of Parcels Impacted in the 1.0% Annual Chance Floodplain - 62

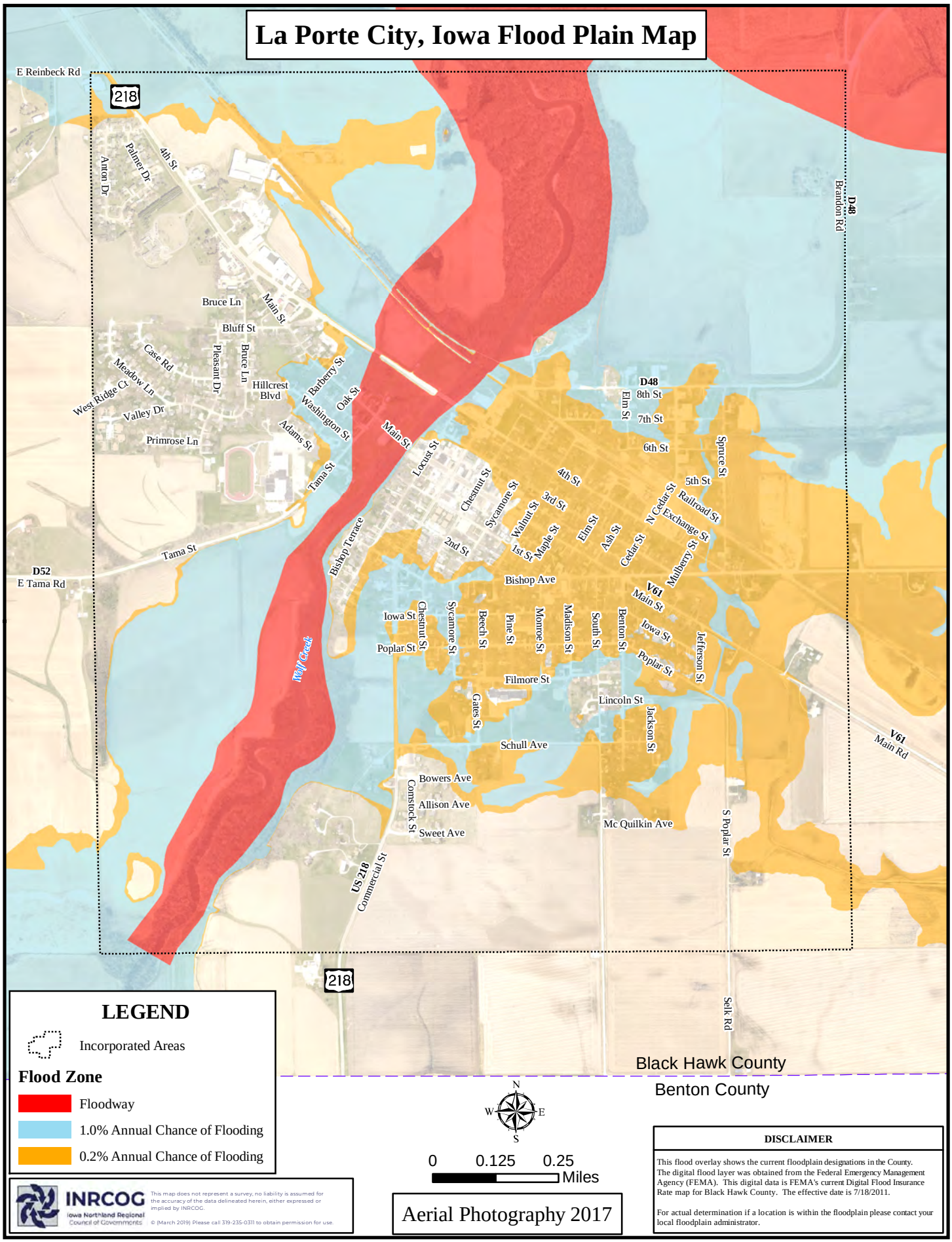
Number of Parcels Impacted in the 0.2% Annual Chance Floodplain - 0

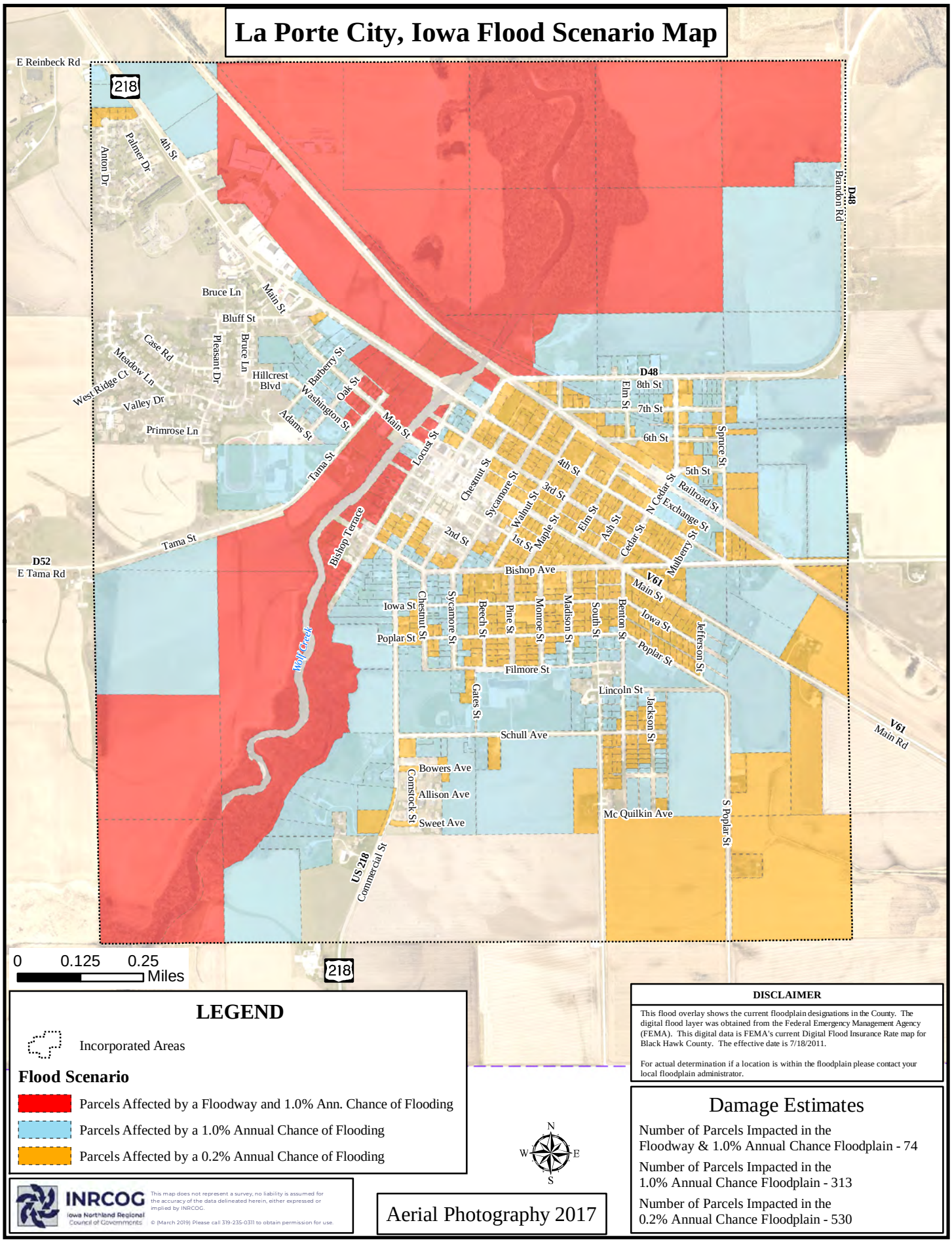
INRCOG Iowa Northland Regional Council of Governments

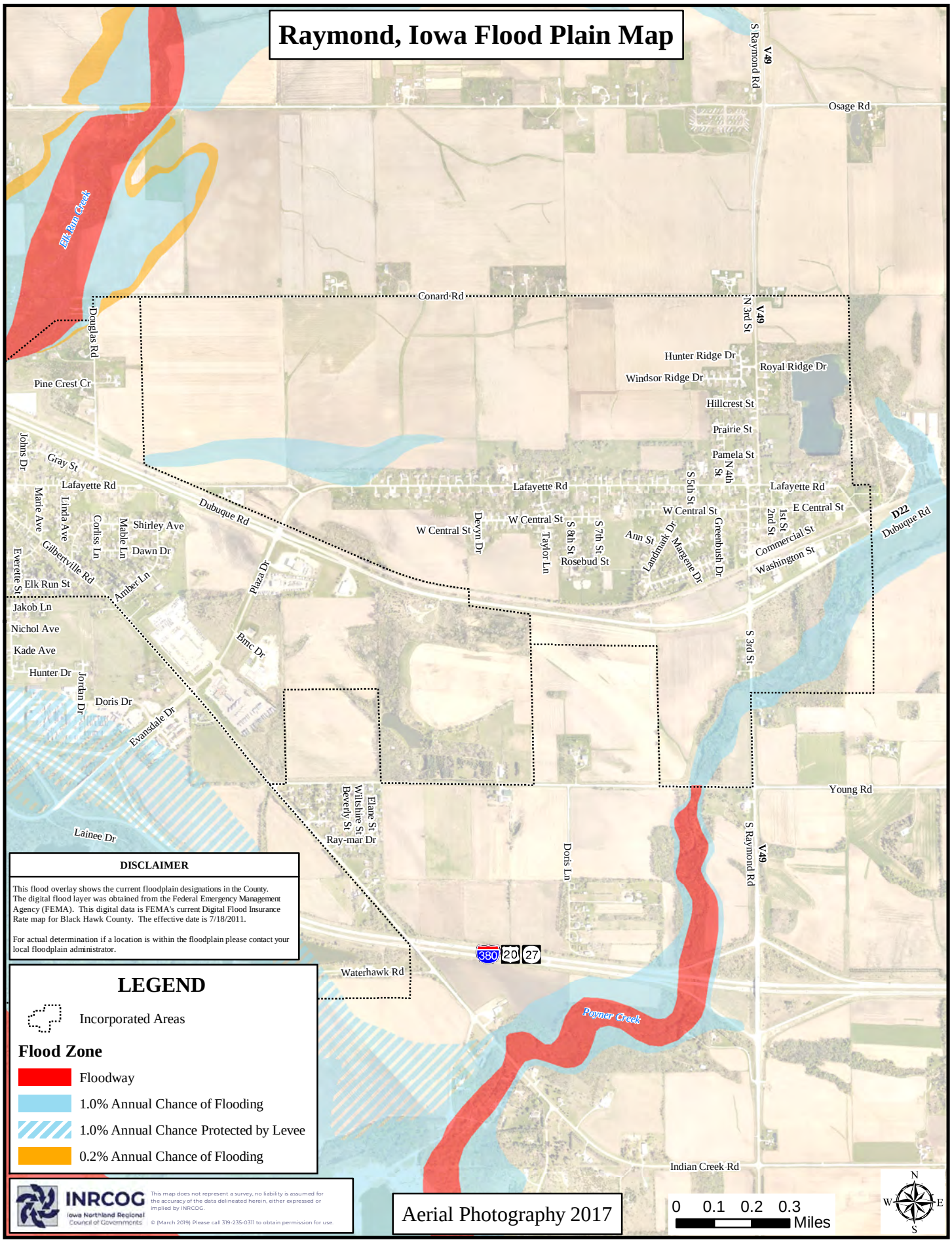
Aerial Photography 2017

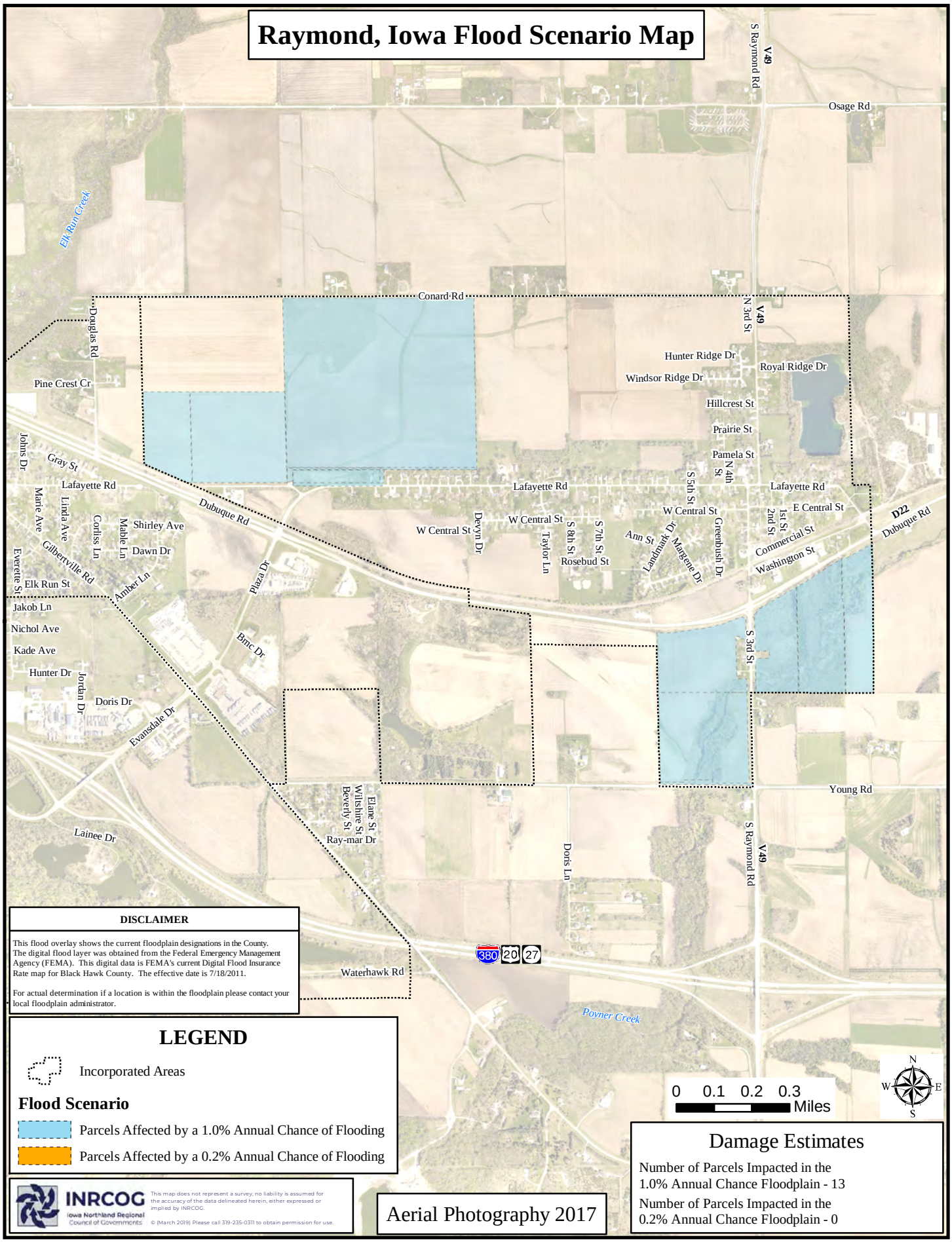

Hudson, Iowa Flood Plain Map
D19
W Ridgeway Ave
20
58
Ace Pl
Fast Riders Rd
Deere Rd
Dewitt Rd
Ranchero Rd
S Union Rd
Butterfield Rd
Green Belt Dr
W Shaulis Rd
Meiz Rd
Hudson Rd
Strayer Rd
Hollis Rd
Sergeant Rd
E Eldora Rd
W Orange Rd
63
Eldora Rd
Springfield Ave
Dale Dr
Wesson Ave
Whitetail Rg
Cherokee Tl
W Washburn Rd
Holmes Rd
Acker Rd
Hudson Heights Dr
Watters Rd
Black Hawk Creek
Hickory Ln
Fair Oaks St
Oak St
Elm St
Walnut St
Pleasant Dr
Griffith St
5th St
7th St
6th St
5th St
4th St
3rd St
2nd St
1st St
Jefferson St
Sunny Ln
Sunset Dr
School St
Wood St
Bonnie Blvd
Pirate St
D35
W Schrock Rd
Primrose Dr
Lincoln Rd
Prescotts Creek
N
W
E
S
0
0.5
1
Miles
LEGEND
Incorporated Areas
Flood Zone
Floodway
1.0% Annual Chance of Flooding
0.2% Annual Chance of Flooding
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.

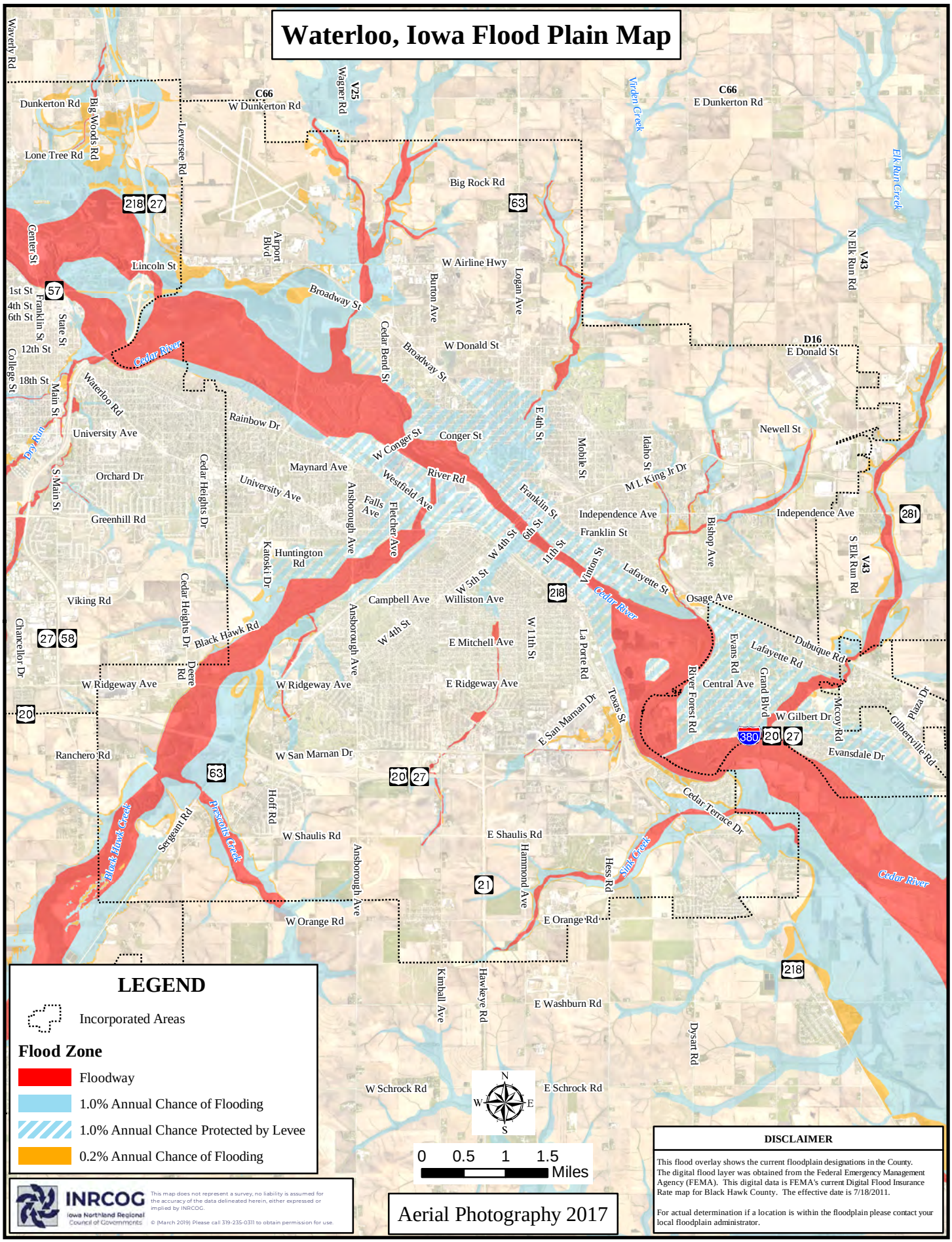

Hudson, Iowa Flood Scenario Map
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
LEGEND
Incorporated Areas
Flood Scenario
Parcels Affected by a Floodway and 1.0% Ann. Chance of Flooding
Parcels Affected by a 1.0% Annual Chance of Flooding
Parcels Affected by a 0.2% Annual Chance of Flooding
0 0.5 1 Miles
N W E S
Damage Estimates
Number of Parcels Impacted in the Floodway & 1.0% Annual Chance Floodplain - 70
Number of Parcels Impacted in the 1.0% Annual Chance Floodplain - 137
Number of Parcels Impacted in the 0.2% Annual Chance Floodplain - 16
INRCOG Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
W Ridgeway Ave
D19
20
58
63
Ranchero Rd
S Union Rd
W Shaulis Rd
Fast Riders Rd
Dewitt Rd
Butterfield Rd
Green Belt Dr
Metz Rd
Hudson Rd
Sergeant Rd
E Eldora Rd
W Orange Rd
Strayer Rd
Hollis Rd
Springfield Ave
Wesson Ave
Dale Dr
W Washburn Rd
Hudson Heights Dr
Watters Rd
Black Hawk Creek
Hickory Ln
Fair Oaks St
Oak St
Elm St
Walnut St
Griffith St
5th St
7th St
6th St
5th St
4th St
3rd St
2nd St
1st St
Jefferson St
Sunny Ln
Sunset Dr
School St
Wood St
Pleasant Dr
Primrose Dr
Bonnie Blvd
Pirate St
Whitetail Rg
Cherokee Tl
Holmes Rd
Acker Rd
D35
W Schrock Rd
Eldora Rd


La Porte City, Iowa Flood Plain Map
E Reinbeck Rd
218
Anton Dr
Palmer Dr
4th St
Brandon Rd
D48
Bruce Ln
Main St
Bluff St
Case Rd
Meadow Ln
West Ridge Ct
Pleasant Dr
Bruce Ln
Hillcrest Blvd
Barberry St
Oak St
Washington St
Valley Dr
Primrose Ln
Adams St
Tama St
Locust St
Chestnut St
Sycamore St
4th St
3rd St
Walnut St
Maple St
Elm St
Ash St
Cedar St
N Cedar St
Railroad St
Exchange St
Mulberry St
Spruce St
5th St
6th St
7th St
8th St
Elm St
2nd St
1st St
Bishop Terrace
Tama St
D52
E Tama Rd
Bishop Ave
V61
Main St
Iowa St
Chestnut St
Sycamore St
Beech St
Pine St
Monroe St
Madison St
South St
Benton St
Iowa St
Jefferson St
Poplar St
Poplar St
Wolf Creek
Filmore St
Lincoln St
Gates St
Jackson St
Schull Ave
V61
Main Rd
Bowers Ave
Comstock St
Allison Ave
Sweet Ave
Mc Quilkin Ave
S Poplar St
US 218
Commercial St
218
Selk Rd
Black Hawk County
Benton County
LEGEND
Incorporated Areas
Flood Zone
Floodway
1.0% Annual Chance of Flooding
0.2% Annual Chance of Flooding
N
W
E
S
0 0.125 0.25
Miles
Aerial Photography 2017
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.

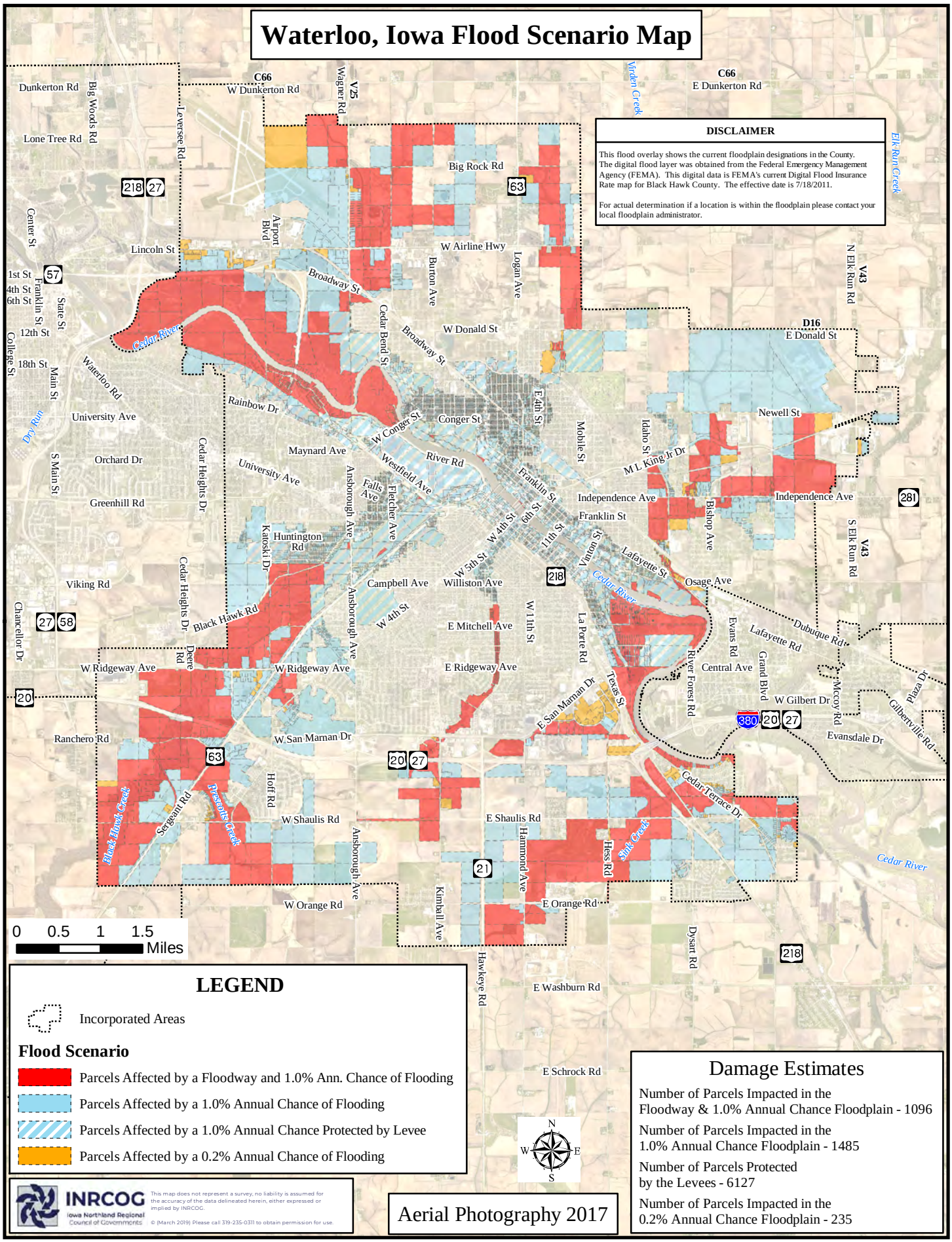

La Porte City, Iowa Flood Scenario Map
E Reinbeck Rd
218
Anton Dr
Palmer Dr
4th St
Brandon Rd
D48
Bruce Ln
Main St
Bluff St
Case Rd
Meadow Ln
West Ridge Ct
Valley Dr
Pleasant Dr
Bruce Ln
Hillcrest Blvd
Barberry St
Oak St
Washington St
Adams St
Primrose Ln
Tama St
Locust St
Chestnut St
Sycamore St
Walnut St
3rd St
4th St
Elm St
7th St
8th St
6th St
Spruce St
5th St
Railroad St
N Cedar St
Exchange St
Ash St
Cedar St
Mulberry St
Maple St
1st St
2nd St
Bishop Terrace
Tama St
D52
E Tama Rd
Bishop Ave
V61
Main St
Iowa St
Chestnut St
Sycamore St
Beech St
Pine St
Monroe St
Madison St
South St
Benton St
Jefferson St
Poplar St
Wolf Creek
Filmore St
Lincoln St
Gates St
Jackson St
Schull Ave
V61
Main Rd
Bowers Ave
Comstock St
Allison Ave
Sweet Ave
Mc Quilkin Ave
S Poplar St
US 218
Commercial St
218
0 0.125 0.25 Miles
LEGEND
Incorporated Areas
Flood Scenario
Parcels Affected by a Floodway and 1.0% Ann. Chance of Flooding
Parcels Affected by a 1.0% Annual Chance of Flooding
Parcels Affected by a 0.2% Annual Chance of Flooding
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
Damage Estimates
Number of Parcels Impacted in the Floodway & 1.0% Annual Chance Floodplain - 74
Number of Parcels Impacted in the 1.0% Annual Chance Floodplain - 313
Number of Parcels Impacted in the 0.2% Annual Chance Floodplain - 530
N
W
E
S
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017

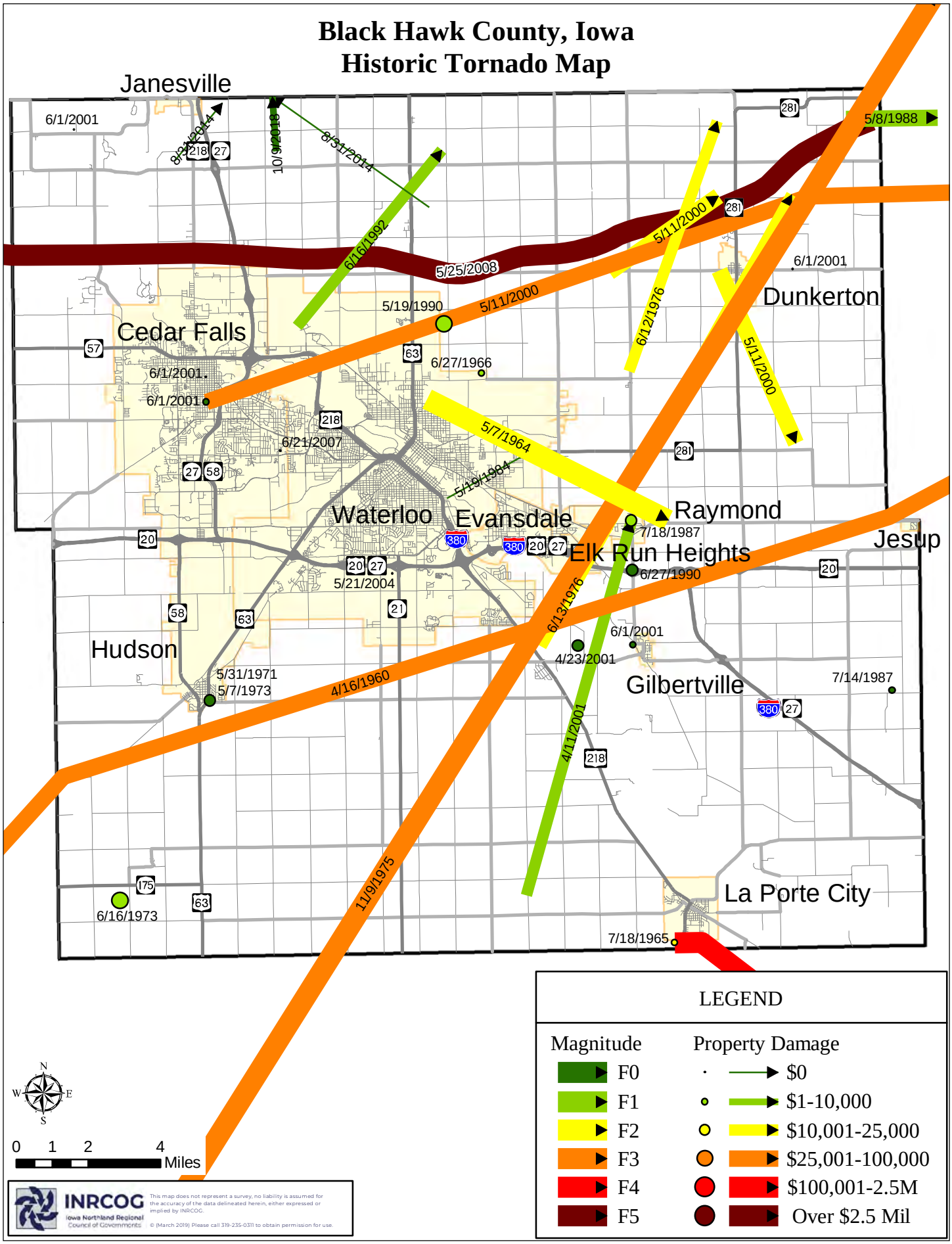

Raymond, Iowa Flood Plain Map
S Raymond Rd
V49
Osage Rd
Elk Run Creek
Conard Rd
Douglas Rd
N 3rd St
Hunter Ridge Dr
Windsor Ridge Dr
Royal Ridge Dr
Pine Crest Cr
Hillcrest St
Prairie St
Pamela St
Johns Dr
Gray St
Lafayette Rd
Dubuque Rd
N 4th St
S 5th St
W Central St
E Central St
1st St
2nd St
Commercial St
Washington St
D22
Marie Ave
Linda Ave
Corliss Ln
Mable Ln
Shirley Ave
Dawn Dr
Gilbertville Rd
Everette St
Elk Run St
Amber Ln
Plaza Dr
Devyn Dr
Taylor Ln
S 8th St
S 7th St
Rosebud St
Ann St
Landmark Dr
Margene Dr
Greenbush Dr
Jakob Ln
Nichol Ave
Kade Ave
Hunter Dr
Jordan Dr
Doris Dr
Evansdale Dr
Bmc Dr
S 3rd St
Young Rd
Lainee Dr
Beverly St
Willshire St
Elane St
Ray-mar Dr
Doris Ln
Waterhawk Rd
380
20
27
Payner Creek
Indian Creek Rd
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
LEGEND
Incorporated Areas
Flood Zone
Floodway
1.0% Annual Chance of Flooding
1.0% Annual Chance Protected by Levee
0.2% Annual Chance of Flooding
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
0 0.1 0.2 0.3 Miles
N
W
E
S

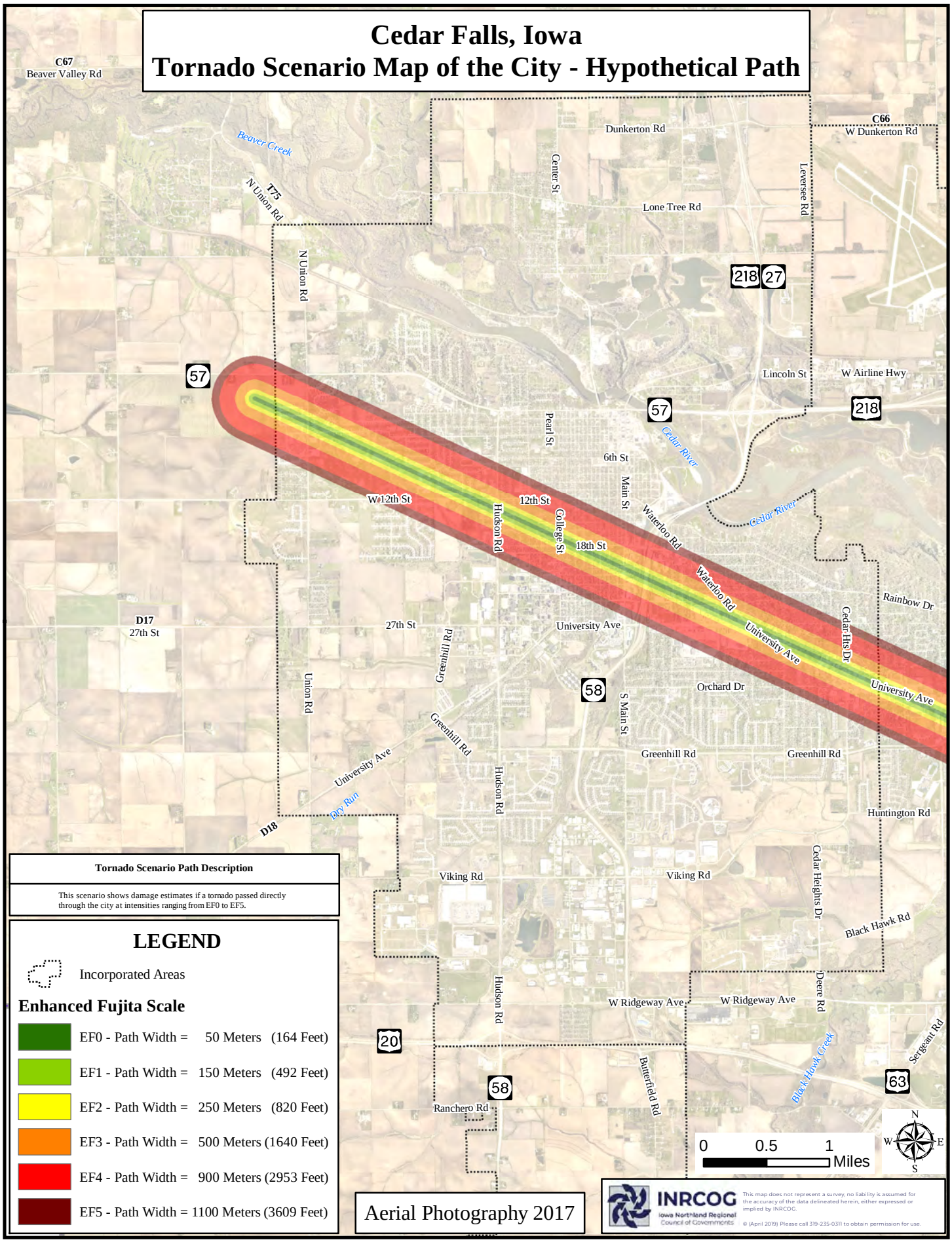

Raymond, Iowa Flood Scenario Map
S Raymond Rd
V49
Osage Rd
Elk Run Creek
Conard Rd
N 3rd St
Douglas Rd
Hunter Ridge Dr
Windsor Ridge Dr
Royal Ridge Dr
Pine Crest Cr
Hillcrest St
Prairie St
Pamela St
Johns Dr
Gray St
Lafayette Rd
N 4th St
S 5th St
E Central St
Marie Ave
Linda Ave
Corliss Ln
Mable Ln
Shirley Ave
Dubuque Rd
W Central St
Devyn Dr
S 8th St
S 7th St
Taylor Ln
Rosebud St
Ann St
Landmark Dr
Margene Dr
Greenbush Dr
1st St
2nd St
Commercial St
Washington St
D22
Dawn Dr
Gilbertville Rd
Everette St
Elk Run St
Amber Ln
Plaza Dr
Jakob Ln
Nichol Ave
Kade Ave
Hunter Dr
Jordan Dr
Doris Dr
Evansdale Dr
Bmc Dr
S 3rd St
Young Rd
Lainee Dr
Elaine St
Willshire St
Beverly St
Ray-mar Dr
Doris Ln
Waterhawk Rd
380
20
27
Poyner Creek
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
LEGEND
Incorporated Areas
Flood Scenario
Parcels Affected by a 1.0% Annual Chance of Flooding
Parcels Affected by a 0.2% Annual Chance of Flooding
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
0 0.1 0.2 0.3
Miles
N
W
E
S
Damage Estimates
Number of Parcels Impacted in the 1.0% Annual Chance Floodplain - 13
Number of Parcels Impacted in the 0.2% Annual Chance Floodplain - 0

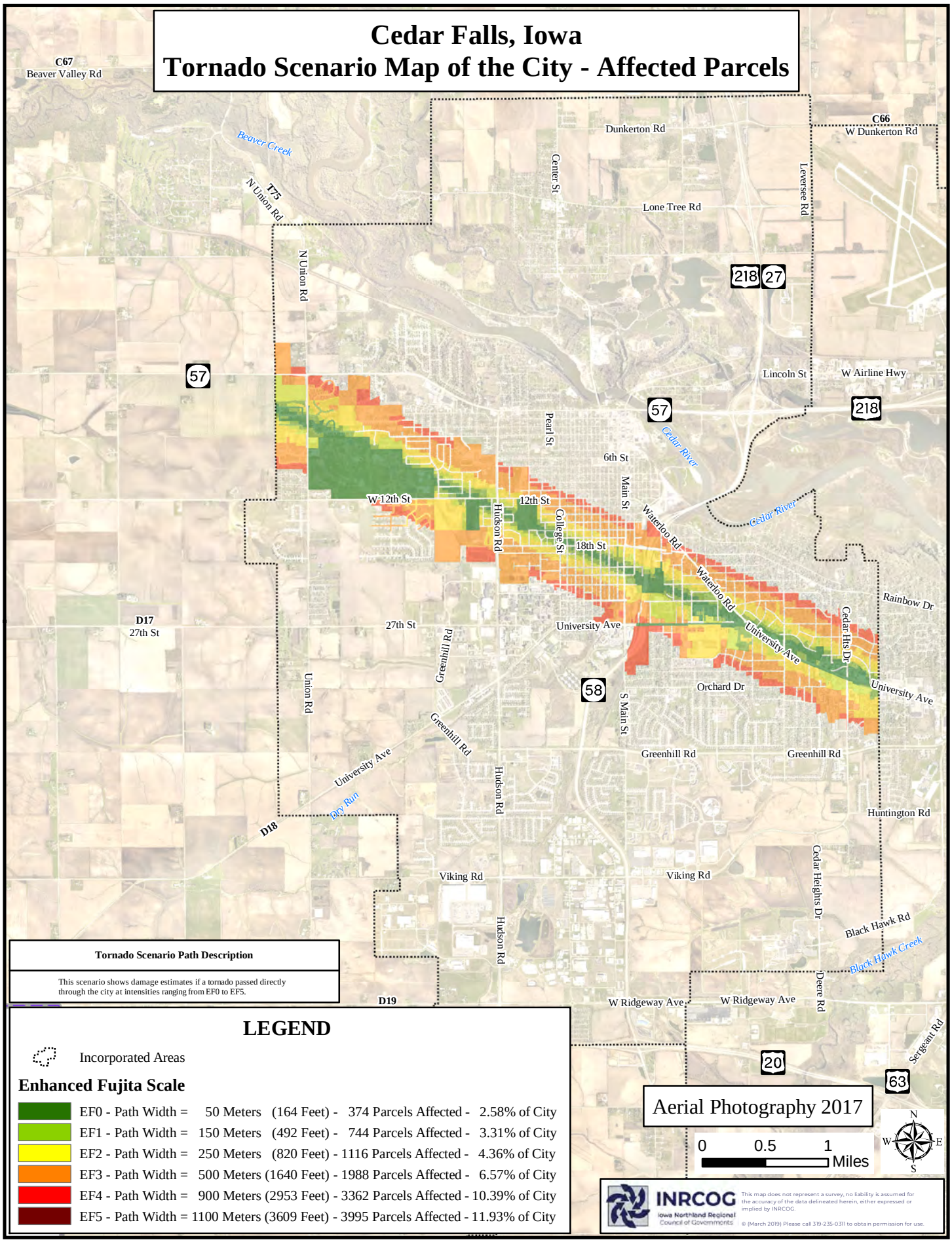

Waterloo, Iowa Flood Plain Map
Waverly Rd
Dunkerton Rd
Big Woods Rd
Lone Tree Rd
Leversee Rd
C66
W Dunkerton Rd
Wagner Rd
V25
Virden Creek
C66
E Dunkerton Rd
Elk Run Creek
Big Rock Rd
63
218
27
Center St
Airport Blvd
Lincoln St
W Airline Hwy
Burton Ave
Logan Ave
N Elk Run Rd
V43
1st St
4th St
6th St
57
Franklin St
State St
Broadway St
Cedar River
12th St
College St
18th St
Main St
Waterloo Rd
Cedar Bend St
Broadway St
W Donald St
D16
E Donald St
Dry Run
University Ave
Rainbow Dr
W Conger St
Conger St
E 4th St
Mobile St
Idaho St
Newell St
M L King Jr Dr
Orchard Dr
S Main St
Cedar Heights Dr
Maynard Ave
University Ave
Ansborough Ave
Falls Ave
Fletcher Ave
Westfield Ave
River Rd
Franklin St
Independence Ave
Bishop Ave
Independence Ave
281
Greenhill Rd
Huntington Rd
Katoski Dr
W 4th St
6th St
11th St
Vinton St
Franklin St
S Elk Run Rd
V43
Viking Rd
Cedar Heights Dr
W 5th St
Williston Ave
Campbell Ave
218
Cedar River
Lafayette St
Osage Ave
Chancellor Dr
27
58
Black Hawk Rd
Deere Rd
Ansborough Ave
W 4th St
E Mitchell Ave
W 11th St
La Porte Rd
Evans Rd
Lafayette Rd
Dubuque Rd
W Ridgeway Ave
W Ridgeway Ave
E Ridgeway Ave
River Forest Rd
Central Ave
Grand Blvd
20
Ranchero Rd
W San Marnan Dr
E San Marnan Dr
Texas St
W Gilbert Dr
Mccoy Rd
Plaza Dr
Gilbertville Rd
380
20
27
Evansdale Dr
63
20
27
Hoff Rd
Sergeant Rd
Prescott Creek
Black Hawk Creek
W Shaulis Rd
E Shaulis Rd
Cedar Terrace Dr
Sink Creek
Hess Rd
Hammond Ave
Ansborough Ave
21
Cedar River
W Orange Rd
E Orange Rd
218
Kimball Ave
Hawkeye Rd
E Washburn Rd
Dysart Rd
W Schrock Rd
E Schrock Rd
N
W
E
S
0 0.5 1 1.5
Miles
LEGEND
Incorporated Areas
Flood Zone
Floodway
1.0% Annual Chance of Flooding
1.0% Annual Chance Protected by Levee
0.2% Annual Chance of Flooding
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
DISCLAIMER
This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Black Hawk County. The effective date is 7/18/2011.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.

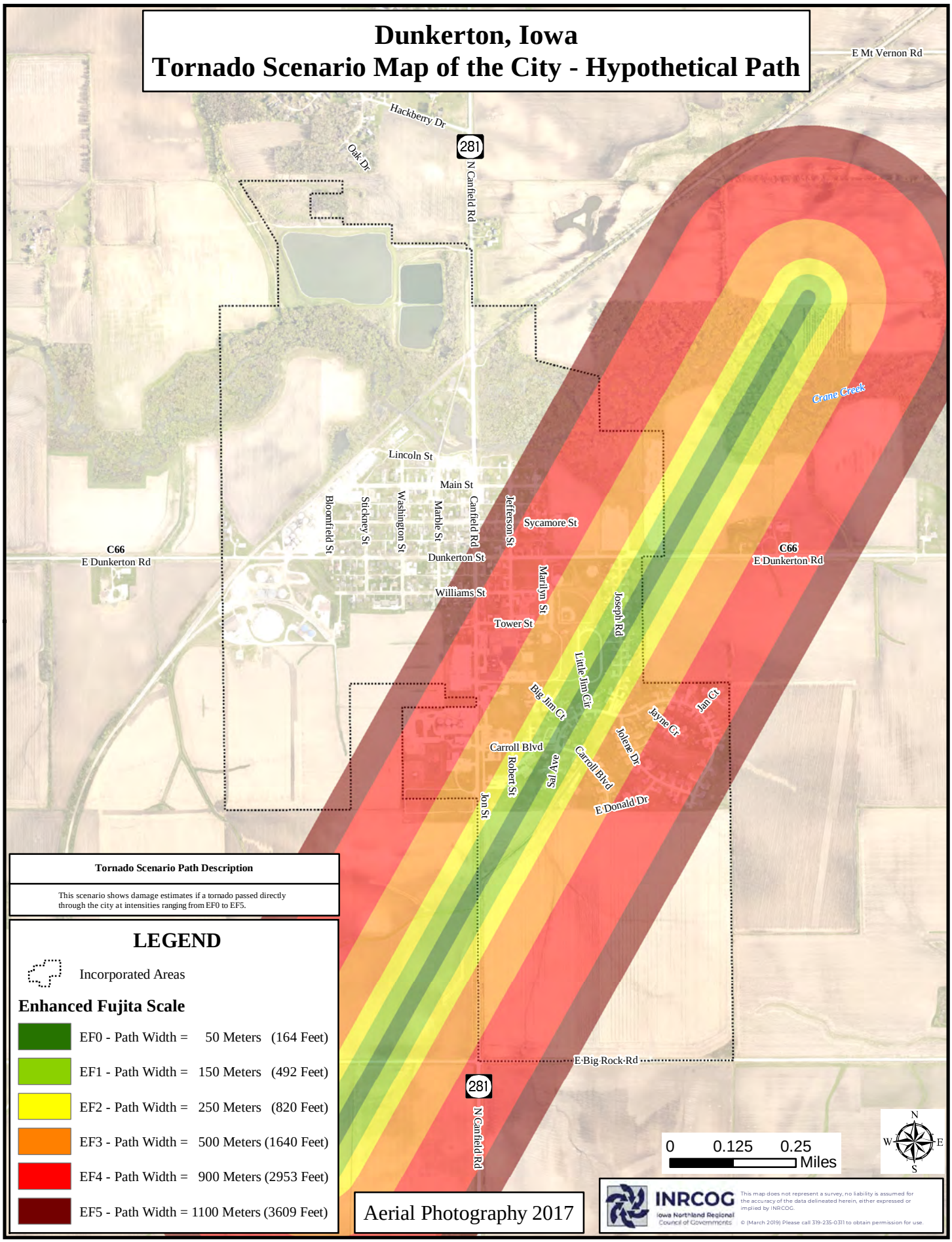
Waterloo, Iowa Flood Scenario Map



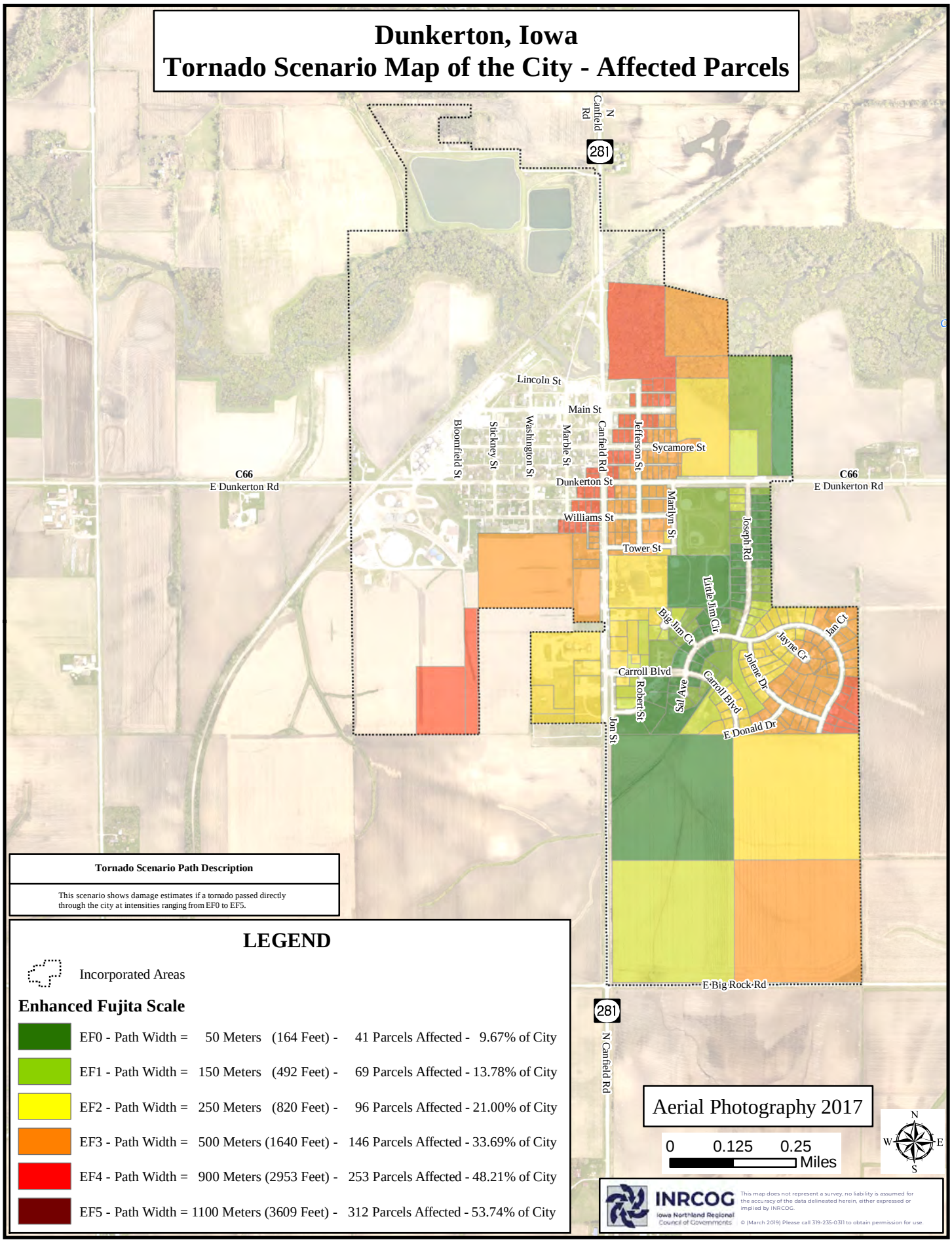

Black Hawk County, Iowa
Historic Tornado Map
Janesville
Cedar Falls
Waterloo
Evansdale
Raymond
Elk Run Heights
Dunkerton
Jesup
Hudson
Gilbertville
La Porte City
6/1/2001
8/31/2014
10/9/2013
8/31/2014
5/8/1988
6/16/1992
5/25/2008
5/11/2000
5/19/1990
6/27/1966
6/1/2001
6/1/2001
6/21/2007
5/19/1964
5/7/1964
6/12/1976
5/11/2000
5/11/2000
6/1/2001
7/18/1987
6/27/1990
5/21/2004
6/13/1976
6/1/2001
4/23/2001
7/14/1987
5/31/1971
5/7/1973
4/16/1960
4/11/2001
11/9/1975
6/16/1973
7/18/1965
LEGEND
Magnitude
F0
F1
F2
F3
F4
F5
Property Damage
$0
$1-10,000
$10,001-25,000
$25,001-100,000
$100,001-2.5M
Over $2.5 Mil
N
W
E
S
0 1 2 4
Miles
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.


Cedar Falls, Iowa
Tornado Scenario Map of the City - Hypothetical Path
C67
Beaver Valley Rd
Beaver Creek
N Union Rd
175
Dunkerton Rd
C66
W Dunkerton Rd
Center St
Lone Tree Rd
Leversee Rd
218
27
N Union Rd
57
Lincoln St
W Airline Hwy
218
Pearl St
57
Cedar River
6th St
Main St
W 12th St
12th St
Hudson Rd
College St
Waterloo Rd
18th St
Cedar River
Waterloo Rd
Rainbow Dr
D17
27th St
27th St
University Ave
Greenhill Rd
Cedar Hts Dr
University Ave
Union Rd
58
Orchard Dr
S Main St
Greenhill Rd
University Ave
Greenhill Rd
Greenhill Rd
Hudson Rd
Dry Run
Huntington Rd
D18
Viking Rd
Viking Rd
Cedar Heights Dr
Black Hawk Rd
Hudson Rd
W Ridgeway Ave
W Ridgeway Ave
Deere Rd
20
Butterfield Rd
Black Hawk Creek
Sergeant Rd
58
63
Ranchero Rd
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
0 0.5 1 Miles
N
W
E
S
Aerial Photography 2017
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (April 2019) Please call 319-235-0311 to obtain permission for use.


Cedar Falls, Iowa
Tornado Scenario Map of the City - Affected Parcels
C67
Beaver Valley Rd
Beaver Creek
N Union Rd
175
Dunkerton Rd
C66
W Dunkerton Rd
Center St
Leversee Rd
Lone Tree Rd
218
27
N Union Rd
57
Lincoln St
W Airline Hwy
218
57
Pearl St
Cedar River
6th St
Main St
W 12th St
12th St
Hudson Rd
College St
Waterloo Rd
18th St
Cedar River
Waterloo Rd
Rainbow Dr
D17
27th St
27th St
University Ave
University Ave
Cedar Hts Dr
Greenhill Rd
Union Rd
58
Orchard Dr
University Ave
S Main St
Greenhill Rd
University Ave
Greenhill Rd
Greenhill Rd
Hudson Rd
Dry Run
Huntington Rd
D18
Viking Rd
Viking Rd
Cedar Heights Dr
Hudson Rd
Black Hawk Rd
Black Hawk Creek
Deere Rd
D19
W Ridgeway Ave
W Ridgeway Ave
Sergeant Rd
20
63
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 374 Parcels Affected - 2.58% of City
EF1 - Path Width = 150 Meters (492 Feet) - 744 Parcels Affected - 3.31% of City
EF2 - Path Width = 250 Meters (820 Feet) - 1116 Parcels Affected - 4.36% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 1988 Parcels Affected - 6.57% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 3362 Parcels Affected - 10.39% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 3995 Parcels Affected - 11.93% of City
Aerial Photography 2017
0 0.5 1
Miles
N
W
E
S
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.


Dunkerton, Iowa
Tornado Scenario Map of the City - Hypothetical Path
E Mt Vernon Rd
Hackberry Dr
Oak Dr
281
N Canfield Rd
Crane Creek
Lincoln St
Main St
Bloomfield St
Stickney St
Washington St
Marble St
Canfield Rd
Jefferson St
Sycamore St
C66
E Dunkerton Rd
Dunkerton St
Williams St
Marilyn St
Tower St
Joseph Rd
Little Jim Cir
Big Jim Ct
Jan Ct
Jayne Cir
Carroll Blvd
Robert St
Sal Ave
Jolere Dr
E Donald Dr
Jon St
E Big Rock Rd
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
0 0.125 0.25
Miles
N
W
E
S
Aerial Photography 2017
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.

Dunkerton, Iowa
Tornado Scenario Map of the City - Affected Parcels



Tornado Scenario Path Description

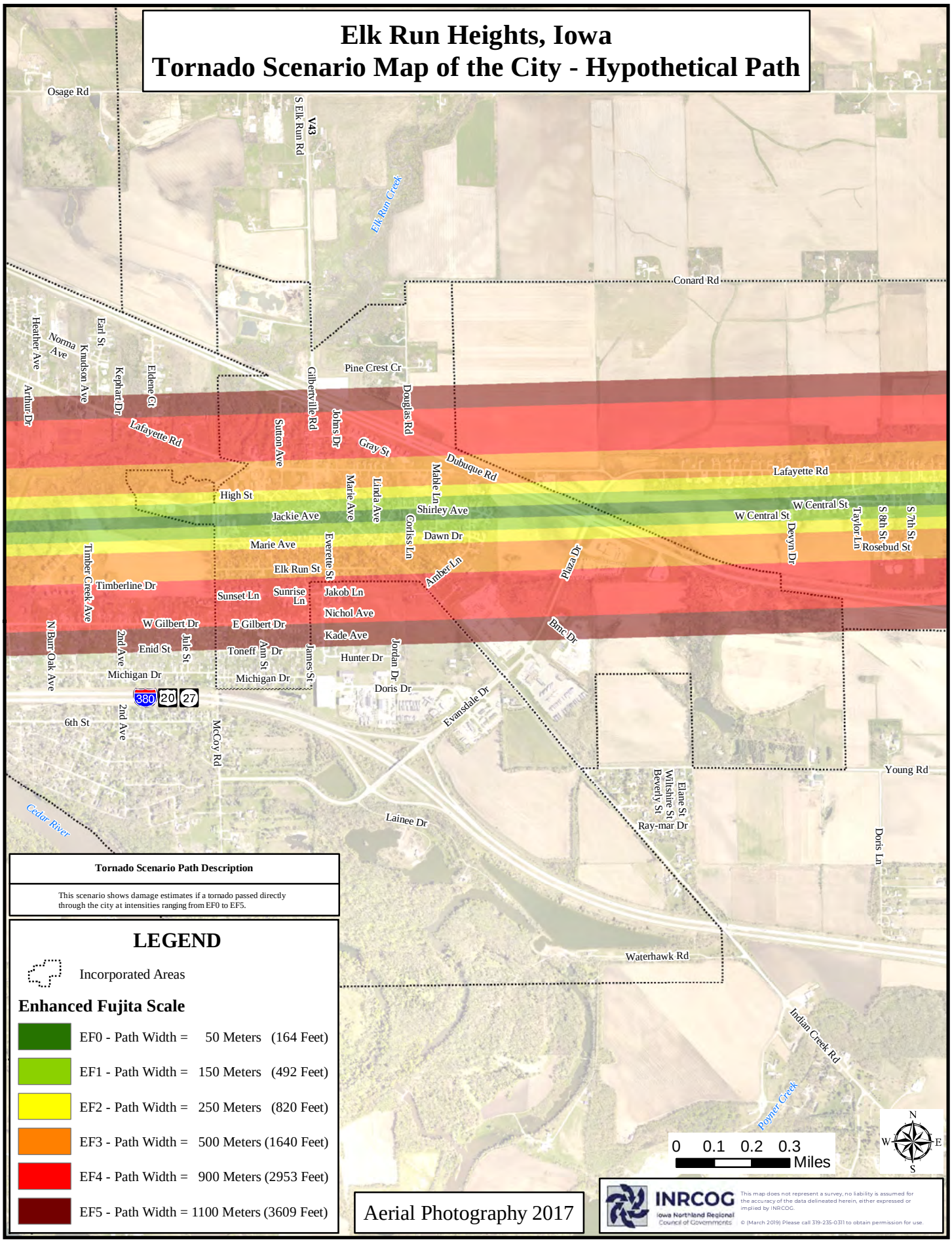
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.

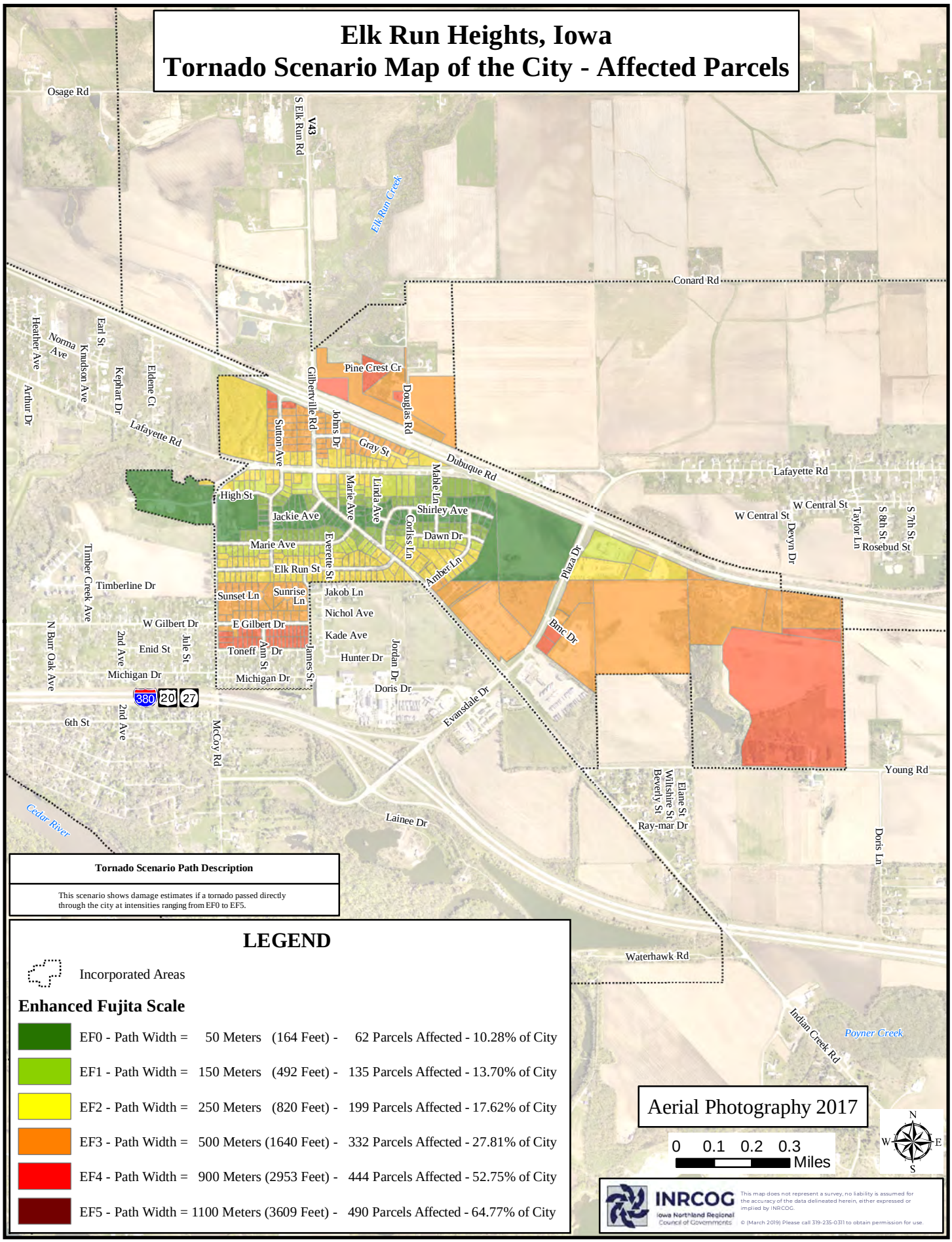
LEGEND

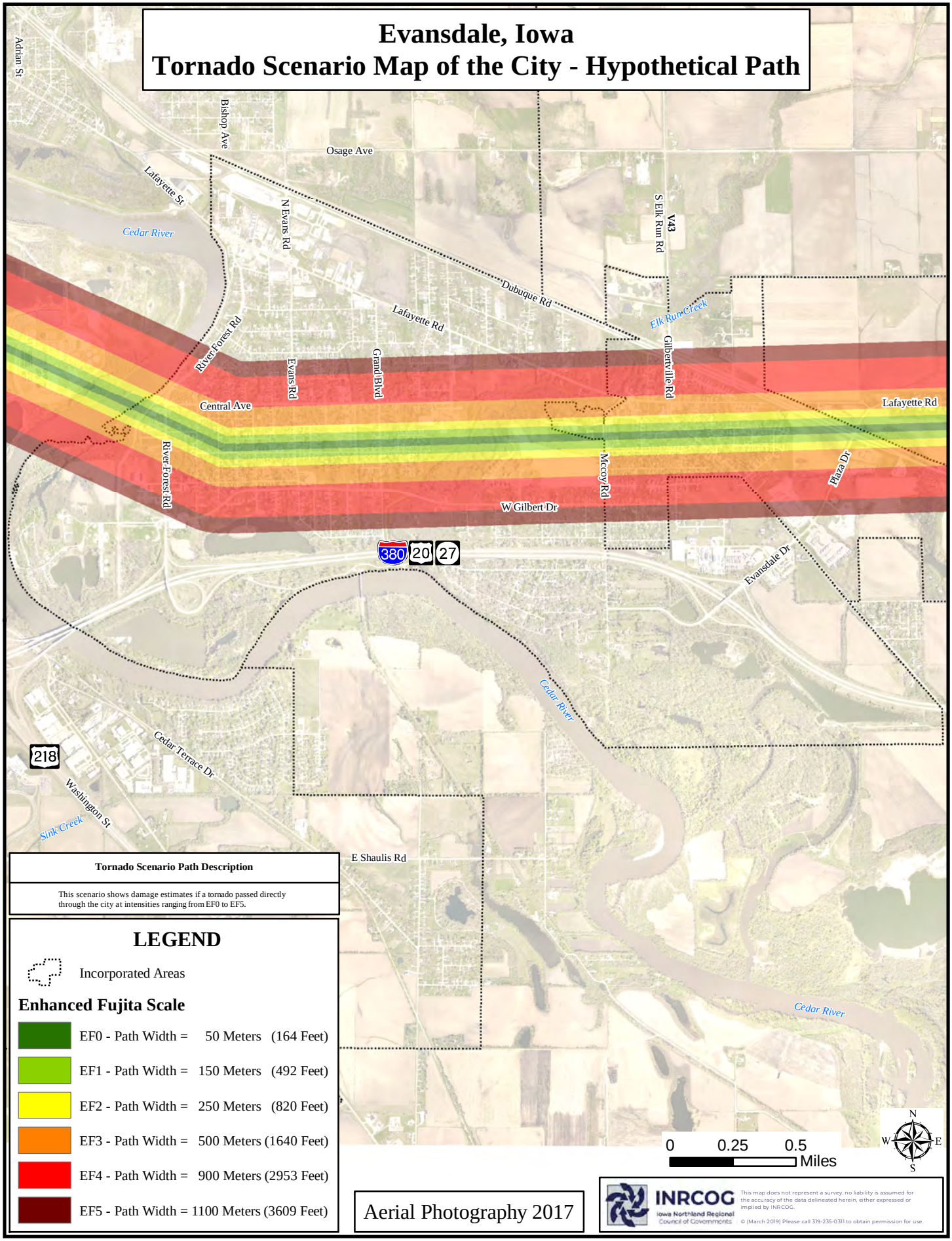
Incorporated Areas

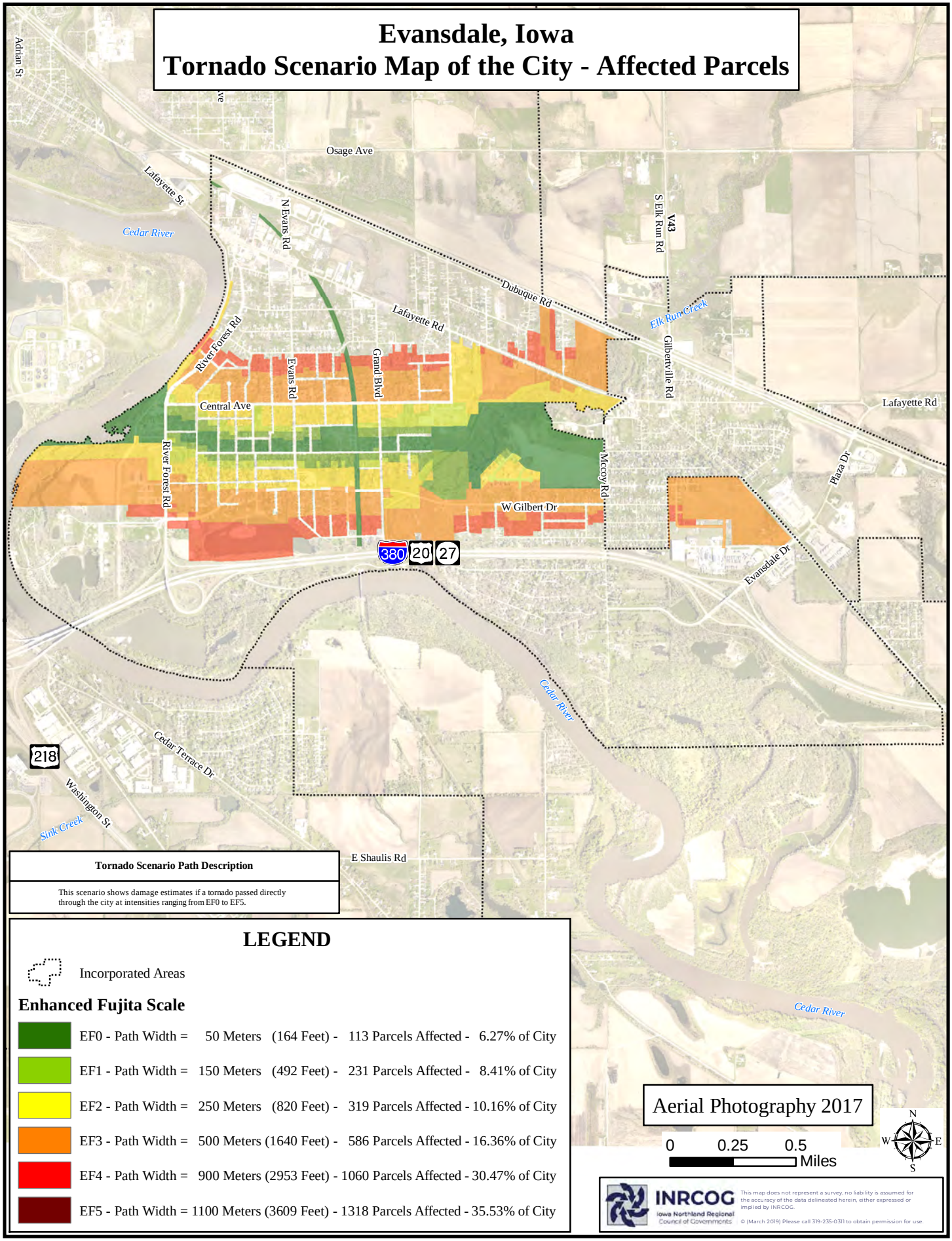
Enhanced Fujita Scale

- EF0 - Path Width = 50 Meters (164 Feet) - 41 Parcels Affected - 9.67% of City
- EF1 - Path Width = 150 Meters (492 Feet) - 69 Parcels Affected - 13.78% of City
- EF2 - Path Width = 250 Meters (820 Feet) - 96 Parcels Affected - 21.00% of City
- EF3 - Path Width = 500 Meters (1640 Feet) - 146 Parcels Affected - 33.69% of City
- EF4 - Path Width = 900 Meters (2953 Feet) - 253 Parcels Affected - 48.21% of City
- EF5 - Path Width = 1100 Meters (3609 Feet) - 312 Parcels Affected - 53.74% of City

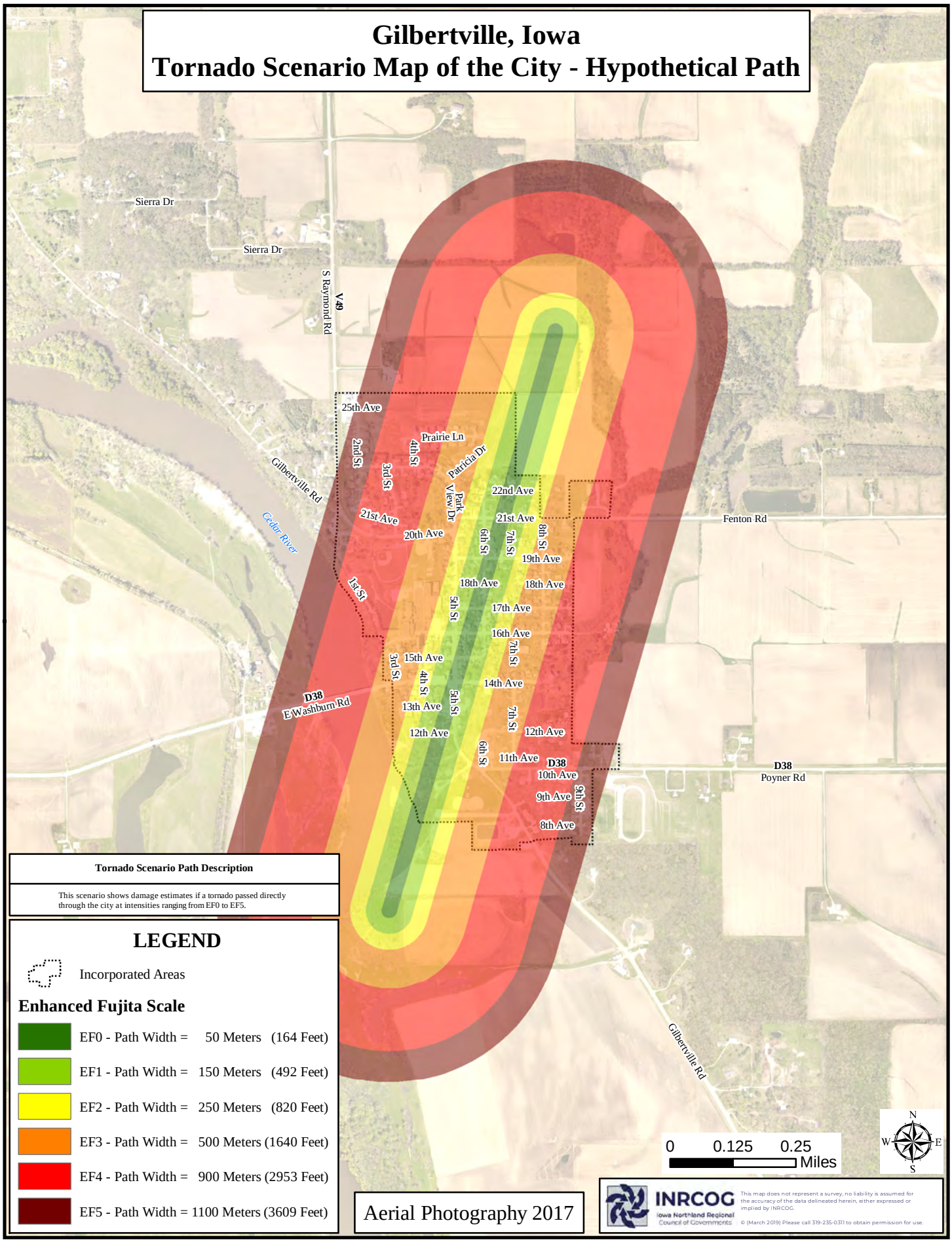

Elk Run Heights, Iowa
Tornado Scenario Map of the City - Hypothetical Path
Osage Rd
S Elk Run Rd
V43
Elk Run Creek
Conard Rd
Heather Ave
Norma Ave
Earl St
Knudson Ave
Kephart Dr
Eldene Ct
Arthur Dr
Lafayette Rd
Gilbertville Rd
Pine Crest Cr
Douglas Rd
Johns Dr
Sutton Ave
Gray St
Dubuque Rd
Mable Ln
Marie Ave
Linda Ave
High St
Jackie Ave
Shirley Ave
Corliss Ln
Dawn Dr
Everette St
Elk Run St
Amber Ln
Plaza Dr
Lafayette Rd
W Central St
Devyn Dr
Taylor Ln
S 8th St
S 7th St
Rosebud St
Timber Creek Ave
Timberline Dr
Sunset Ln
Sunrise Ln
Jakob Ln
Nichol Ave
Kade Ave
Bmc Dr
W Gilbert Dr
E Gilbert Dr
N Burr Oak Ave
2nd Ave
Enid St
Julie St
Toneff Dr
Ann St
James St
Hunter Dr
Jordan Dr
Michigan Dr
Doris Dr
Evansdale Dr
380
20
27
6th St
McCoy Rd
Young Rd
Beverly St
Wilshire St
Elane St
Ray-mar Dr
Doris Ln
Cedar River
Lainee Dr
Waterhawk Rd
Indian Creek Rd
Poyner Creek
0 0.1 0.2 0.3
Miles
N
W
E
S
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
Aerial Photography 2017
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.

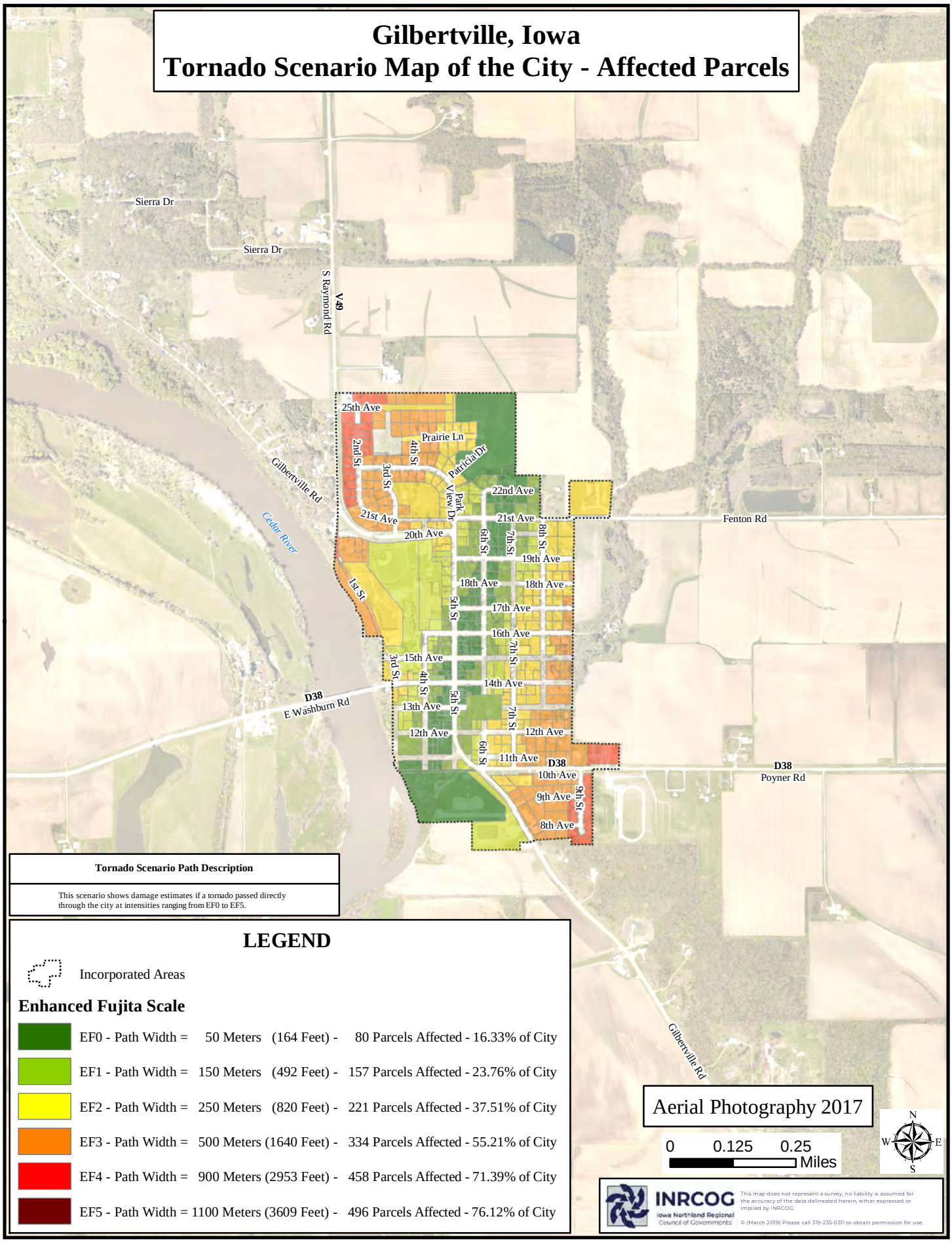

Elk Run Heights, Iowa
Tornado Scenario Map of the City - Affected Parcels
Osage Rd
S Elk Run Rd
V43
Elk Run Creek
Conard Rd
Heather Ave
Norma Ave
Earl St
Knudson Ave
Kephart Dr
Eldene Ct
Arthur Dr
Lafayette Rd
Gilbertville Rd
Pine Crest Cr
Douglas Rd
Johns Dr
Sutton Ave
Gray St
Dubuque Rd
Mable Ln
Marie Ave
Linda Ave
Shirley Ave
High St
Jackie Ave
Corliss Ln
Dawn Dr
Everette St
Marie Ave
Elk Run St
Amber Ln
Plaza Dr
Timber Creek Ave
Timberline Dr
Sunset Ln
Sunrise Ln
Jakob Ln
Nichol Ave
Kade Ave
Hunter Dr
Jordan Dr
Doris Dr
Evansdale Dr
W Gilbert Dr
E Gilbert Dr
Toneff Dr
Ann St
James St
Michigan Dr
Enid St
Julie St
2nd Ave
N Burr Oak Ave
6th St
McCoy Rd
Cedar River
Lainee Dr
Bmc Dr
Lafayette Rd
W Central St
Devyn Dr
Taylor Ln
S 8th St
S 7th St
Rosebud St
Young Rd
Beverly St
Wilshire St
Elaine St
Ray-mar Dr
Doris Ln
Waterhawk Rd
Indian Creek Rd
Poyner Creek
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 62 Parcels Affected - 10.28% of City
EF1 - Path Width = 150 Meters (492 Feet) - 135 Parcels Affected - 13.70% of City
EF2 - Path Width = 250 Meters (820 Feet) - 199 Parcels Affected - 17.62% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 332 Parcels Affected - 27.81% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 444 Parcels Affected - 52.75% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 490 Parcels Affected - 64.77% of City
Aerial Photography 2017
0 0.1 0.2 0.3
Miles
N
W
E
S
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.

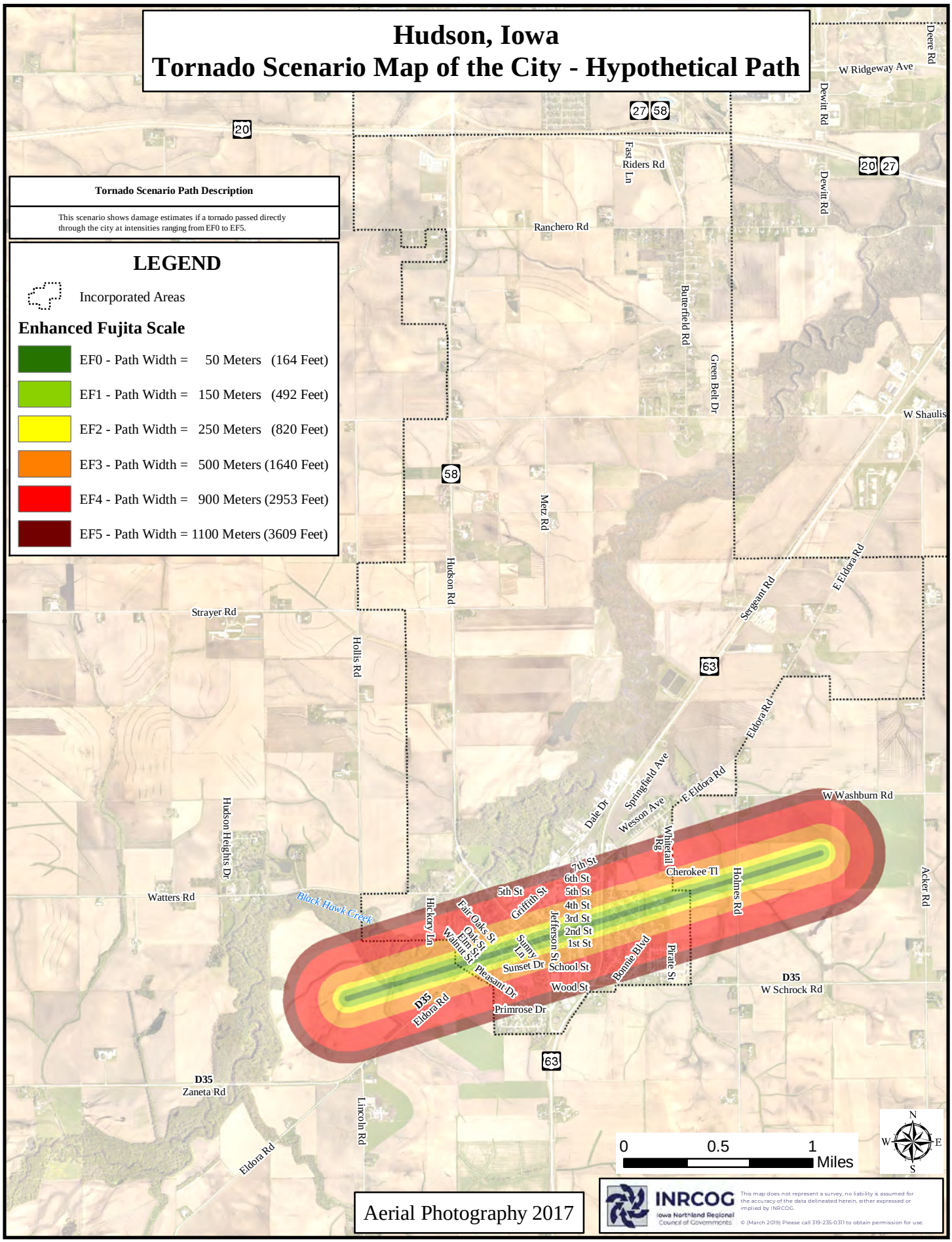

Evansdale, Iowa
Tornado Scenario Map of the City - Hypothetical Path
Adrian St
Bishop Ave
Osage Ave
Lafayette St
Cedar River
N Evans Rd
S Elk Run Rd
V43
Dubuque Rd
Lafayette Rd
Elk Run Creek
River Forest Rd
Evans Rd
Grand Blvd
Gilbertville Rd
Central Ave
Lafayette Rd
River Forest Rd
Mccoy Rd
Plaza Dr
W Gilbert Dr
380
20
27
Evansdale Dr
Cedar River
218
Cedar Terrace Dr
Washington St
Sink Creek
E Shaulis Rd
Cedar River
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
0 0.25 0.5
Miles
N
W
E
S
Aerial Photography 2017
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.

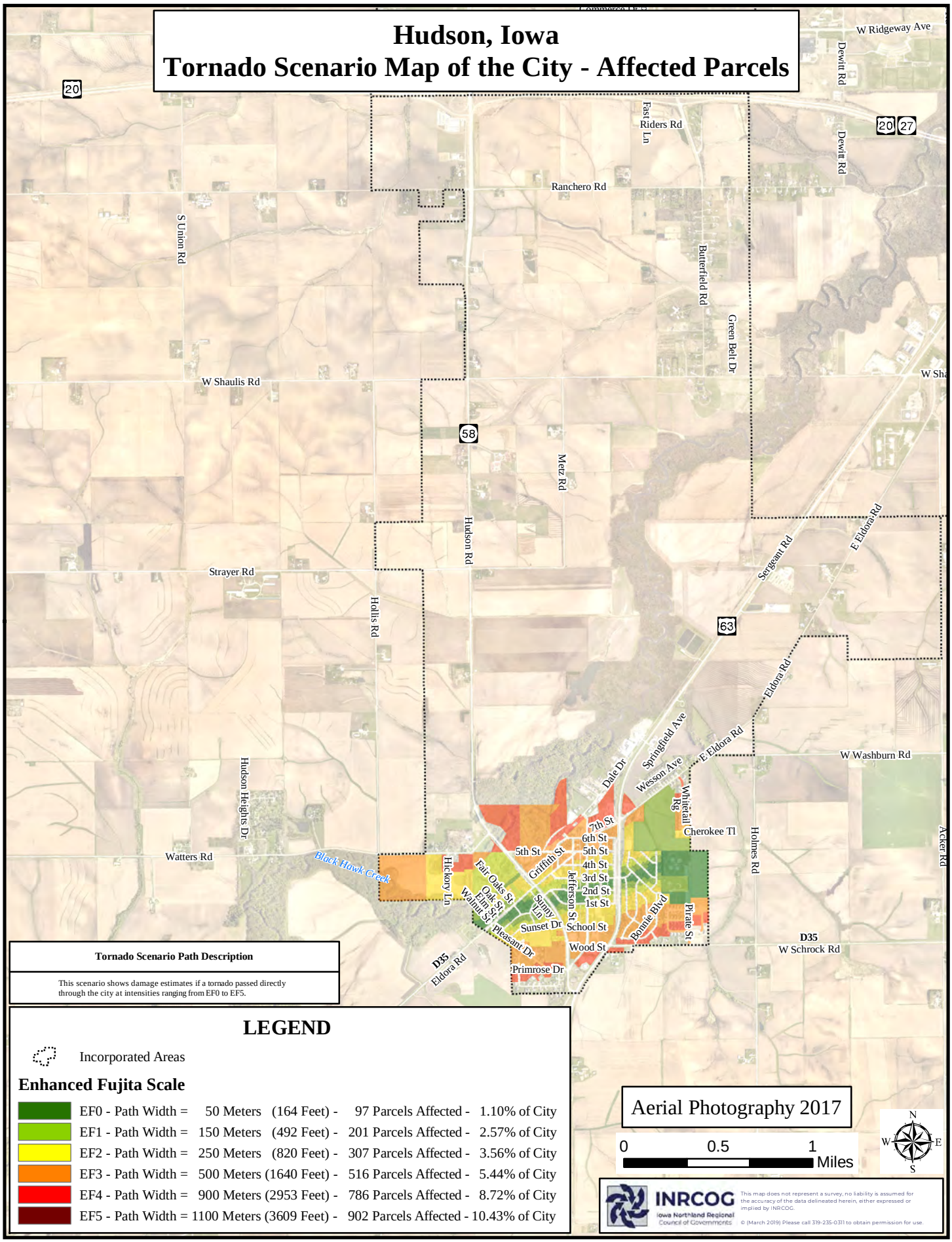

Evansdale, Iowa
Tornado Scenario Map of the City - Affected Parcels
Adrian St
Osage Ave
Lafayette St
Cedar River
N Evans Rd
S Elk Run Rd
V43
Dubuque Rd
Elk Run Creek
Lafayette Rd
River Forest Rd
Evans Rd
Grand Blvd
Central Ave
Gilbertville Rd
Lafayette Rd
River Forest Rd
Mccoy Rd
Plaza Dr
W Gilbert Dr
380
20
27
Evansdale Dr
Cedar River
218
Cedar Terrace Dr
Washington St
Sink Creek
E Shaulis Rd
Cedar River
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 113 Parcels Affected - 6.27% of City
EF1 - Path Width = 150 Meters (492 Feet) - 231 Parcels Affected - 8.41% of City
EF2 - Path Width = 250 Meters (820 Feet) - 319 Parcels Affected - 10.16% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 586 Parcels Affected - 16.36% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 1060 Parcels Affected - 30.47% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 1318 Parcels Affected - 35.53% of City
Aerial Photography 2017
0 0.25 0.5
Miles
N
W
E
S
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.

Gilbertville, Iowa
Tornado Scenario Map of the City - Hypothetical Path

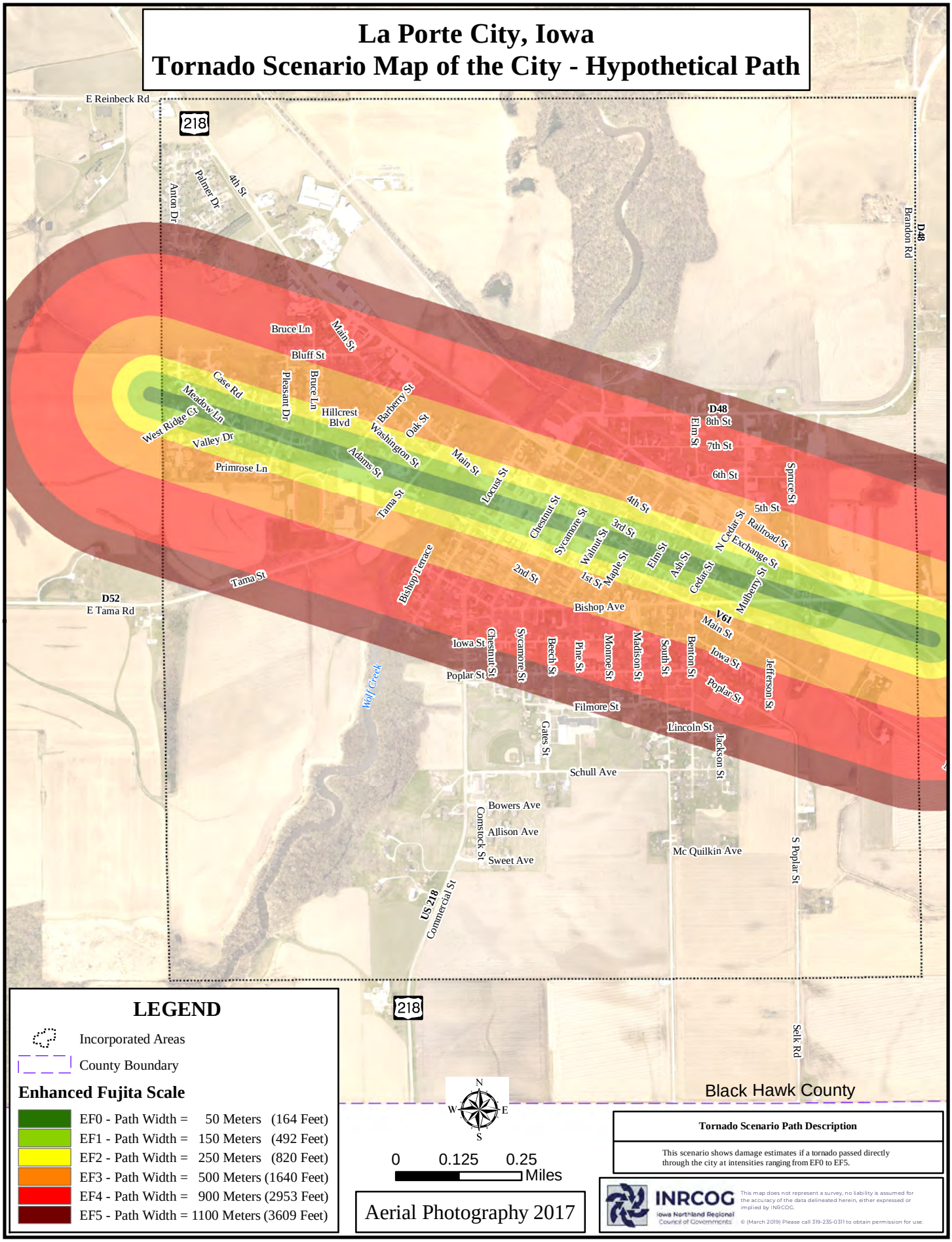



Gilbertville, Iowa
Tornado Scenario Map of the City - Affected Parcels
Sierra Dr
Sierra Dr
S Raymond Rd
V49
Gilbertville Rd
Cedar River
25th Ave
2nd St
4th St
Prairie Ln
Patricia Dr
3rd St
View Dr
Park
22nd Ave
21st Ave
21st Ave
20th Ave
6th St
7th St
8th St
19th Ave
18th Ave
18th Ave
1st St
5th St
17th Ave
16th Ave
7th St
3rd St
15th Ave
4th St
14th Ave
5th St
13th Ave
7th St
12th Ave
12th Ave
6th St
11th Ave
D38
10th Ave
9th Ave
9th St
8th Ave
D38
E Washburn Rd
D38
Poyner Rd
Fenton Rd
Gilbertville Rd
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 80 Parcels Affected - 16.33% of City
EF1 - Path Width = 150 Meters (492 Feet) - 157 Parcels Affected - 23.76% of City
EF2 - Path Width = 250 Meters (820 Feet) - 221 Parcels Affected - 37.51% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 334 Parcels Affected - 55.21% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 458 Parcels Affected - 71.39% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 496 Parcels Affected - 76.12% of City
Aerial Photography 2017
0 0.125 0.25
Miles
N
W
E
S
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.


Hudson, Iowa
Tornado Scenario Map of the City - Hypothetical Path
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
W Ridgeway Ave
Deere Rd
Dewitt Rd
Fast Riders Rd Ln
Ranchero Rd
Butterfield Rd
Green Belt Dr
W Shaulis
Metz Rd
Hudson Rd
Strayer Rd
Hollis Rd
Sergeant Rd
E Eldora Rd
Eldora Rd
Springfield Ave
Dale Dr
Wesson Ave
W Washburn Rd
Whitetail Rg
Cherokee Tl
Holmes Rd
Acker Rd
Hudson Heights Dr
Watters Rd
Black Hawk Creek
Hickory Ln
Fair Oaks St
Oak St
Elm St
Walnut St
Griffith St
5th St
7th St
6th St
5th St
4th St
3rd St
2nd St
1st St
Jefferson St
Sunny Ln
Sunset Dr
School St
Bonnie Blvd
Pirate St
Wood St
Pleasant Dr
Primrose Dr
D35
W Schrock Rd
D35
Eldora Rd
D35
Zaneta Rd
Lincoln Rd
Eldora Rd
20
27
58
63
0 0.5 1 Miles
N
W
E
S
Aerial Photography 2017
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.


Hudson, Iowa
Tornado Scenario Map of the City - Affected Parcels
W Ridgeway Ave
Dewitt Rd
20
Fast Ln
Riders Rd
20 27
Ranchero Rd
S Union Rd
Butterfield Rd
Green Belt Dr
W Shaulis Rd
58
Metz Rd
Hudson Rd
Strayer Rd
Hollis Rd
Sergeant Rd
E Eldora Rd
63
Eldora Rd
Springfield Ave
Wesson Ave
Dale Dr
W Washburn Rd
Hudson Heights Dr
Watters Rd
Black Hawk Creek
Hickory Ln
Fair Oaks St
Oak St
Elm St
Walnut St
Griffith St
Jefferson St
Sunny Ln
Sunset Dr
Pleasant Dr
Primrose Dr
7th St
6th St
5th St
4th St
3rd St
2nd St
1st St
School St
Wood St
Whitetail Rg
Cherokee Tl
Bonnie Blvd
Pirate St
Holmes Rd
Acker Rd
D35
W Schrock Rd
D35
Eldora Rd
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 97 Parcels Affected - 1.10% of City
EF1 - Path Width = 150 Meters (492 Feet) - 201 Parcels Affected - 2.57% of City
EF2 - Path Width = 250 Meters (820 Feet) - 307 Parcels Affected - 3.56% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 516 Parcels Affected - 5.44% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 786 Parcels Affected - 8.72% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 902 Parcels Affected - 10.43% of City
Aerial Photography 2017
0 0.5 1
Miles
N
W
E
S
INROG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.

La Porte City, Iowa
Tornado Scenario Map of the City - Hypothetical Path



LEGEND

Incorporated Areas

County Boundary

Enhanced Fujita Scale

- EF0 - Path Width = 50 Meters (164 Feet)
- EF1 - Path Width = 150 Meters (492 Feet)
- EF2 - Path Width = 250 Meters (820 Feet)
- EF3 - Path Width = 500 Meters (1640 Feet)
- EF4 - Path Width = 900 Meters (2953 Feet)
- EF5 - Path Width = 1100 Meters (3609 Feet)

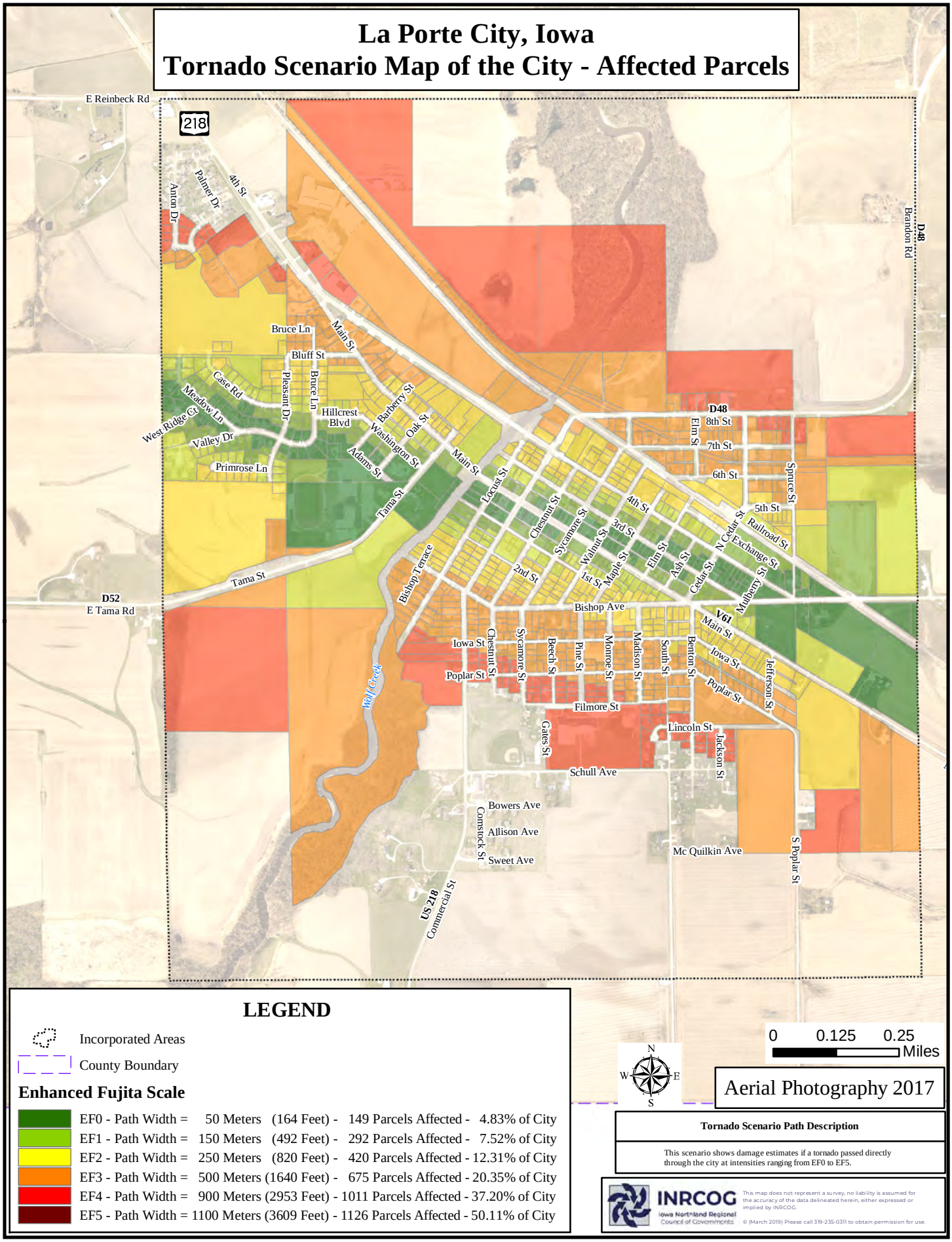
N W E S

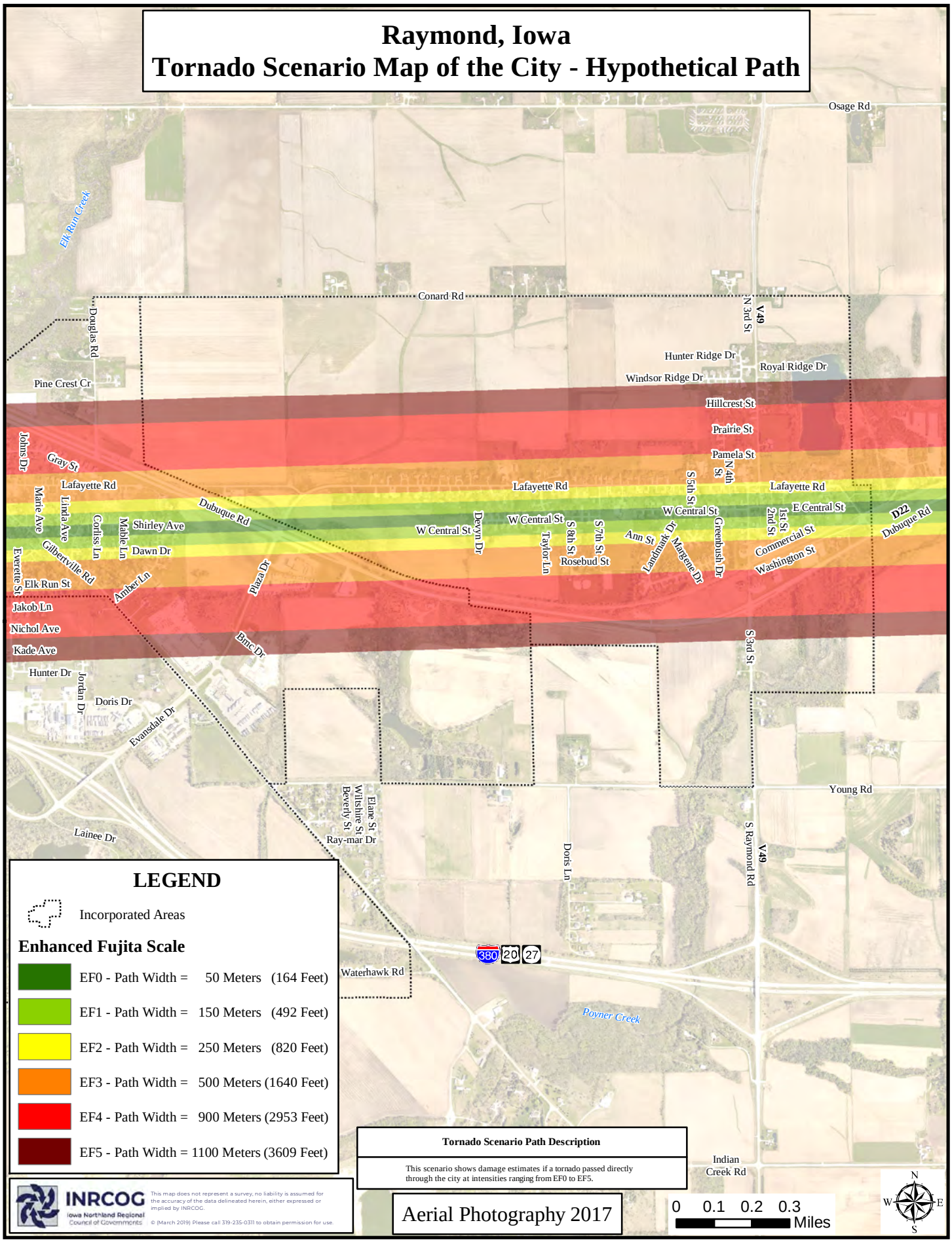
0 0.125 0.25 Miles

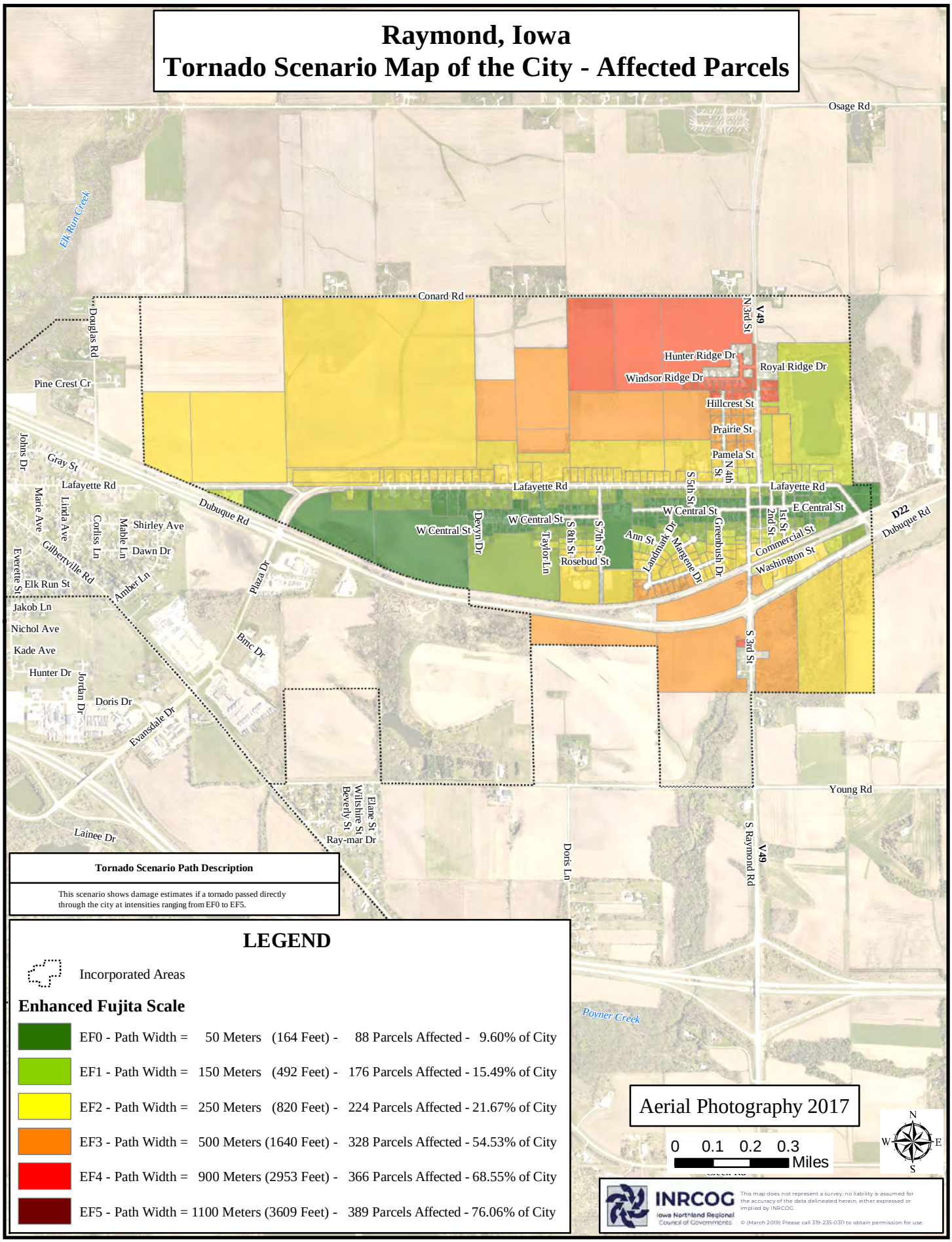
Aerial Photography 2017

Tornado Scenario Path Description

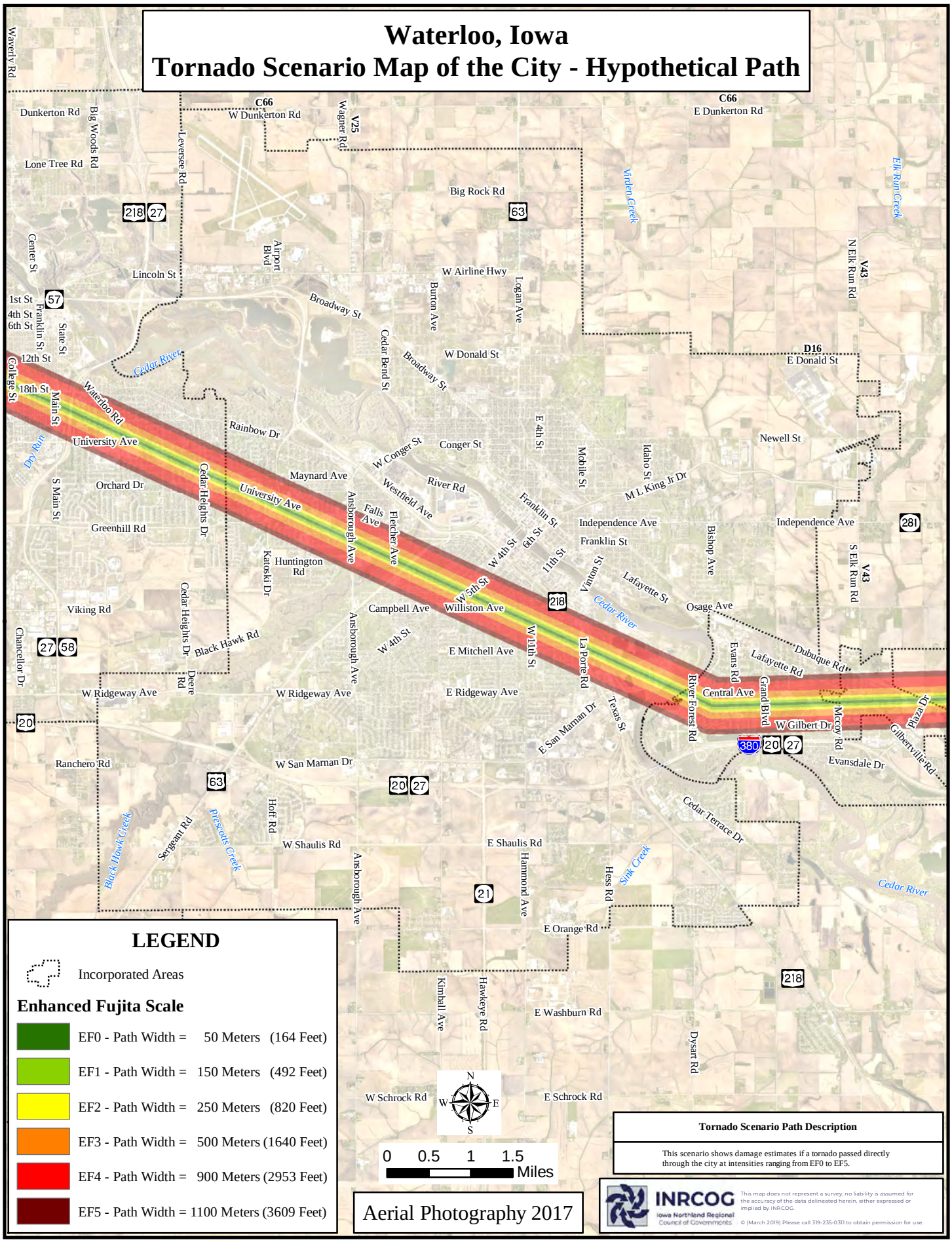
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.


La Porte City, Iowa
Tornado Scenario Map of the City - Affected Parcels
E Reinbeck Rd
218
Anton Dr
Palmer Dr
4th St
Brandon Rd
D48
Bruce Ln
Main St
Bluff St
Case Rd
Meadow Ln
West Ridge Ct
Valley Dr
Primrose Ln
Pleasant Dr
Bruce Ln
Hillcrest Blvd
Barberry St
Oak St
Washington St
Adams St
Main St
Tama St
Locust St
Chestnut St
Sycamore St
Walnut St
Maple St
Elm St
Ash St
Cedar St
Mulberry St
N Cedar St
Exchange St
Railroad St
Spruce St
Elm St
8th St
7th St
6th St
5th St
4th St
3rd St
2nd St
1st St
Bishop Terrace
Bishop Ave
Tama St
D52
E Tama Rd
V61
Main St
Iowa St
Poplar St
Chestnut St
Sycamore St
Beech St
Pine St
Monroe St
Madison St
South St
Benton St
Jefferson St
Wolf Creek
Filmore St
Lincoln St
Gates St
Jackson St
Schull Ave
Bowers Ave
Comstock St
Allison Ave
Sweet Ave
Mc Quilkin Ave
S Poplar St
US 218
Commercial St
LEGEND
Incorporated Areas
County Boundary
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 149 Parcels Affected - 4.83% of City
EF1 - Path Width = 150 Meters (492 Feet) - 292 Parcels Affected - 7.52% of City
EF2 - Path Width = 250 Meters (820 Feet) - 420 Parcels Affected - 12.31% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 675 Parcels Affected - 20.35% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 1011 Parcels Affected - 37.20% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 1126 Parcels Affected - 50.11% of City
N
W
E
S
0 0.125 0.25
Miles
Aerial Photography 2017
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.


Raymond, Iowa
Tornado Scenario Map of the City - Hypothetical Path
Osage Rd
Elk Run Creek
Conard Rd
Douglas Rd
N 3rd St
V49
Hunter Ridge Dr
Royal Ridge Dr
Windsor Ridge Dr
Pine Crest Cr
Hillcrest St
Prairie St
Pamela St
N 4th St
Johns Dr
Gray St
Lafayette Rd
Lafayette Rd
Lafayette Rd
S 5th St
Marie Ave
Linda Ave
Corliss Ln
Mable Ln
Shirley Ave
Dubuque Rd
W Central St
W Central St
W Central St
E Central St
2nd St
1st St
D22
Dubuque Rd
Devyn Dr
S 8th St
S 7th St
Taylor Ln
Ann St
Landmark Dr
Margene Dr
Greenbush Dr
Commercial St
Washington St
Gilbertville Rd
Dawn Dr
Everette St
Elk Run St
Amber Ln
Plaza Dr
Jakob Ln
Nichol Ave
Kade Ave
Bmc Dr
S 33rd St
Hunter Dr
Jordan Dr
Doris Dr
Evansdale Dr
Young Rd
Beverly St
Willshire St
Elane St
Ray-mar Dr
Lainee Dr
Doris Ln
S Raymond Rd
V49
380
20
27
Waterhawk Rd
Poyner Creek
Indian Creek Rd
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
0 0.1 0.2 0.3 Miles
N
W
E
S


Raymond, Iowa
Tornado Scenario Map of the City - Affected Parcels
Osage Rd
Elk Run Creek
Conard Rd
Douglas Rd
Pine Crest Cr
Johns Dr
Gray St
Lafayette Rd
Marie Ave
Linda Ave
Gilbertville Rd
Corliss Ln
Mable Ln
Shirley Ave
Dawn Dr
Everette St
Elk Run St
Jakob Ln
Nichol Ave
Kade Ave
Hunter Dr
Jordan Dr
Doris Dr
Evansdale Dr
Lainee Dr
Amber Ln
Plaza Dr
Bmc Dr
Dubuque Rd
N 3rd St
V49
Hunter Ridge Dr
Windsor Ridge Dr
Royal Ridge Dr
Hillcrest St
Prairie St
Pamela St
N 4th St
S 5th St
W Central St
E Central St
1st St
2nd St
Commercial St
Washington St
D22
Dubuque Rd
Devyn Dr
S 6th St
S 7th St
Taylor Ln
Rosebud St
Ann St
Landmark Dr
Margene Dr
Greenbush Dr
S 3rd St
Young Rd
Beverly St
Willshire St
Elane St
Ray-mar Dr
Doris Ln
S Raymond Rd
V49
Poyner Creek
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 88 Parcels Affected - 9.60% of City
EF1 - Path Width = 150 Meters (492 Feet) - 176 Parcels Affected - 15.49% of City
EF2 - Path Width = 250 Meters (820 Feet) - 224 Parcels Affected - 21.67% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 328 Parcels Affected - 54.53% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 366 Parcels Affected - 68.55% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 389 Parcels Affected - 76.06% of City
Aerial Photography 2017
0 0.1 0.2 0.3
Miles
N
W
E
S
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.

Waterloo, Iowa
Tornado Scenario Map of the City - Hypothetical Path



LEGEND

Incorporated Areas

Enhanced Fujita Scale

- EF0 - Path Width = 50 Meters (164 Feet)
- EF1 - Path Width = 150 Meters (492 Feet)
- EF2 - Path Width = 250 Meters (820 Feet)
- EF3 - Path Width = 500 Meters (1640 Feet)
- EF4 - Path Width = 900 Meters (2953 Feet)
- EF5 - Path Width = 1100 Meters (3609 Feet)

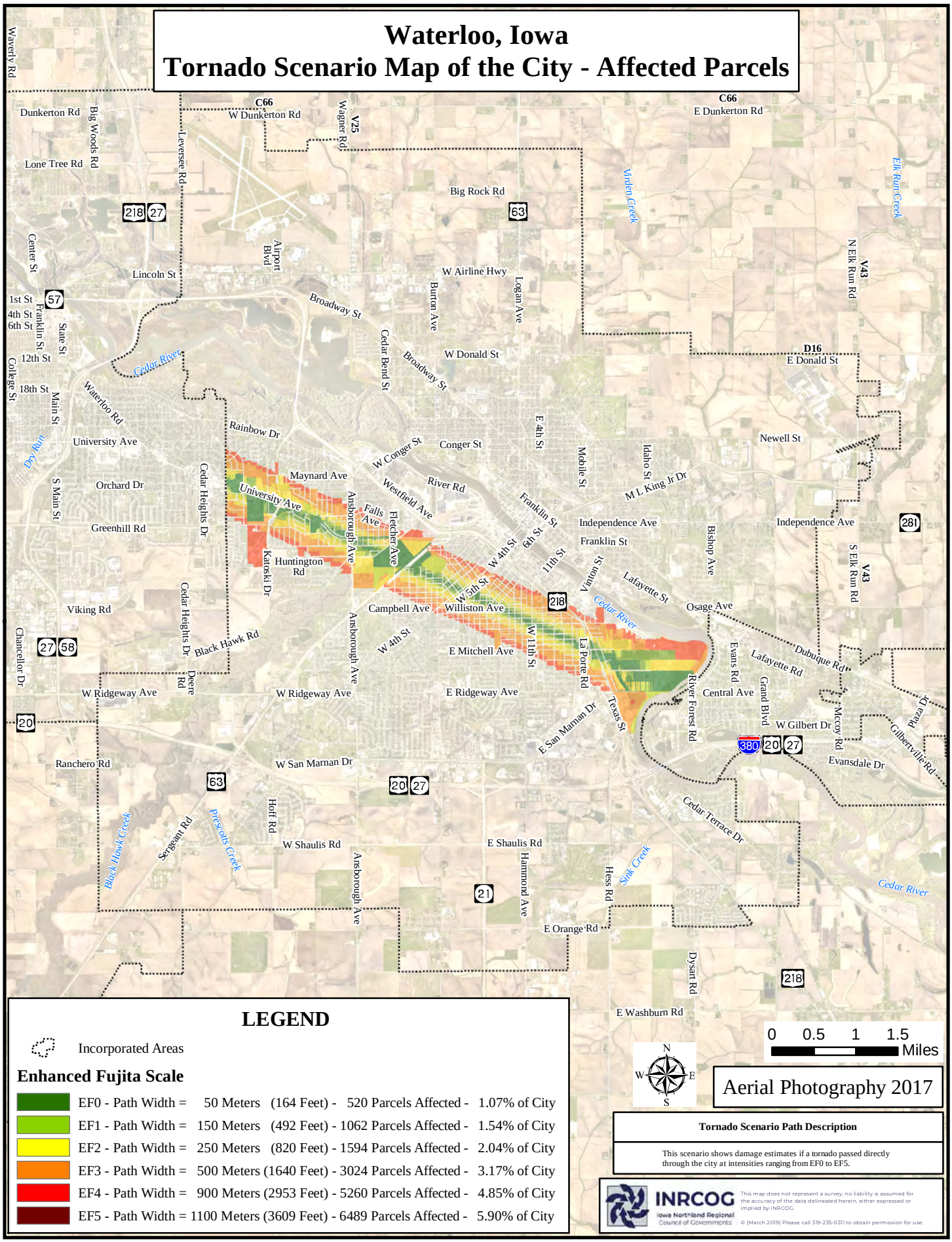
Tornado Scenario Path Description

This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.

Aerial Photography 2017

INRCOG Iowa Northland Regional Council of Governments

Waterloo, Iowa
Tornado Scenario Map of the City - Affected Parcels



LEGEND

Incorporated Areas

Enhanced Fujita Scale

EF0 - Path Width =	50 Meters	(164 Feet) -	520 Parcels Affected -	1.07% of City
EF1 - Path Width =	150 Meters	(492 Feet) -	1062 Parcels Affected -	1.54% of City
EF2 - Path Width =	250 Meters	(820 Feet) -	1594 Parcels Affected -	2.04% of City
EF3 - Path Width =	500 Meters	(1640 Feet) -	3024 Parcels Affected -	3.17% of City
EF4 - Path Width =	900 Meters	(2953 Feet) -	5260 Parcels Affected -	4.85% of City
EF5 - Path Width =	1100 Meters	(3609 Feet) -	6489 Parcels Affected -	5.90% of City

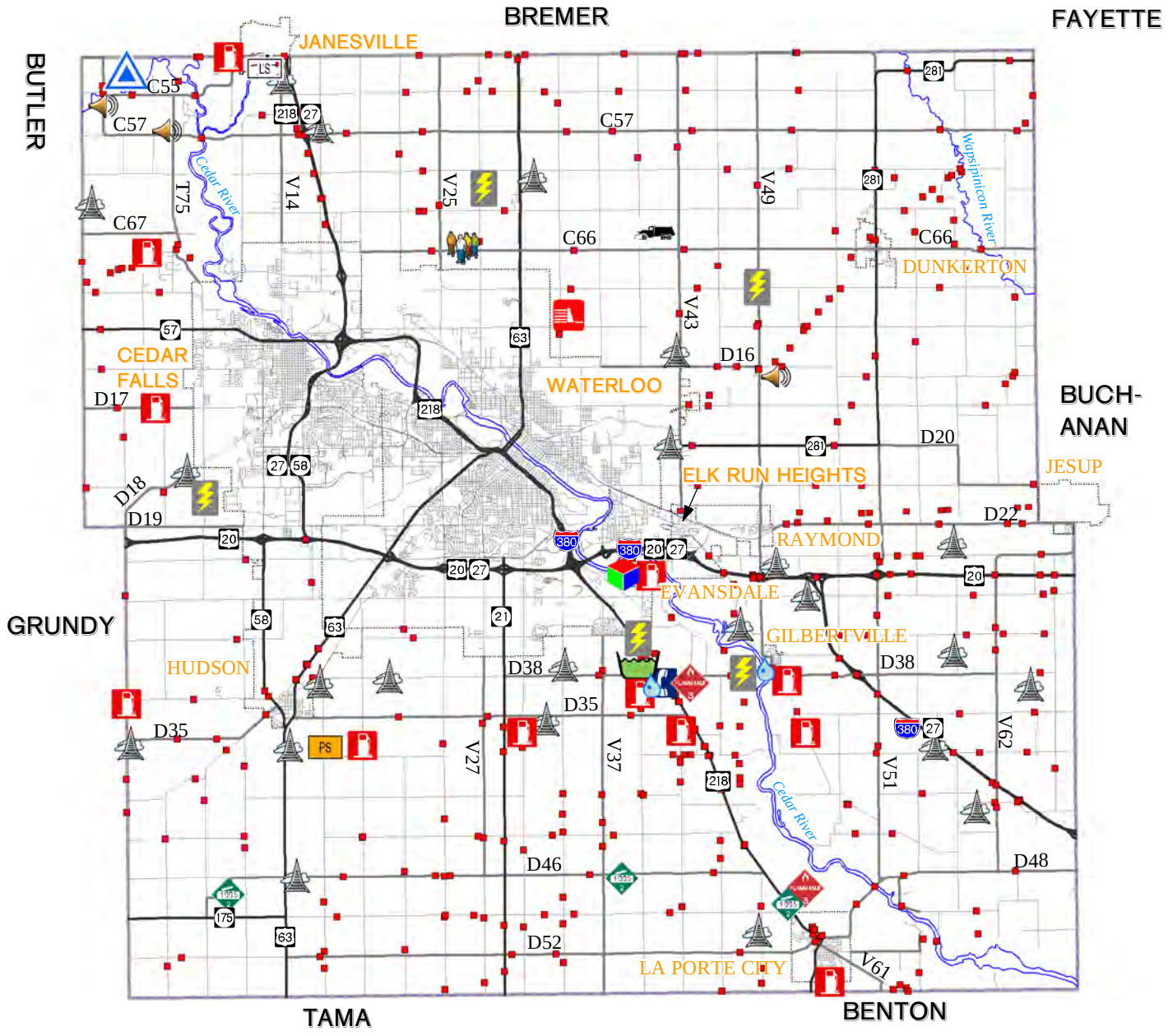
Aerial Photography 2017

Tornado Scenario Path Description

This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.

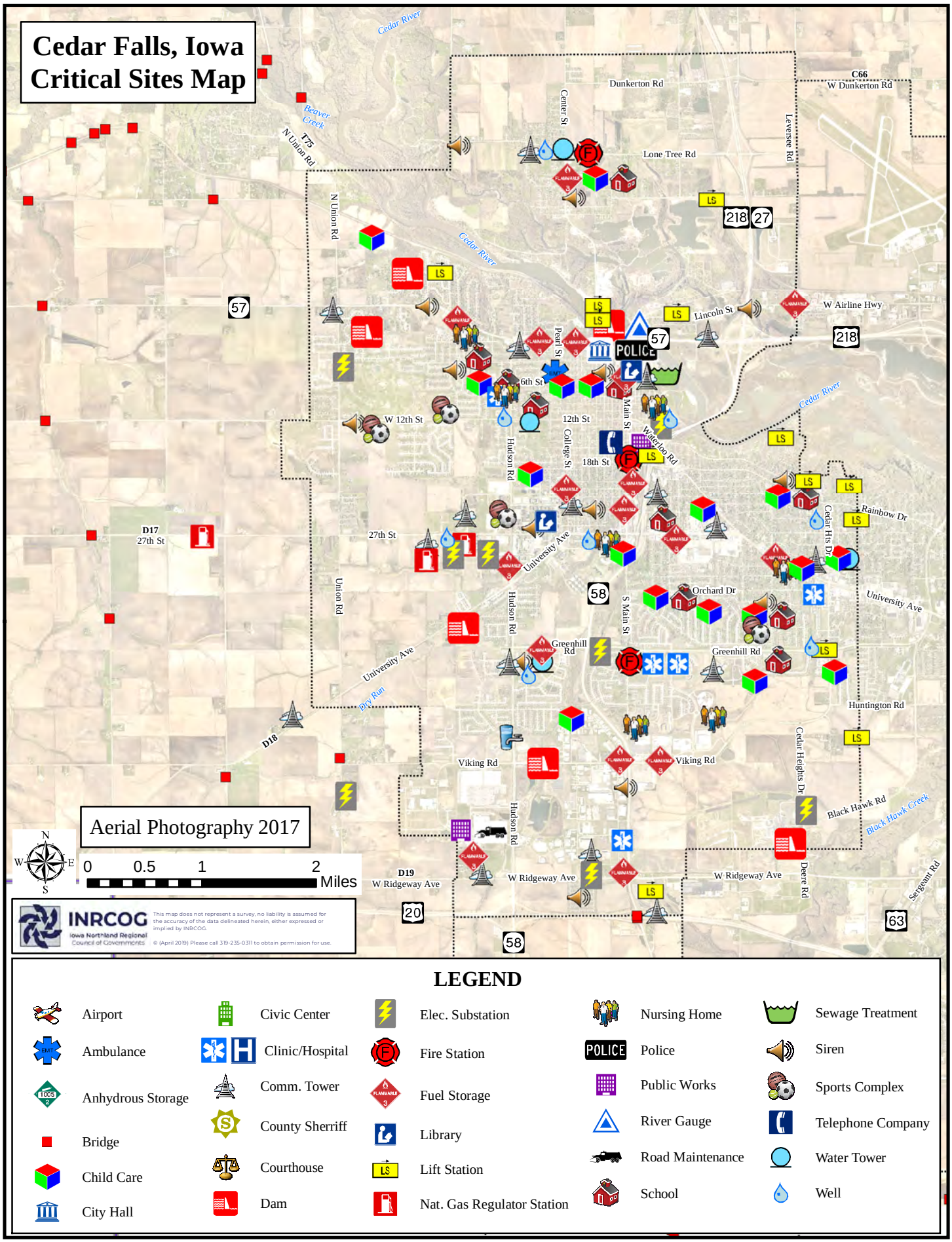
INRCOG Iowa Northland Regional Council of Governments

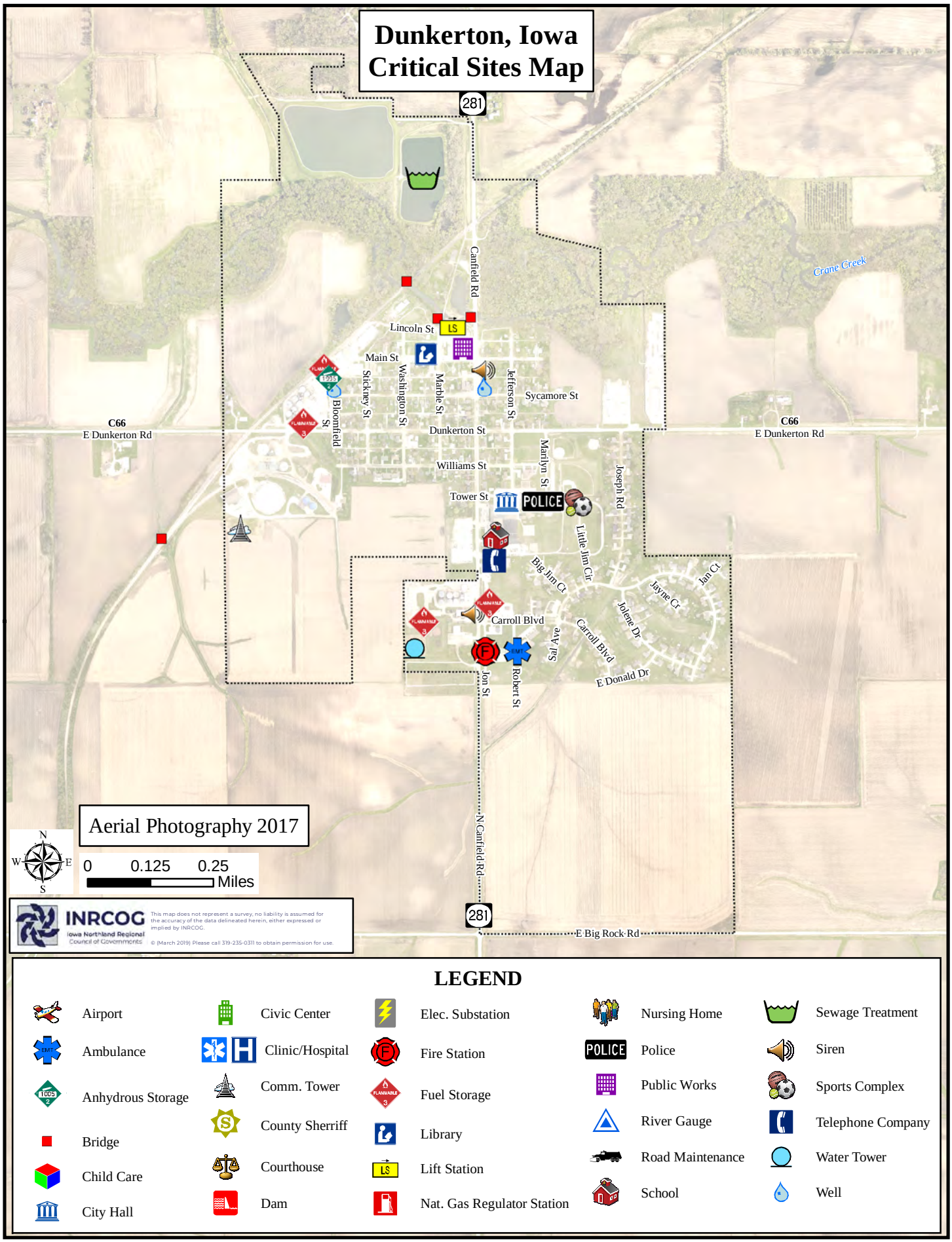
Black Hawk County, Iowa
Critical Sites Map of Unincorporated Areas

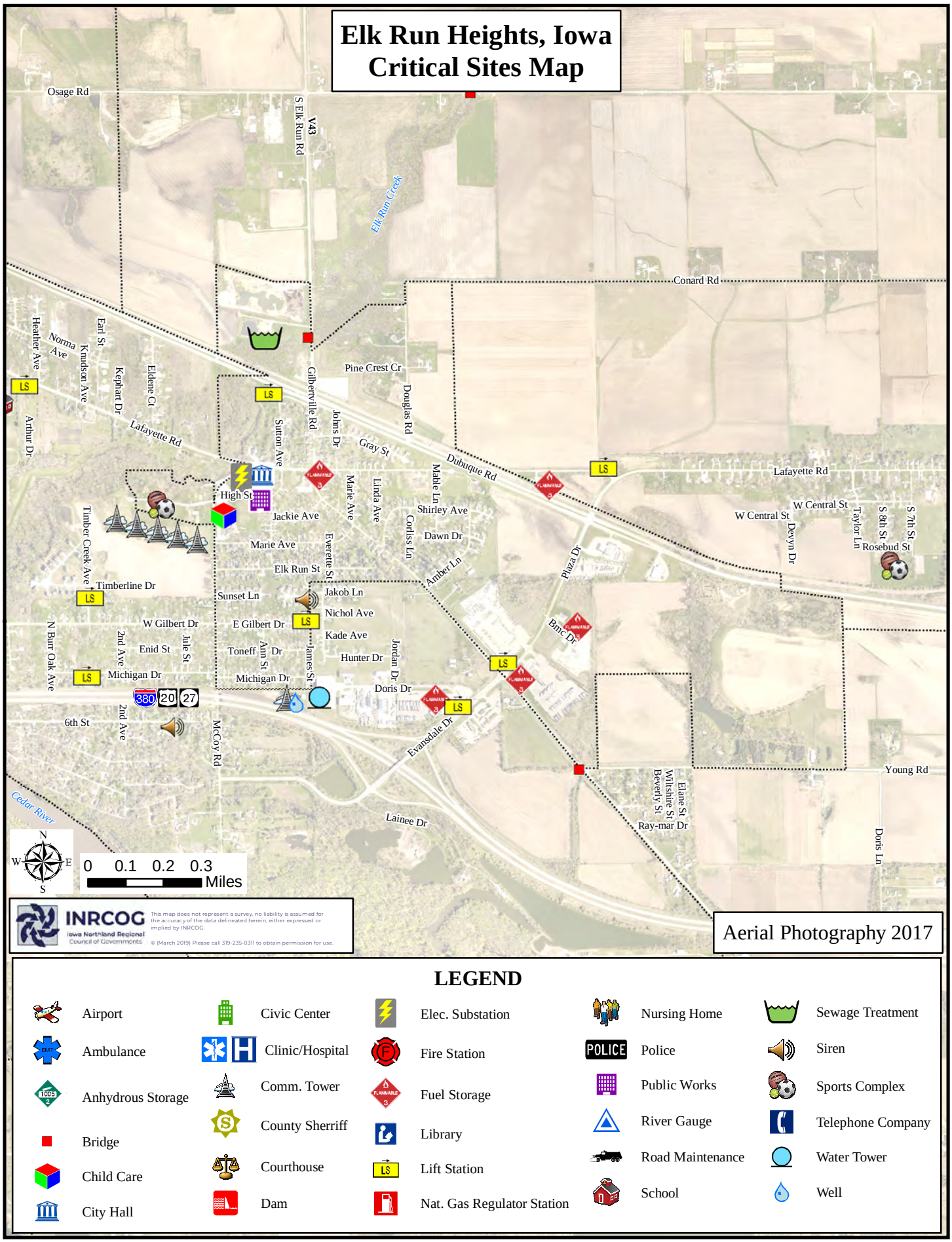


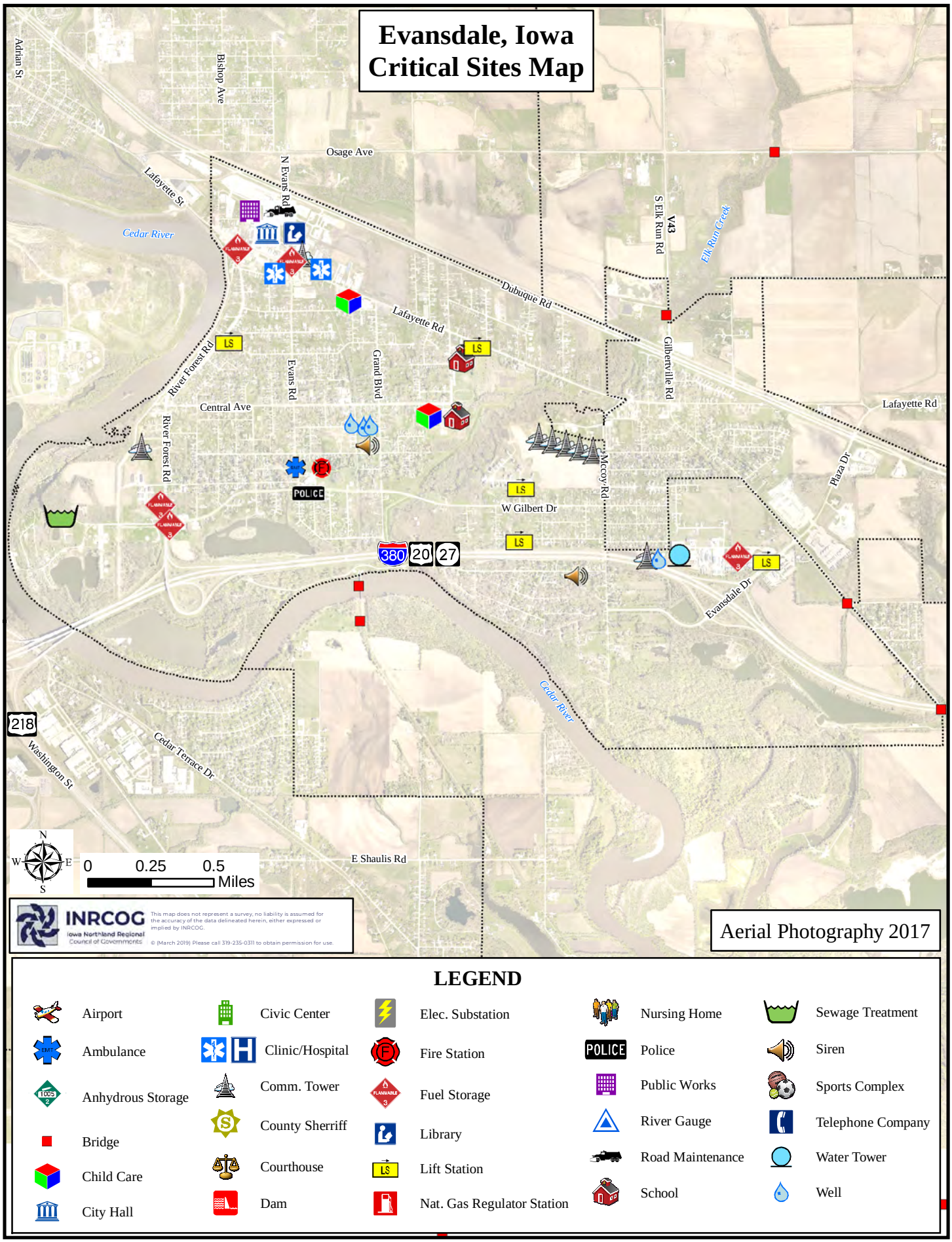
LEGEND

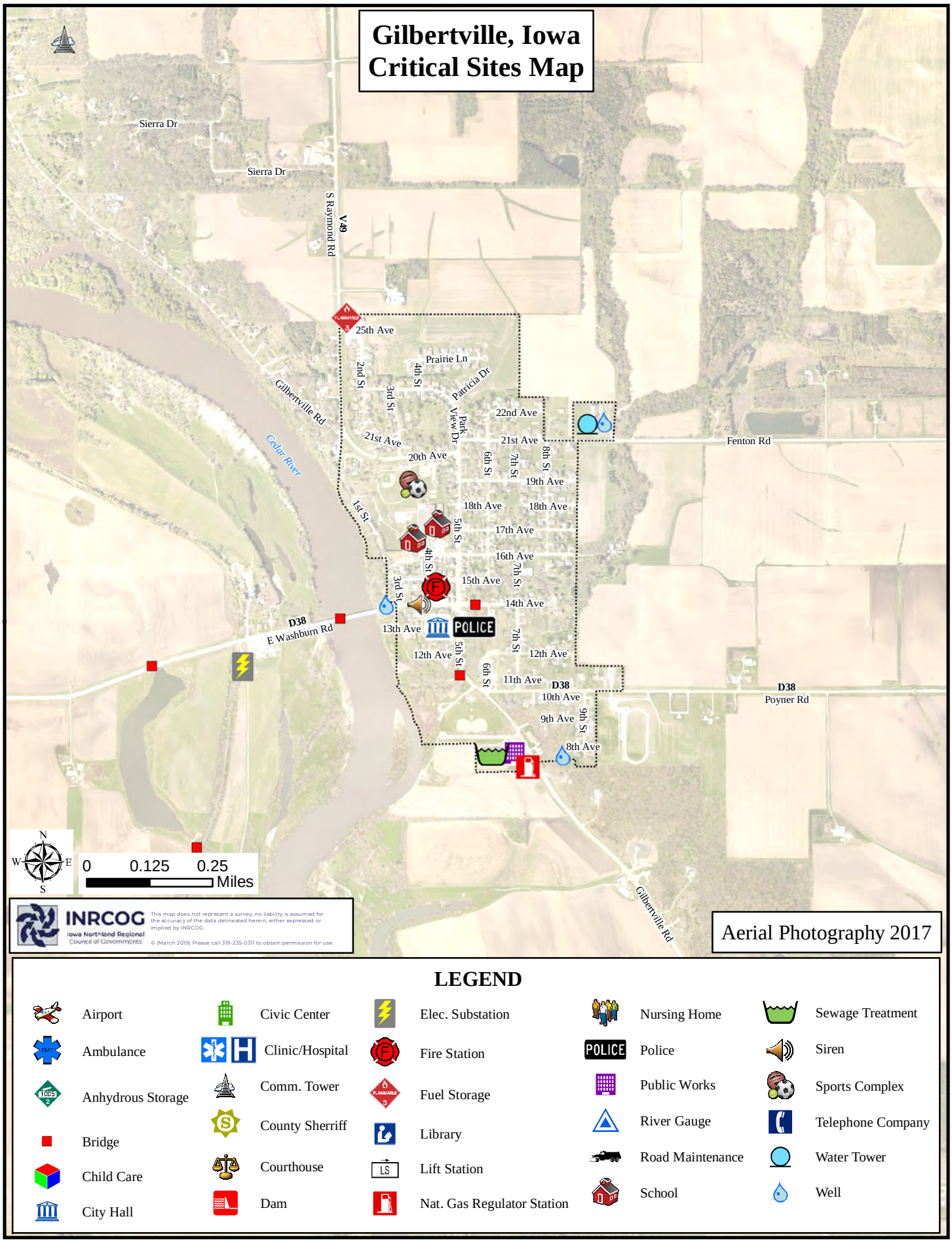
- Airport
- Ambulance
- Anhydrous Storage
- Bridge
- Child Care
- City Hall
- Civic Center
- Clinic/Hospital
- Comm. Tower
- County Sherriff
- Courthouse
- Dam
- Elec. Substation
- Fire Station
- Fuel Storage
- Library
- Lift Station
- Nat. Gas Regulator Station
- Nursing Home
- Police
- Public Works
- River Gauge
- Road Maintenance
- School
- Sewage Treatment
- Siren
- Sports Complex
- Telephone Company
- Water Tower
- Well

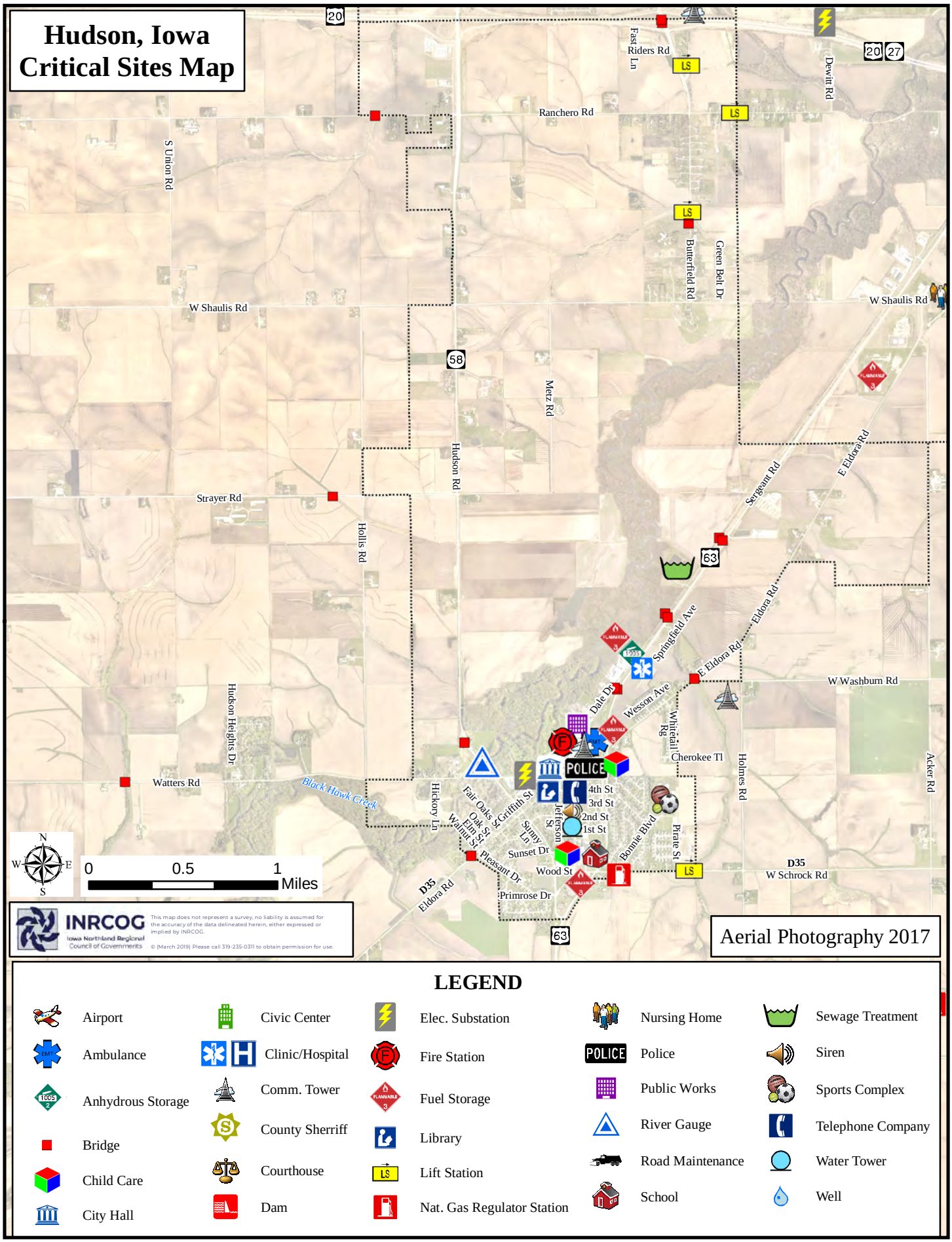

Cedar Falls, Iowa
Critical Sites Map
Aerial Photography 2017
0 0.5 1 2 Miles
N
W
E
S
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (April 2019) Please call 319-235-0311 to obtain permission for use.
Cedar River
Beaver Creek
Dry Run
Black Hawk Creek
Dunkerton Rd
W Dunkerton Rd
C66
Center St
Lone Tree Rd
Leversee Rd
N Union Rd
T75
W Airline Hwy
Lincoln St
Pearl St
6th St
12th St
W 12th St
Main St
Waterloo Rd
College St
Hudson Rd
18th St
Rainbow Dr
Cedar Hts Dr
27th St
D17
University Ave
Union Rd
Orchard Dr
S Main St
Greenhill Rd
Huntington Rd
Viking Rd
Cedar Heights Dr
Black Hawk Rd
D18
D19
W Ridgeway Ave
Deere Rd
Sergeant Rd
POLICE
LS
57
218
27
58
20
63
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sherriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Public Works
River Gauge
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well

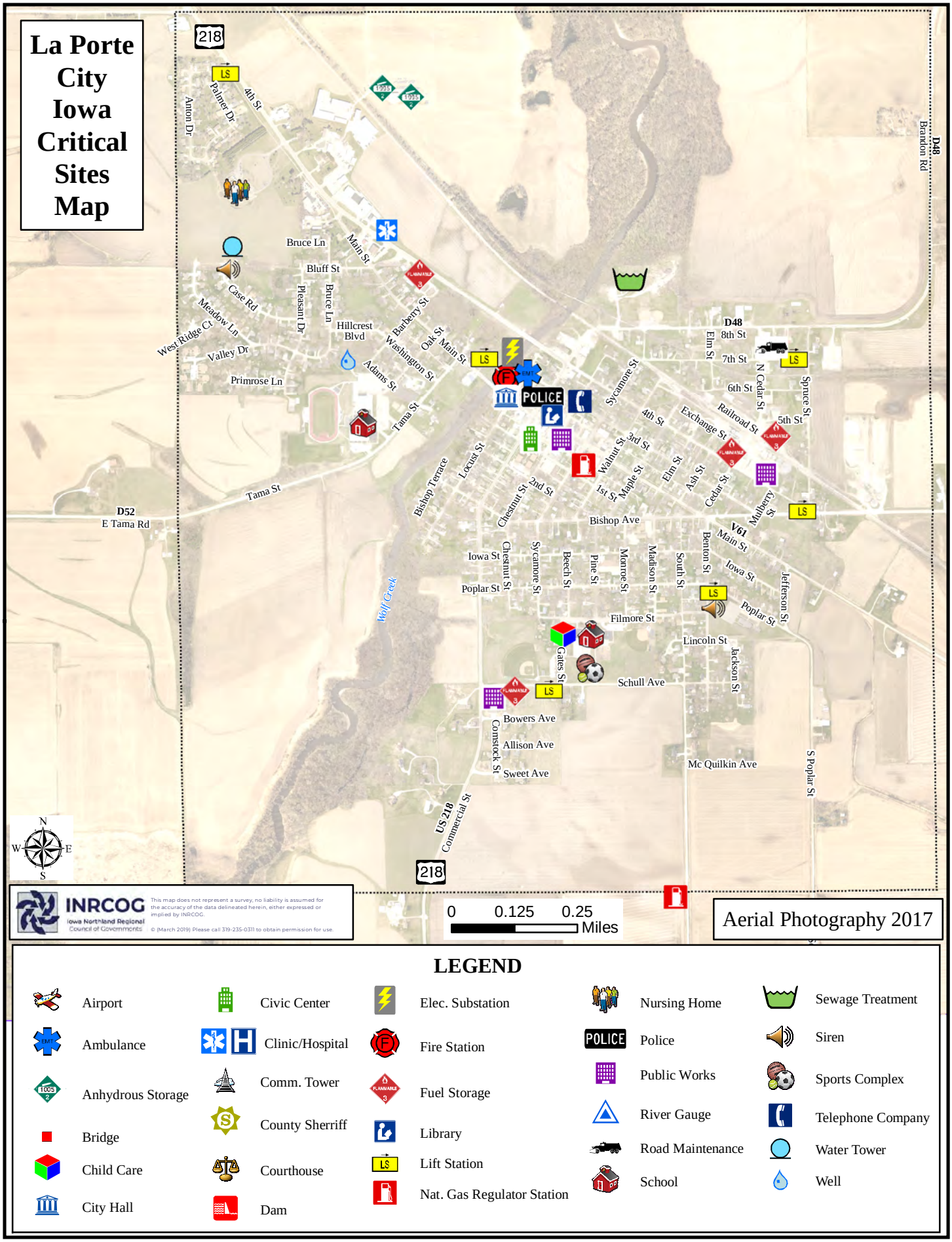

Dunkerton, Iowa
Critical Sites Map
281
Canfield Rd
Crane Creek
Lincoln St
LS
Main St
Stickney St
Washington St
Marble St
Jefferson St
Sycamore St
Bloomfield St
C66
E Dunkerton Rd
Dunkerton St
Williams St
Marilyn St
Joseph Rd
Tower St
POLICE
Little Jim Cir
Big Jim Ct
Jayne Cir
Jan Ct
Carroll Blvd
Jolene Dr
Sal Ave
E Donald Dr
Jon St
Robert St
N Canfield Rd
E Big Rock Rd
Aerial Photography 2017
N
W
E
S
0 0.125 0.25
Miles
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sherriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Public Works
River Gauge
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well

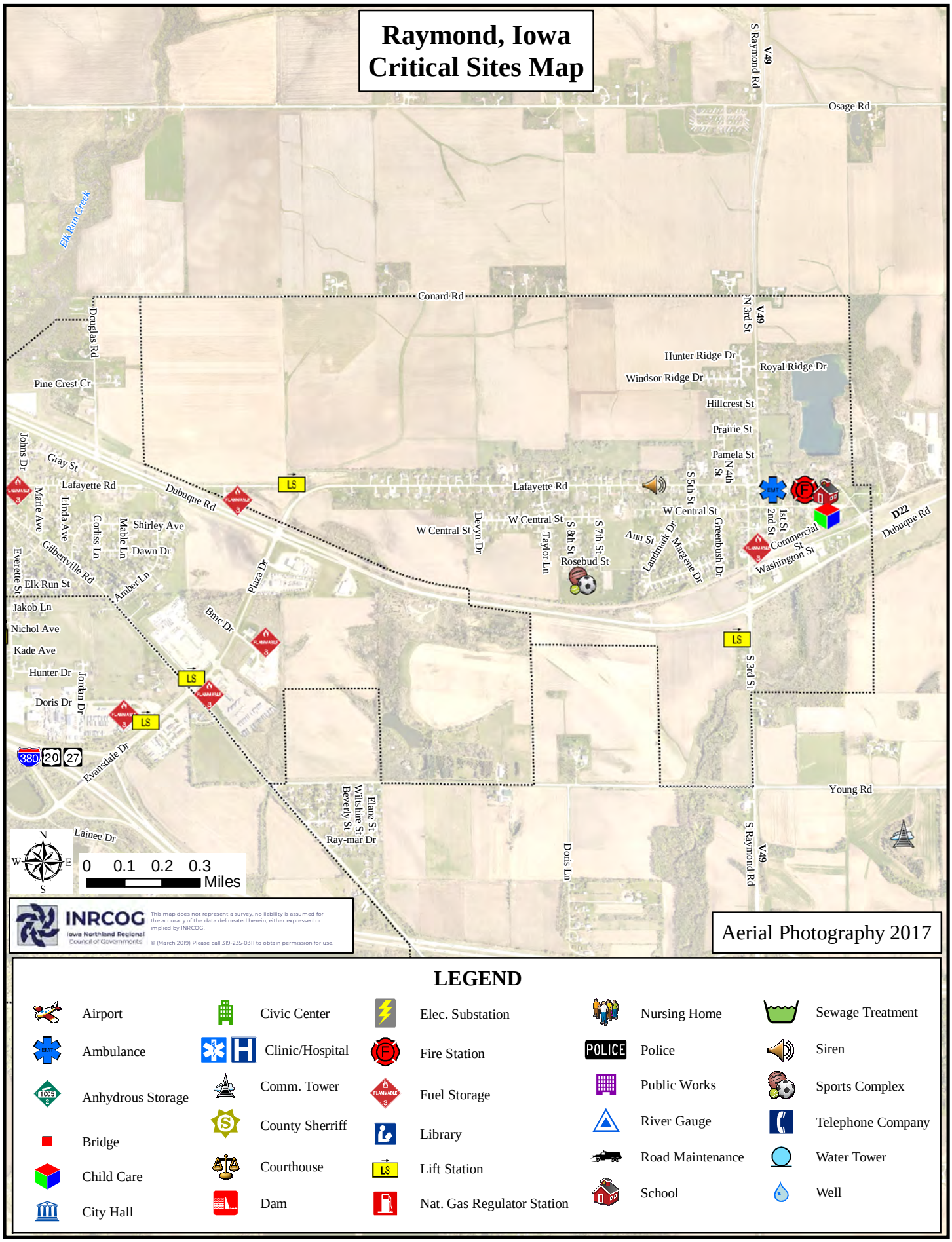

Elk Run Heights, Iowa
Critical Sites Map
Osage Rd
S Elk Run Rd
V43
Elk Run Creek
Conard Rd
Heather Ave
Norma Ave
Earl St
Knudson Ave
Kephart Dr
Eldene Ct
Arthur Dr
Lafayette Rd
Pine Crest Cr
Gilbertville Rd
Douglas Rd
Johns Dr
Sutton Ave
Gray St
Dubuque Rd
High St
Jackie Ave
Marie Ave
Linda Ave
Mable Ln
Shirley Ave
Corliss Ln
Dawn Dr
Everette St
Elk Run St
Amber Ln
Plaza Dr
Timber Creek Ave
Timberline Dr
Sunset Ln
Jakob Ln
Nichol Ave
Kade Ave
Hunter Dr
Jordan Dr
Doris Dr
Evansdale Dr
W Gilbert Dr
E Gilbert Dr
Enid St
Julie St
Toneff Dr
Ann St
James St
Michigan Dr
N Burr Oak Ave
2nd Ave
6th St
McCoy Rd
Cedar River
Lainee Dr
Bmc Dr
Lafayette Rd
W Central St
Devyn Dr
Taylor Ln
S 8th St
S 7th St
Rosebud St
Young Rd
Beverly St
Wilshire St
Elaine St
Ray-mar Dr
Doris Ln
380
20
27
LS
N
S
E
W
0 0.1 0.2 0.3 Miles
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sherriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Public Works
River Gauge
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well

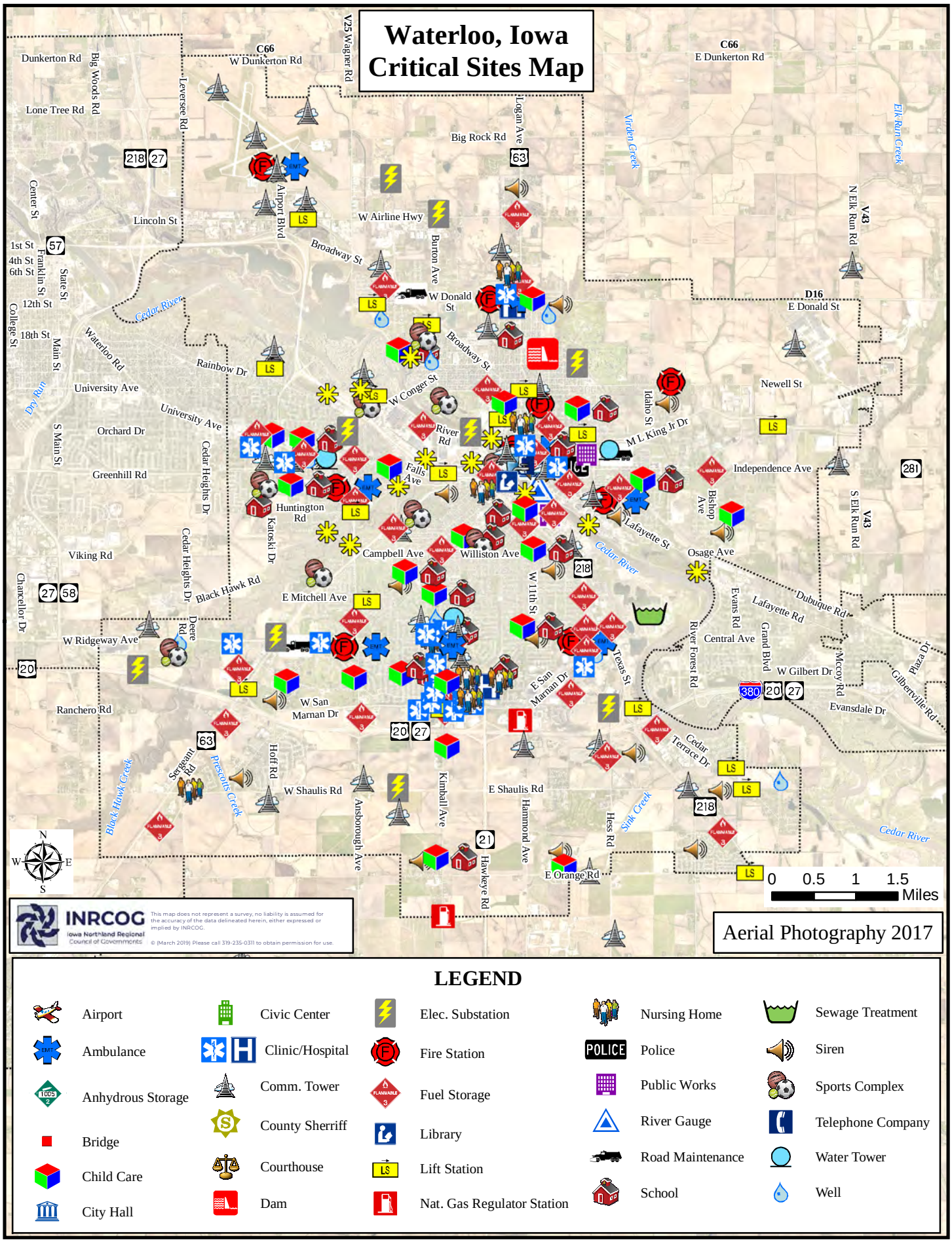

Evansdale, Iowa
Critical Sites Map
Adrian St
Bishop Ave
Osage Ave
N Evans Rd
Lafayette St
Cedar River
Dubuque Rd
Lafayette Rd
S Elk Run Rd
V43
Elk Run Creek
Gilbertville Rd
River Forest Rd
Evans Rd
Grand Blvd
Central Ave
Lafayette Rd
Plaza Dr
Mccoy Rd
W Gilbert Dr
POLICE
LS
380
20
27
Evansdale Dr
Cedar River
218
Washington St
Cedar Terrace Dr
E Shaulis Rd
N
W
E
S
0
0.25
0.5
Miles
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sherriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Public Works
River Gauge
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well


Gilbertville, Iowa
Critical Sites Map
Sierra Dr
Sierra Dr
S Raymond Rd
V49
25th Ave
Prairie Ln
2nd St
4th St
3rd St
Patricia Dr
Park View Dr
Gilbertville Rd
Cedar River
22nd Ave
21st Ave
21st Ave
20th Ave
6th St
7th St
8th St
19th Ave
Fenton Rd
1st St
18th Ave
18th Ave
5th St
17th Ave
4th St
16th Ave
7th St
3rd St
15th Ave
14th Ave
D38
E Washburn Rd
13th Ave
POLICE
7th St
5th St
12th Ave
12th Ave
6th St
11th Ave
D38
10th Ave
9th Ave
9th St
8th Ave
D38
Poyner Rd
Gilbertville Rd
N
W
E
S
0
0.125
0.25
Miles
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sherriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Public Works
River Gauge
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well


Hudson, Iowa
Critical Sites Map
20
Fast Riders Rd
LS
Dewitt Rd
20
27
Ranchero Rd
S Union Rd
LS
Butterfield Rd
Green Belt Dr
W Shaulis Rd
W Shaulis Rd
58
Metz Rd
Hudson Rd
Strayer Rd
Hollis Rd
Sergeant Rd
E Eldora Rd
63
Springfield Ave
Eldora Rd
E Eldora Rd
W Washburn Rd
Dale Dr
Wesson Ave
Whitetail Rg
Cherokee Tl
Holmes Rd
Acker Rd
Hudson Heights Dr
Watters Rd
Black Hawk Creek
Hickory Ln
Fair Oaks Dr
Griffith St
Oak St
Elm St
Walnut St
POLICE
4th St
3rd St
2nd St
1st St
Jefferson St
Sunny Ln
Sunset Dr
Wood St
Pleasant Dr
Primrose Dr
Bonnie Blvd
Pirate St
LS
D35
W Schrock Rd
D35
Eldora Rd
63
N
W
E
S
0
0.5
1
Miles
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sherriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
POLICE
Police
Public Works
River Gauge
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well


La Porte City Iowa Critical Sites Map
218
LS
Anton Dr
Palmer Dr
4th St
Bruce Ln
Main St
Bluff St
Case Rd
Meadow Ln
West Ridge Ct
Valley Dr
Primrose Ln
Pleasant Dr
Bruce Ln
Hillcrest Blvd
Barberry St
Washington St
Oak St
Main St
Adams St
Tama St
D52
E Tama Rd
Bishop Terrace
Locust St
Chestnut St
2nd St
1st St
Maple St
Walnut St
3rd St
4th St
Sycamore St
Railroad St
Exchange St
Elm St
Ash St
Cedar St
Mulberry St
Bishop Ave
D48
8th St
7th St
6th St
5th St
N Cedar St
Spruce St
Elm St
Brandon Rd
V61
Main St
Iowa St
Poplar St
Benton St
South St
Madison St
Monroe St
Pine St
Beech St
Sycamore St
Chestnut St
Jefferson St
Wolf Creek
Filmore St
Lincoln St
Gates St
Jackson St
Schull Ave
Bowers Ave
Allison Ave
Sweet Ave
Comstock St
Mc Quilkin Ave
S Poplar St
US 218
Commercial St
POLICE
N
W
E
S
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
0 0.125 0.25
Miles
Aerial Photography 2017
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sherriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Public Works
River Gauge
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well


Raymond, Iowa
Critical Sites Map
S Raymond Rd
V49
Osage Rd
Elk Run Creek
Conard Rd
Douglas Rd
N 3rd St
Hunter Ridge Dr
Windsor Ridge Dr
Royal Ridge Dr
Pine Crest Cr
Hillcrest St
Prairie St
Pamela St
Johns Dr
Gray St
Lafayette Rd
Dubuque Rd
Marie Ave
Linda Ave
Corliss Ln
Mable Ln
Shirley Ave
Dawn Dr
Gilbertville Rd
Everette St
Elk Run St
Amber Ln
Jakob Ln
Nichol Ave
Kade Ave
Hunter Dr
Doris Dr
Jordan Dr
Plaza Dr
Bmc Dr
Evansdale Dr
Lainee Dr
W Central St
Devyn Dr
S 8th St
S 7th St
Taylor Ln
Rosebud St
Ann St
Landmark Dr
Margene Dr
Greenbush Dr
S 5th St
N 4th St
1st St
2nd St
Commercial St
Washington St
D22
S 3rd St
Young Rd
Beverly St
Willshire St
Elane St
Ray-mar Dr
Doris Ln
LS
380
20
27
N
W
E
S
0 0.1 0.2 0.3 Miles
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sherriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Public Works
River Gauge
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well


Waterloo, Iowa
Critical Sites Map
Dunkerton Rd
Big Woods Rd
Lone Tree Rd
C66
W Dunkerton Rd
V25 Wagner Rd
Leversee Rd
Logan Ave
Big Rock Rd
Virden Creek
Elk Run Creek
C66
E Dunkerton Rd
218
27
63
Center St
Lincoln St
Airport Blvd
W Airline Hwy
Burton Ave
N Elk Run Rd
V43
1st St
4th St
6th St
12th St
18th St
57
Franklin St
State St
College St
Main St
Broadway St
W Donald St
D16
E Donald St
Cedar River
Waterloo Rd
Rainbow Dr
W Conger St
Idaho St
M L King Jr Dr
Newell St
Dry Run
University Ave
Orchard Dr
S Main St
River Rd
Falls Ave
Independence Ave
281
Greenhill Rd
Cedar Heights Dr
Huntington Rd
Katoski Dr
Bishop Ave
S Elk Run Rd
Lafayette St
Campbell Ave
Williston Ave
Osage Ave
Viking Rd
Black Hawk Rd
E Mitchell Ave
W 11th St
Dubuque Rd
Lafayette Rd
Chancellor Dr
27
58
Deere Rd
W Ridgeway Ave
Evans Rd
Central Ave
Grand Blvd
River Forest Rd
W Gilbert Dr
Mccoy Rd
Plaza Dr
Gilbertville Rd
20
380
Texas St
E San Marnan Dr
W San Marnan Dr
Evansdale Dr
Ranchero Rd
Cedar Terrace Dr
Sergeant Rd
Prescotts Creek
Hoff Rd
W Shaulis Rd
E Shaulis Rd
Kimball Ave
Ansborough Ave
Hammond Ave
Hess Rd
Sink Creek
Black Hawk Creek
21
Hawkeye Rd
E Orange Rd
Cedar River
N
W
E
S
0 0.5 1 1.5
Miles
INRCOG
Iowa Northland Regional Council of Governments
This map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
© (March 2019) Please call 319-235-0311 to obtain permission for use.
Aerial Photography 2017
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sherriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Public Works
River Gauge
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well

APPENDIX K: PLAN ADOPTION RESOLUTIONS

AGENDA FOR THE REGULAR SESSION OF THE BLACK HAWK COUNTY BOARD OF SUPERVISORS, WATERLOO, IOWA; TO BE HELD AT 9:00 A.M. IN THE FRANK MAGSAMEN BOARD ROOM #201 OF THE BLACK HAWK COUNTY COURTHOUSE

April 14, 2020

Black Hawk County – Governing for the Future

2028 Vision

Black Hawk County government is transforming itself with new capabilities for effective service to our citizens and greater-good decision making throughout the organization. We stay current with advances in technology and government to assure the best possible service to the public. We work in a culture of collaboration, learning from others' successes, and together, we anticipate and adapt to rapidly changing circumstances and demographics, both globally and locally. With others throughout our county and region, we form a safe, thriving community.

Motivating Values - Black Hawk County is committed to being:
Effective Responsible Collaborative Efficient Innovative Adaptable

Vision Elements in a Rapidly Changing Future- Black Hawk County Government will strive to:
Build Desirable Communities
Promote Economic Vitality
Achieve Environmental Sustainability
Apply Technology to Serve
Work Together

Revised by the Black Hawk County Board of Supervisors on November 26, 2013

GENERAL RULES FOR PUBLIC PARTICIPATION

1. You may address any item on the agenda by stepping up to the podium. After recognition by the Chair, state your name, address and group affiliation (if appropriate) and speak clearly into the microphone.
2. You may speak one (1) time per agenda item for a maximum of three (3) minutes.
3. The "Public Comments" section of the agenda is your opportunity to address items not on the agenda. A speaker may speak on one (1) issue per meeting for a maximum of three (3) minutes. Official action cannot be taken by the Board at that time, but may be placed on a future agenda or referred to the appropriate department.
4. Keep comments germane and refrain from personal, impertinent or slanderous remarks.
5. Questions concerning these rules or any agenda item may be directed to the Board Office at 319-833-3003.
6. Please turn cell phones off during the board meeting.

EQUAL HOUSING OPPORTUNITY

NOTICE: In accordance with Governor Reynolds' 3/17/2020 Public Health Disaster Emergency proclamation, the total number of attendees at this meeting may not exceed ten (10) persons, including the Board of Supervisors, County Auditor, Assistant County Attorney, Finance Director, and media persons. Because of this strict limitation, others who wish to join the meeting are encouraged to do so via Zoom using the following login information:

Join Zoom Meeting
https://zoom.us/j/869815746?pwd=ZE9kSG1RVnF2RUNjVkl1Z3VLZXo0dz09

Meeting ID: 869 815 746
Password: 027771
One tap mobile
+13126266799,,869815746#,,#,027771# US (Chicago)
+16465588656,,869815746#,,#,027771# US (New York)

Dial by your location
+1 312 626 6799 US (Chicago)
+1 646 558 8656 US (New York)
+1 346 248 7799 US (Houston)
+1 669 900 9128 US (San Jose)
+1 253 215 8782 US
+1 301 715 8592 US
Meeting ID: 869 815 746
Password: 027771
Find your local number: https://zoom.us/u/aeymIyR7qR

ROLL CALL

MOMENT OF SILENCE – To Reflect on Actions

PLEDGE OF ALLEGIANCE

1. **AGENDA RECEIVED AS PROPOSED OR AS AMENDED**

2. **PUBLIC COMMENTS**

3. **CLAIMS AND PAYMENTS**

   A. Resolution-that the Board of Supervisors APPROVE EXPENDITURES, and that the County Auditor be authorized and directed to ISSUE CHECKS, against the various settlement of such claims as allowed.

4. **RECEIVE PROJECT UPDATES FROM DEPARTMENT HEADS/ELECTED OFFICIALS**

5. **MINUTES APPROVED –** April 7, 2020

6. HEARINGS – Times are approximate

i. 9:00 a.m. adoption of the 2020 Multi-Jurisdictional Hazard Mitigation Plan for Black Hawk County, Iowa.

7. CONSENT AGENDA

The following items will be acted upon by voice vote on a single **RESOLUTION**, without separate discussion, unless someone from the board or the public requests that a specific item be considered separately.

A. TO APPROVE, RECEIVE, PLACE ON FILE WITH THE COUNTY AUDITOR

1. The Board of Supervisors APPROVE INTERGOVERNMENTAL JOURNAL ENTRIES, and that the County Auditor be authorized and directed to TRANSFER monies within the various funds as submitted.

2. The CERTIFICATE OF INSURANCE for Young Plumbing and Heating.

3. The Sheriff's MONTHLY REPORT of fees as of March 31, 2020.

4. The Auditor's QUARTERLY REPORT of fees collected from July 1, 2019 through March 31, 2020.

B. TO RECEIVE AND PLACE ON FILE WITH THE COUNTY AUDITOR

1. The PERMIT FOR UTILITY WORK WITHIN THE RIGHT-OF-WAY for MidAmerican Energy Company, Davenport, Iowa for placement of overhead electric utility on County right-of-way along various locations as recommended by Catherine Nicholas, County Engineer.

C. TO APPROVE AND DIRECT THE CHAIR TO SIGN

1. The FIREWORKS PERMIT request by Walt Anderson for April 18, 2020 with a rain date of April 25, 2020, to be held at the applicant's home, 8962 Barclay, Dunkerton, Iowa with Pyrotechnics done by Adam Anderson.

---

8. OTHER BUSINESS

A. Resolution - to change the name of the Conservation Land Acquisition Trust Fund to the Conservation Trust Fund, and to change the fund type from a Capital Expenditure Fund to a Special Revenue Fund.

B. 9:00 A.M. HEARING on the 2020 Multi-Jurisdictional Hazard Mitigation Plan

i. Motion-to receive and place on file proof of publication of notice of public hearing.
ii. Motion-to close the hearing as oral and written comments were received and placed on file.

iii. Resolution - that the Board of Supervisors of Black Hawk County, Iowa herewith adopts the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comment and future FEMA and IHSEMD recommendations.

9. WORK SESSION

A. DISCUSSION/POSSIBLE BOARD ACTION – to discuss County preparedness for COVID-19.

10. ANY REPORTS OR INFORMATION FROM THE BOARD

11. ADJOURNMENT

PLEASE NOTE BOARD OF SUPERVISORS AGENDA DEADLINE IS WEDNESDAY AT 4:00 P.M.

FOR YOUR INFORMATION:

Board of Supervisors meetings can be seen on Mediacom Government Access Channel 79.2 in Waterloo on Tuesday at 2:00 PM and 8:00 PM, Wednesday at 2:30 AM and 6:30 AM, Saturday at 9:00 AM and Sunday at 8:00 PM.

To contact a supervisor with your comments or concerns:

Chris Schwartz	833-3074	cschwartz@co.black-hawk.ia.us
Tom Little	833-3075	tlittle@co.black-hawk.ia.us
Linda Laylin	833-3076	llaylin@co.black-hawk.ia.us
Dan Trelka	833-3077	dtrelka@co.black-hawk.ia.us
Craig White	833-3078	cwhite@co.black-hawk.ia.us

Our web site is: www.co.black-hawk.ia.us

RESOLUTION

A RESOLUTION OF THE BOARD OF SUPERVISORS, OF BLACK HAWK COUNTY, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR BLACK HAWK COUNTY.

WHEREAS, the Board of Supervisors of Black Hawk County, Iowa has authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan ("Plan") for Black Hawk County; and,

WHEREAS, Black Hawk County, Iowa has contracted with the Iowa Northland Regional Council of Governments for the development of said Plan; and,

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Planning Committee of Black Hawk County has participated in the formulation of said Plan; and has recommended the adoption of said Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a Public Hearing has been held in the County Courthouse for the purpose of obtaining citizen input on the Multi-Jurisdictional Hazard Mitigation Plan; and

NOW THEREFORE BE IT RESOLVED THAT the Board of Supervisors of Black Hawk County, Iowa herewith adopts the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comment and future FEMA and IHSEMD recommendations.

Passed and adopted this 14th day of April 2020.

Chris Schwartz
Chair

ATTEST:

Tracy Wieland

RESOLUTION NO. 21,961

RESOLUTION APPROVING AND ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR BLACK HAWK COUNTY

WHEREAS, the City Council of the City of Cedar Falls, Iowa has agreed to participate in the development of a Multi-Jurisdictional Hazard Mitigation Plan ("Plan") for Black Hawk County; and

WHEREAS, Black Hawk County, Iowa has received funding through the Hazard Mitigation Grant Program for the development of said Plan; and

WHEREAS, the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44 C.F.R. 201.6; and

WHEREAS, the City of Cedar Falls, participated in the formulation of said Plan through community representation on the Hazard Mitigation Planning Committee ("Committee"); and said Committee has recommended the adoption of said Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a public hearing has been held at the Cedar Falls City Council meeting for the purpose of obtaining citizen input on said Plan.

NOW THEREFORE, be it resolved that the City Council of the City of Cedar Falls, Iowa herewith adopts the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comments and future FEMA and IHSEMD recommendations.

PASSED AND ADOPTED this 18th day of May, 2020.

Robert M. Green, Mayor

ATTEST:

Jacqueline Danielsen, City Clerk

RESOLUTION NO. 2020-36

A RESOLUTION OF THE CITY COUNCIL OF DUNKERTON, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR BLACK HAWK COUNTY.

WHEREAS, the City Council of the City of Dunkerton, Iowa has agreed to participate in the development of a Multi-Jurisdictional Hazard Mitigation Plan ("Plan") for Black Hawk County; and,

WHEREAS, Black Hawk County, Iowa has received funding through the Hazard Mitigation Grant Program for the development of said Plan; and,

WHEREAS, the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44 C.F.R. 201.6; and,

WHEREAS, the City of Dunkerton, participated in the formulation of said Plan through community representation on the Hazard Mitigation Planning Committee ("Committee"); and said Committee has recommended the adoption of said Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan; and,

WHEREAS, a Public Hearing has been held in the City Hall for the purpose of obtaining citizen input on said Plan; and,

NOW THEREFORE BE IT RESOLVED that the City Council of the City of Dunkerton, Iowa herewith adopts the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comments and future FEMA and IHSEMD recommendations.

Passed and adopted this 11th day of May, 2020.

Michael J. Schares

Michael J. Schares, Mayor

ATTEST:

Sheila K. Steffen, City Clerk

RESOLUTION 3014

A RESOLUTION OF THE CITY COUNCIL OF ELK RUN HEIGHTS, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR BLACK HAWK COUNTY.

WHEREAS, the City Council of the City of Elk Run Heights, Iowa has agreed to participate in the development of a Multi-Jurisdictional Hazard Mitigation Plan ("Plan") for Black Hawk County; and,

WHEREAS, Black Hawk County, Iowa has received funding through the Hazard Mitigation Grant Program for the development of said Plan; and,

WHEREAS, the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44 C.F.R. 201.6; and,

WHEREAS, the City of Elk Run Heights, participated in the formulation of said Plan through community representation on the Hazard Mitigation Planning Committee ("Committee"); and said Committee has recommended the adoption of said Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan; and,

WHEREAS, a Public Hearing has been held in the City Hall for the purpose of obtaining citizen input on said Plan; and,

NOW THEREFORE BE IT RESOLVED THAT the City Council of the City of Elk Run Heights, Iowa herewith adopts the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comments and future FEMA and IHSEMD recommendations.

PASSED AND ADOPTED ON THIS 9TH DAY OF JUNE 2020

Kristi Lundy

Kristi Lundy, Mayor

ATTEST:

Julie Eastman

Julie Eastman, City Clerk

*** Proof of Publication ***

Courier Communications
100 East 4th Street, Waterloo, Iowa 50703
Black Hawk County

I do solemnly swear that the annexed copy of notice was published in the WATERLOO/CEDAR FALLS COURIER, a daily newspaper printed in WATERLOO, Black Hawk County, Iowa, and that the annexed rate of advertising is the regular legal rate of said newspaper, and that the following is a correct bill for publishing said notice.

Elk Run Heights, City - Legals

5042 LAFAYETTE RD.
ELK RUN HEIGHTS IA 50707

ORDER NUMBER 182509

NOTICE OF PUBLIC HEARING
Notice is hereby given that on June 9, 2020 at 6:00 p.m. the City Council of the City of Elk Run Heights, State of Iowa will hold a public hearing to accept input regarding the Multi-Jurisdictional Hazard Mitigation Plan, recently undertaken by Black Hawk County.
Due to public health concerns related to COVID-19, as authorized by emergency proclamation of the Governor of the State of Iowa, this meeting of the City Council will be conducted electronically, pursuant to Iowa Code Section 21.8, as holding the meeting in person is impossible or impractical.
The public may access the meeting electronically through Zoom.us:
Join Zoom Meeting
https://zoom.us/j/95870385513
1-312-626-6799
Meeting ID: 958 7038 5513
Please check the posted agenda in advance of the June 9, 2020 meeting for any updates to the manner in which the public may access the meeting.
Anyone interested may access the meeting electronically and be heard or may file written comments electronically or by mail to:
City of Elk Run Heights
Attn: Julie Eastman
5042 Lafayette Rd.
Elk Run Heights, Iowa 50707
Written comments must be received at the City Clerk's office before 4:00 pm on the date set for said hearing. Copies of the plan can be made available for review online at www.inrcog.org/pub.
Dated this May 26, 2020.
Julie Eastman
City Clerk

Signed

Subscribed and sworn to before me this 5 day of June, 2020

Jodi E McKinstry
Notary Public

Received of _____

the sum of _____ Dollars in full
for publication of the above invoice.

Notary Seal:

NOTARIAL SEAL IOWA
JODI E MCKINSTRY
COMMISSION NO.782413
MY COMMISSION EXPIRES
1/30/23

Section: Legals
Category: 950 Legal Notice
PUBLISHED ON: 05/29/2020

TOTAL AD COST: 25.05
FILED ON: 6/3/2020

RESOLUTION 6409

A RESOLUTION OF THE CITY COUNCIL OF EVANSDALE, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR BLACK HAWK COUNTY

WHEREAS, the City Council of the City of Evansdale, Iowa has agreed to participate in the development of a Multi-Jurisdictional Hazard Mitigation Plan ("Plan") for Black Hawk County; and

WHEREAS, Black Hawk County, Iowa has received funding through the Hazard Mitigation Grant Program for the development of said Plan; and

WHEREAS, the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44 C.F.R. 201.6; and

WHEREAS, the City of Evansdale participated in the formulation of said Plan through community representation on the Hazard Mitigation Planning Committee ("Committee"); and said Committee has recommended the adoption of said Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a Public Hearing has been held for the purpose of obtaining citizen input on said Plan.

NOW THEREFORE BE IT RESOLVED that the City Council of the City of Evansdale, Iowa herewith adopts the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comments and future FEMA and IHSEMD recommendations.

PASSED AND ADOPTED THIS 5TH DAY OF MAY 2020

ATTEST:

Troy Beatty, Mayor

DeAnne Kobliska, City Clerk

*** Proof of Publication ***

Courier Communications
100 East 4th Street, Waterloo, Iowa 50703
Black Hawk County

I do solemnly swear that the annexed copy of notice was published in the WATERLOO/CEDAR FALLS COURIER, a daily newspaper printed in WATERLOO, Black Hawk County, Iowa, and that the annexed rate of advertising is the regular legal rate of said newspaper, and that the following is a correct bill for publishing said notice.

Evansdale, City of - Legals

123 NORTH EVANS RD.
EVANSDALE IA 50707

ORDER NUMBER 180845

NOTICE OF PUBLIC HEARING
Notice is hereby given that on May 5, 2020 at 6:00 p.m. the City Council of the City of Evansdale, State of Iowa will hold a public hearing to accept input regarding the Multi-Jurisdictional Hazard Mitigation Plan, recently undertaken by Black Hawk County.
Due to public health concerns related to COVID-19, as authorized by emergency proclamation of the Governor of the State of Iowa, this meeting of the City Council will be conducted electronically, pursuant to Iowa Code Section 21.8, as holding the meeting in person is impossible or impractical.
The public may access the meeting electronically by entering the following meeting information:
Please join my meeting from your computer, tablet or smartphone at https://global.gotomeeting.com/join/827564429
OR
You can also dial in using your phone.
(For supported devices, tap a one-touch number below to join instantly.)
United States: +1 (872) 240-3311
Access Code: 827564429
OR
-One-touch:
tel:+18722403311,,827564429#
Please check the posted agenda in advance of the May 5, 2020 meeting for any updates to the manner in which the public may access the meeting.
The public hearing was set by Resolution 6406. Anyone interested may access the meeting electronically and be heard. Written comments may be filed in person or mailed to the City Clerk, Evansdale City Hall, 123 North Evans Rd, Evansdale, IA 50707 no later than 4:30 p.m. on May 5, 2020.
DeAnne Kobliska
City Clerk

Signed

Subscribed and sworn to before me this 24 day of April, 2020

Notary Public

Received of _____

the sum of _____ Dollars in full
for publication of the above invoice.

Notary Seal:

NOTARIAL SEAL IOWA
JODI E MCKINSTRY
COMMISSION NO.782413
MY COMMISSION EXPIRES
1/30/23

Section: Legals
Category: 950 Legal Notice
PUBLISHED ON: 04/22/2020

TOTAL AD COST:	23.56
FILED ON:	4/24/2020

RESOLUTION #2020-2169

A RESOLUTION SETTING A DATE FOR A PUBLIC HEARING ON THE ADOPTION OF THE MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR BLACK HAWK COUNTY, IOWA.

WHEREAS, the City Council of Gilbertville, Iowa has authorized the Iowa Northland Regional Council of Governments to develop a Multi-Jurisdictional Hazard Mitigation Plan in cooperation with the Multi-Jurisdictional Hazard Mitigation Planning Committee for the County; and,

WHEREAS, the City Council of Gilbertville desires citizen input on the establishment and adoption of a Multi-Jurisdictional Hazard Mitigation Plan, and,

NOW THEREFORE BE IT RESOLVED THAT, a public hearing be held on the adoption of a Multi-Jurisdictional Hazard Mitigation Plan for Black Hawk County, Iowa. Said Public Hearing to be held on the 4th day of May, 2020 at 7:00 P.M. at the City of Gilbertville City Hall.

Passed and adopted this 20th day of April 2020.

Mark Thome, Mayor

ATTEST:

Teresa Adamson, MMC

Passed and adopted this 20th day of April 2020.

RESOLUTION NO 2616

A RESOLUTION OF THE CITY COUNCIL OF HUDSON, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR BLACK HAWK COUNTY.

WHEREAS, the City Council of the City of Hudson, Iowa has agreed to participate in the development of a Multi-Jurisdictional Hazard Mitigation Plan ("Plan") for Black Hawk County; and,

WHEREAS, Black Hawk County, Iowa has received funding through the Hazard Mitigation Grant Program for the development of said Plan; and,

WHEREAS, the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44 C.F.R. 201.6; and,

WHEREAS, the City of Hudson, participated in the formulation of said Plan through community representation on the Hazard Mitigation Planning Committee ("Committee"); and said Committee has recommended the adoption of said Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan; and,

WHEREAS, a Public Hearing has been held in the City Hall for the purpose of obtaining citizen input on said Plan; and,

NOW THEREFORE BE IT RESOLVED THAT the City Council of the City of Hudson, Iowa herewith adopts the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comments and future FEMA and IHSEMD recommendations.

Passed and adopted this 11th day of May 2020.

George Wessel, Mayor — 5/11/2020 date of signature

ATTEST:

Chrissi Wiersma, City Clerk/Zoning Administration, MPA/IaCMC/IaCMFO — 5/11/20 date of signature

RESOLUTION 20-33

A RESOLUTION OF THE CITY COUNCIL OF LA PORTE CITY IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR BLACK HAWK COUNTY.

WHEREAS, the City Council of the City of La Porte City, Iowa has agreed to participate in the development of a Multi-Jurisdictional Hazard Mitigation Plan ("Plan") for Black Hawk County; and,

WHEREAS, Black Hawk County, Iowa has received funding through the Hazard Mitigation Grant Program for the development of said Plan; and,

WHEREAS, the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44 C.F.R. 201.6; and,

WHEREAS, the City of La Porte City, participated in the formulation of said Plan through community representation on the Hazard Mitigation Planning Committee ("Committee"); and said Committee has recommended the adoption of said Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan; and,

WHEREAS, a Public Hearing has been held in the City Hall for the purpose of obtaining citizen input on said Plan; and,

NOW THEREFORE BE IT RESOLVED THAT the City Council of the City of La Porte City, Iowa herewith adopts the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comments and future FEMA and IHSEMD recommendations.

Passed and adopted this 27th day of April 2020.

ATTEST:

Mayor

City Clerk

RESOLUTION 1382

A RESOLUTION OF THE CITY COUNCIL OF RAYMOND, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR BLACK HAWK COUNTY.

WHEREAS, the City Council of the City of Raymond, Iowa has agreed to participate in the development of a Multi-Jurisdictional Hazard Mitigation Plan ("Plan") for Black Hawk County; and,

WHEREAS, Black Hawk County, Iowa has received funding through the Hazard Mitigation Grant Program for the development of said Plan; and,

WHEREAS, the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44 C.F.R. 201.6; and,

WHEREAS, the City of Raymond, participated in the formulation of said Plan through community representation on the Hazard Mitigation Planning Committee ("Committee"); and said Committee has recommended the adoption of said Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan; and,

WHEREAS, a Public Hearing has been held in the City Hall for the purpose of obtaining citizen input on said Plan; and,

NOW THEREFORE BE IT RESOLVED THAT the City Council of the City of Raymond, Iowa herewith adopts the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comments and future FEMA and IHSEMD recommendations.

Passed and adopted this 4th day of May, 2020.

Mayor

ATTEST:

City Clerk

Prepared by LeAnn M. Even, Deputy City Clerk, City of Waterloo, 715 Mulberry Street, Waterloo, IA 50703, (319) 291-4323.

RESOLUTION NO. 2020-474

RESOLUTION ADOPTING THE UPDATED MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR BLACK HAWK COUNTY, IOWA.

WHEREAS, the City Council of the City of Waterloo, Iowa has agreed to participate in the development of a Multi-Jurisdictional Hazard Mitigation Plan ("Plan") for Black Hawk County; and,

WHEREAS, Black Hawk County, Iowa has received funding through the Hazard Mitigation Grant Program for the development of said Plan; and,

WHEREAS, the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44 C.F.R. 201.6; and,

WHEREAS, the City of Waterloo, participated in the formulation of said Plan through community representation on the Hazard Mitigation Planning Committee ("Committee"); and said Committee has recommended the adoption of said Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan; and,

WHEREAS, a Public Hearing has been held in the City Hall for the purpose of obtaining citizen input on said Plan; and,

NOW THEREFORE BE IT RESOLVED THAT the City Council of the City of Waterloo, Iowa herewith adopts the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comments and future FEMA and IHSEMD recommendations.

PASSED AND ADOPTED this 22nd day of June 2020.

Quentin Hart
Quentin Hart, Mayor

ATTEST:

Kelley Felchle
Kelley Felchle
City Clerk

CITY WATERLOO IOWA SEAL

RESOLUTION

A RESOLUTION OF THE COMMUNITY SCHOOL DISTRICT OF CEDAR FALLS, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR BLACK HAWK COUNTY.

WHEREAS, the Community School District of Cedar Falls, Iowa has agreed to participate in the development of a Multi-Jurisdictional Hazard Mitigation Plan ("Plan") for Black Hawk County; and,

WHEREAS, the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44 C.F.R. 201.6; and,

WHEREAS, the Community School District of Cedar Falls, participated in the formulation of said Plan through community representation on the Hazard Mitigation Planning Committee ("Committee"); and said Committee has recommended the adoption of said Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan; and,

WHEREAS, a Public Hearing has been held via zoom pursuant to Iowa Code 21.8 due to COVID-19 for the purpose of obtaining citizen input on said Plan; and,

NOW THEREFORE BE IT RESOLVED THAT the Community School District of the City of Cedar Fa;s, Iowa herewith adopts the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comments and future FEMA and IHSEMD recommendations.

Passed and adopted this 13th day of July 2020.

Jeff Hassman/Board President

ATTEST:

Denelle Gonnerman/Board Secretary

RESOLUTION OF THE WATERLOO SCHOOLS, WATERLOO, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR BLACK HAWK COUNTY

WHEREAS, the Waterloo Schools, Waterloo, Iowa has agreed to participate in the development of a Multi-Jurisdictional Hazard Mitigation Plan ("Plan") for Black Hawk County; and,

WHEREAS, the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44 C.F.R. 201.6; and,

WHEREAS, the Waterloo Schools participated in the formulation of said Plan through community representation on the Hazard Mitigation Planning Committee ("Committee"); and said Committee has recommended the adoption of said Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan; and,

WHEREAS, a Public Hearing has been held in the Board Room of the Education Service Center, 1516 Washington Street, Waterloo, Iowa, at 5pm on Monday, July 13, 2020, for the purpose of obtaining citizen input on said Plan [citizen input to be provided electronically prior to the board meeting and read aloud by the board secretary at the board meeting];

NOW THEREFORE BE IT RESOLVED THAT the Waterloo Schools, Waterloo, Iowa herewith adopts the Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comments and future FEMA and IHSEMD recommendations.

Passed and adopted this 13th day of July 2020.

Shanlee McNally

Shanlee McNally, Board President

ATTEST:

Pamela G. Arndorfer

Pamela Arndorfer, Board Secretary

APPENDIX L: PREVIOUS HAZARD MITIGATION PLANS

PREVIOUS HAZARD MITIGATION ACTIVITIES

As part of the plan update and developing this MJ-HMP Update, the Committee analyzed their previous mitigation activities. The Committee looked at each activity during the MJ-HMP Update planning session and determined those that had been completed, those that had not been implemented but remained relevant, those that are still active, and those that were no longer applicable. The language of the previous activities was cleaned up and redundant activities have been combined in the 2014 Update. Finally, the Committee developed comments to justify why activities were or were not placed in the plan update. Within each jurisdiction, duplicative mitigation actions from previous plans which address several hazards individually have been omitted from the following analysis. The following tables contain this analysis.

Black Hawk County Unincorporated 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status** ***Please indicate status of action and commentary on its progress or lack of progress.***
Educate the Public.	Active: as opportunities allow.
Maintain a viable secondary roads department in order to facilitate the timely and effective clearing of roads in the wake of a winter storm.	Active: Efforts to clear roads are active during normal business hours. During off hours, "on call" staff are available.
Encourage utilities and developers to place utilities (power, telephone, cable) underground.	Active: Utility permits are required for work completed within county row. All permits are reviewed by County Engineer and approved by the Board of Supervisors.
Cooperate with Red Cross, Hawkeye Valley Area Agency on Aging (HVAAA) and other relief agencies in order to determine possible heating shelter locations and meet the demands of vulnerable populations.	Dropped from Plan.
Enhance public awareness of closed and open roads through public announcements (i.e. radio, media releases).	Active: In addition to physical structures being placed in affected roadways, the public is notified via social media, email and an interactive website.
Purchase needed equipment for county staff and organizations (i.e. blower equipment, back-up generation for heating shelters).	Active: Requests for capital equipment are submitted annually during budget time.
Maintain and periodically evaluate outdoor warning sirens in the community for effectiveness	Active: Checked monthly. When repairs are necessary, they are addressed by

Black Hawk County Unincorporated 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status** ***Please indicate status of action and commentary on its progress or lack of progress.***
.and operability.	the County Maintenance Department.
Periodically review areas identified in the county to install new outdoor warning sirens in close proximity.	Dropped from Plan.
Systematically review and make necessary updates to building code requirements.	Active: the County adopts building codes from the City of Waterloo.
Research all available opportunities for grant dollars and potentially construct community tornado shelters in areas with vulnerable populations, including, but not limited to the areas listed below: - Big Woods Lake Campground Shower - Hartman Interpretative Center	Active: Staff continually review funding opportunities.
Inform local developers of tornado safe room alternatives and encourage them to be included in developments.	Active.
Encourage mobile home park owners to construct tornado safe rooms.	Active.
Cooperate with pipeline owners and operators to ensure that the locations are properly marked using GIS.	Dropped from Plan.
Periodically review system established for identifying all rural water sources to be utilized in the event of an emergency.	Active; Health Department.
Ensure emergency responders are properly trained and equipped.	Active; Regular training.
Coordinate efforts with applicable response agencies.	Active.
Encourage residents to subscribe to Emergency Alerts services.	Active. On website.
Establish redundancy in the communications system to reduce the chance of failure.	Active.

Black Hawk County Unincorporated 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status** ***Please indicate status of action and commentary on its progress or lack of progress.***
Purchase automatic translation machines and train personnel in their use in order to better communicate with public in times of disaster.	Dropped from Plan.
Develop and maintain a list of media outlets to be used to efficiently communicate vital information to the public.	Dropped from Plan.
Continue to ensure that all applicable personnel are trained in the Incident Command System in order to enhance any potential emergency response.	Active.
Coordinate with message boards to communicate disaster related messages (i.e. DMS, Banks, etc.).	To be proposed during FY21 to install a message board at the Courthouse.
Expand internet services in the county/rural areas.	Active: Board of Supervisors supports funding for Rural Broadband. Dropped from Plan.
Develop an interoperability system to be used between county, city, state and federal agencies.	Active. Dropped from Plan.
Promote public/private partnerships to enhance joint communication between sectors.	Active. Dropped from Plan.
Continue to participate and cooperate with Tri-County Drug Task Force for the cleanup and disposal of identified methamphetamine labs.	Active. Dropped from Plan.
Coordinate with Regional HAZMAT Training Center to identify personnel who should receive HAZMAT training.	Active.
Continue to support Tier II HAZMAT reporting requirements.	Active.

Black Hawk County Unincorporated 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status** ***Please indicate status of action and commentary on its progress or lack of progress.***
Continue cooperation with Black Hawk County Emergency Management Agency in order to ensure that the County's Emergency Response Plan is in compliance with State and Federal requirements.	Ongoing.
Coordinate response efforts with the Northeast Iowa Emergency Response Group.	Active.
Identify certified and qualified clean-up companies.	No timeline established.
Establish buffer zones and filter strips.	Dropped from Plan.
Identify and/or develop program for the location and filling of abandoned wells throughout the county.	Black Hawk County Health Department identifies and financially assists with closing abandoned wells through the Grants for Counties program with IDPH & DNR. Dropped from Plan.
Cooperate with Health Department to maintain programs for the testing and inspections of existing wells and septic systems throughout the county.	Active. The Health Department participates in University of Iowa Water testing samples on an as needed basis. BHC environmental oversees septic systems.
Seek and secure funding to help in the establishment of several GIS layers to be used to project potential areas of pollution throughout the county.	No timeline established.
Develop and strengthen Storm Water Management Programs.	Active: Developed on a project-by-project basis, involving County Roads and ROW.
Research grant opportunities through the Iowa Department of Natural Resources (IDNR) and the Iowa Department of Public Health.	Active: Utilize Grants to Counties Program.
Make available oblique imagery of all structures in the planning area.	Active: The Black Hawk County Assessor has new aerial photography flown every other year. Dropped from Plan.
Continue to cooperate with private property owners and public utilities to maintain and improve tree-trimming practices.	Active: Ongoing through the Cities and Utility Companies as they require. Dropped from Plan.
Consider subsidizing the purchase of NOAA Weather Radios for government facilities and county residents.	Dropped from Plan.
Maintain and enhance a storm spotter network made up of volunteers cooperating with Dispatch and the National Weather Service, and train volunteer storm spotters through NWS severe weather trainings.	Active.
Ensure that all county roadways have proper signage in order to promote the smooth, orderly, and safe flow of traffic.	Active.
Continue to enhance the Trail Emergency Access System (TEAS) so that location can be established for proper and timely response in the event of an on-trail incident.	Active: As local governments request.

Black Hawk County Unincorporated 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status** ***Please indicate status of action and commentary on its progress or lack of progress.***
Place crossbucks at certain railroad crossing sites.	Active.
Consider placing embargos on certain county routes and designating specific HAZMAT transportation routes.	Not Applicable. Drop from next Plan.
Maintain and update as necessary the County Snow Policy.	Active: Efforts are underway to determine if the current County Snow Policy requires updating.
Cooperate with local snowmobile groups to be contacted for enhanced emergency response during winter storm events.	Active. Dropped from Plan.
Continue history of cooperation between emergency response personnel and snow removal units.	Active.
Continue enhancing and encouraging the use public transportation.	Active: Transit Systems.
Assess traffic data on primary and secondary county roadways in an attempt to identify patterns and trends.	Active.
Research and acquire grant dollars for various transportation related projects.	Active as projects arise.
Examine and potentially implement alternative intersection design for existing, problematic intersections.	Active: Efforts to improve problematic intersections are ongoing.
Implement Dynamic Message Signs (DMS) on primary roadways in applicable situations.	Remove from Plan. No plans to implement such signage.
Implement Changeable Message Signs (CMS) on primary roadways in applicable situations.	Active: Two signs are owned by the County.
Implement USNG for the County.	Active.
Continue membership with the National Flood Insurance Program (NFIP).	Active: Annual.
Research and pursue all available grant dollars designated for flood mitigation efforts.	Active.
Continue to identify, purchase, and remove structures from flood hazard areas.	Active.
Continue efforts to complete the FEMA flood map updates.	Active.
Continue to enforce Floodplain Ordinance, Zoning ordinance, and Subdivision Ordinance and update these documents as necessary.	Active: Updated through a contractual agreement with the City of Waterloo Planning and Zoning Department.
Continue to seek alternatives to historic flooding situation in the North Cedar/Highway 218 area.	Retained
Elevation, Retrofitting or removal of structures in flood hazard areas.	Retained
Construct new and enhance existing detention basins, also increase the amount of wetland area and preserve areas already established in the County.	Active: Engineers office continues o offset wetlands disturbed by projects on Roads or in County ROW.
Consider the establishment of a drainage district for storm water utilities in areas generally	Retained

Black Hawk County Unincorporated 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status** ***Please indicate status of action and commentary on its progress or lack of progress.***
located along Highway 218, north of the City of Cedar Falls.	
Continue bridge improvement programs incorporating County standards into any reconstruction effort.	Active.
Encourage the use of back flow valves in any new or existing developments.	Active.
Map alternative routes for flood prone areas and identify susceptible routes to avoid in the event of a flood.	Active. Based on Evacuation Plan.
Establish a fund designated for purchasing homes in the flood plain.	Completed.
Develop a partnership with insurance companies and lending intuitions with the intent of educating them on flood insurance facts and requirements.	Active.
Construct lift stations in applicable areas.	Active: As needed during new construction.
Establish and/or maintain Continuity of Government plans to handle post disaster operations (i.e. animal disposal, clean-up, demolition).	Active: Update planned for FY21.
Develop, maintain, and expand a list of potential cooling shelter locations.	Active. List is maintained.
Work with designated authorities to ensure that dead animals are properly disposed of.	Active.
Encourage local organizations to continue community assistance efforts (i.e. Operation Threshold has, in the past, conducted fan sharing programs in the county).	Active.
Coordinate with energy service providers to market energy conservation.	Active. Managed by energy companies.
Assess and meet the needs of the county's vulnerable populations.	Active.
Implement and enforce burn bans.	Active: Fire Departments.
Create a controlled burning ordinance.	Not Established.
Regularly update firewall software on all county computer systems to prevent cyber terrorism.	Active: Routinely monitored with additional support and services from the State.
Cooperate with all local, State, and Federal law enforcement and first responder agencies in order to provide the most appropriate response to any terrorism event (i.e. Law Enforcement Intelligent Network (LEIN) Region II).	Active. No LEIN Regions.
Ensure that local law enforcement is aware of local groups and individuals who may be considered a high risk to perform an act of terrorism.	Active.
Continue cooperation with the Local Emergency Planning Committee (LEPC).	Active.
Consider steps to increase security and reduce accessibility to vulnerable and attractive targets in the county.	Active.

Black Hawk County Unincorporated 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status** ***Please indicate status of action and commentary on its progress or lack of progress.***
Execute effective potential employee screening program to identify those individuals who may be considered a danger to the community and government.	Active: Conducted through Human Resources and Black Hawk County Sheriff's Office.
Implement precautionary mechanisms or 'hardened targets' into public spaces and events which are highly vulnerable to a terrorist attack (i.e. Installing cameras in public events and areas with low visibility, 'hardened target' could be a concrete flower bed in front of the court house).	Active.
Purchase and maintain an adequate amount of equipment for blockading roads.	Active: Signs and equipment for blocking roads is owned and maintained by Secondary Roads Department.
Consider the adoption and enforcement of building codes requiring earthquake mitigating construction techniques.	Active: Updated with the City of Waterloo's codes.
Coordinate with utility companies to automatically shut-off gas supplies.	Active: Coordinate as needed.
Develop plans for establishing an intake area for earthquake victims.	Active.
Work with the Black Hawk County Board of Health/Health Department and the State Health Department to determine which diseases are most likely to have an impact in the County and develop strategies to prevent their occurrence.	Active: Black Hawk County Board of Health / Public Health Department has a broad emergency plan to respond to any disease outbreak. Their planning efforts include a list of diseases most likely to impact the county.
Conduct mock disasters and tabletop exercises in order to help prepare first responders for proper response to an outbreak of disease.	Active.
Comply with the 2014 Animal Plan and make updates as necessary.	Active.
Work with responsible parties to ensure that levees and dams are properly maintained and evaluated for proper mitigation efforts.	Not applicable. Drop from Plan.
Continue to evaluate potential flood control measures to alleviate stress on major water retention structures.	Active.
Ensure any water retention structures to be built are constructed within the requirements of the National Flood Plain Ordinance.	Active.
Strengthen ordinances and building codes for building behind a levee through planning and zoning.	Active.
Ensure that all applicable response and recovery plans are in place and that authorities are aware of these plans.	Active.
Maintain county roads to reduce/eliminate damage to vehicles caused by poorly maintained roads.	Active.
Encourage building practices conducive to prolonging the lifespan of roads and other county infrastructure.	Active.

Black Hawk County Unincorporated 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status** ***Please indicate status of action and commentary on its progress or lack of progress.***
Identify and map all known locations and areas vulnerable to sinkholes.	Active.
Cooperate with the Iowa Department of Natural Resources and enforce any and all applicable state regulations concerning sinkholes.	Active.
Strengthen zoning ordinances to prohibit building at both the top and bottom of areas susceptible to landslides / mudflows.	Active.
Develop and implement program to use GPS receiver technology in the recording and reporting of damage in the wake of a disaster.	Active for Roads and County ROW.
Regularly conduct small scale, and large-scale emergency exercises in order to ensure that personnel are trained and able to respond properly to any type of emergency that occurs.	Active.
Activate the Operations Center as needed.	Active.
Continually update and maintain an adequate Geographic Information System.	Active: County continues to update the new releases on mapping software and performs map maintenance.
Periodically review and continue to implement all mitigation activities included in the plan.	Active.
Encourage intergovernmental cooperation with local, state, and federal agencies.	Active.
Maintain and upgrade the Emergency Operation Center to proficiently meet the demands of the public and county officials/agencies.	Active.
Designate and maintain a clear list of Public Information Officers (PIO's) with a body of three persons ready to be activated at all times.	Active.
Ensure all public and private agencies contracted with the county adhere to all applicable Occupational Health and Safety (OSHA) regulations.	Active: County is managed and enforced by IOSH and OSHA.

PREVIOUS MITIGATION ACTIONS – CEDAR FALLS

Cedar Falls - 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Educate the public.	Active: Flood information is updated and made available on the city's website quarterly. The city's flood brochure was updated in 2016. Articles on flood information are regularly published in Currents.
Maintain and improve outdoor warning siren system.	Active: Siren CAA was relocated north of Ridgeway Avenue from its former location south of Ridgeway Avenue to provide better coverage in the industrial park due to siren CAE being removed from Blackhawk Lane as a result of the Highway 58/Viking Rd project. Additional sites will be evaluated and added as the City expands.
Construct public tornado shelters-safe rooms at vulnerable points in the community.	Active: Safe rooms are in place at all Cedar Falls Schools, large businesses and athletic complexes. At least one trailer park has a tornado shelter. Staff will explore adding requirements for tornado shelters to mobile home park regulations.
Construct tornado safe rooms in homes, businesses, and schools.	Active: Safe rooms are in place at all Cedar Falls Schools, large businesses, and athletic complexes. At least one trailer park has a tornado shelter. Staff will explore adding requirements for tornado shelters to mobile home park regulations.
Encourage residents to sign up for emergency alerts services on their mobile phones.	Completed: Completed in 2009. The City of Cedar Falls participates in a County wide project and Iowa alert and there is a major outreach effort every spring.
Consider the adoption of local ordinances requiring tornado shelters in mobile home parks, multi-family dwellings, and land lease communities (e.g. condominiums, townhouses).	Nothing has been done in this area yet. Trailer parks are seen as the priority in this area. New trailer parks would require storm shelters.
Maintain tree-trimming policies to reduce the likelihood of falling branches.	Active: CFU has an annual tree-trimming program to keep electric lines clear of trees to reduce electric service interruption.
Continue to recruit and train individuals in the proper storm watching techniques in order to increase potential warning time.	*City was not identified as a responsible agency, it was: Black Hawk County EMA*, REACT, CB Clubs, National Weather Bureau*
Bury power and communications lines, as is possible.	Active: Underground electric and communication distribution lines are installed in all new additions. Areas of overhead to underground conversion are annually budgeted and portions of the City are converted every year.
Install redundant high voltage loops to increase the reliability of the electric supply in the city.	Active: All new high voltage installations are looped for reliability. All 600A main feeder lines are also looped, most w/multiple routes for redundancy.

Cedar Falls - 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Maintain a list of potential storm sewer improvement projects to mitigate potential flash flooding associated with a heavy rain event.	Active: The CIP lists funded and unfunded projects under 'Storm Water Funds'. There are currently 13 projects listed: Big Woods Road ditch improvements, Cedar Heights storm sewer, Clay Street Park drainage, Comprehensive Watershed Assessment, Dry Run Creek Watershed Improvement Phase 1, Erosion Repair project, Greenhill Road Ext Bioretention Swales/Cells, Greenwood Cemetery Slope Repair Project, Hudson Road subdrain, Mandalay Easement Slope repair, Permeable Alley Program, University Avenue bioretention swales, cells, water quality testing. This list is updated every cycle.
Place lightning arrestors on power lines.	Active: CFU has lightning arrestors installed at all primary dead ends, 600A switches, transformers, and substations. Scout arrestors are installed in the rural areas.
Protect critical electronic equipment with surge protection devices, data replication services, and battery backups to allow for controlled shut down during a prolonged power outage.	Active: Critical equipment is protected by surge suppressors and battery backups. Critical data is replicated to the disaster recovery site twice daily.
Purchase and maintain existing backup generators, as is necessary.	Active: CFU battery backup and generators are inspected and maintained on a monthly basis.
Evaluate designated snow routes on a regular basis to ensure effectiveness.	Active: Snow routes are prioritized and assigned to drivers. When new streets are added by new subdivisions the streets are reprioritized and assigned for maximum efficiency (equalized). Each fall the routes are driven to review and ensure effectiveness before snow fall. New GIS analysis will help with mapping.
Continue to support (equipment, finances, personnel, etc.) the Public Works Department in order to ensure proper street clearing in the event of a winter storm.	Active: RFPs will be sent out in the summer looking for contractors who can help with operations. Plow trucks have a 22-year rotation. Extensive two-day training is conducted annually for all staff involved with snow removal.
Continue to cooperate with local medical facilities and Health Department officials to increase the likelihood of detection and proper response.	*Black Hawk County Health Department*, Hospitals, Black Hawk County EMA.*
Continue to test local drinking water supply in order to monitor quality.	Active: Water system testing and monitoring continues to exceed Federal and State requirements.
Maintain a list of sites that could be used as public cooling shelters during extreme heat events.	Active: The American Red Cross has in the past, and would again if requested, open cooling shelters to be used by the general public in the event of a severe heat wave or extreme heat event. Other public venues can be used including: malls, movie theatres, restaurants, etc. The city does not currently have a list of all potential public cooling shelters.

Cedar Falls - 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Construct detention basins in areas deemed beneficial to the community.	Active: This is ongoing and implemented through subdivision and site plan reviews.
Clear brush and debris from creeks in order to ensure proper flow of streams.	Active: Brush and obstruction clearing is performed on an ongoing basis. Waterways are inspected after heavy rain events for debris and blockages. Necessary clearing is then scheduled. Larger woody vegetation clearing is typically done during the winter months.
Identify areas in the community, along stream banks, that need some type of bank stabilization.	Active: There have been studies (Brown, Nicholas A. et al., Stream Channel Analysis on Dry Run Creek, Black Hawk County, Iowa, 2005) and (Schuppert, Phillip, Watershed Management Plan for Dry Run Creek Watershed, 2009) that identify areas in need of stabilization. From these reports or from areas known to have erosion issues/may be causing problems for infrastructure, staff picks areas that are accessible and repairs them from a corridor restoration perspective. For sections of streams that are not located within Dry Run Creek, they are assessed periodically by engineering or public works staff. In the past ten years 4,000 LF of stream bank has been stabilized between the City and the County Conservation District. There are also two other publications that aid decisions when it comes to watershed management and repair: Iowa Department of Natural Resources, Stressor Identification, Dry Run Creek, Iowa, 2008 Palmer, Jason and Mindy Buyck, Water Quality Improvement Plan for Dry Run Creek: TMDL for Connected Impervious Surface, 2011
Require the installation of back flow valves in structures in order to reduce the risk of sewer backup damage.	Active: All new buildings require the installation of back flow valves.
Consider areas inside and outside of the city limits where buffer strips can be placed in order to control release of runoff and capture debris.	Active: Integrated as feasible. Currently Bioretention Cells are proposed in the CIP for University Ave and Greenhill Rd.

Cedar Falls - 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Maintain relationships with private businesses that have equipment that can be used to help protect the city from a flood event.	Active: Current list includes Peterson Contractors Inc. (PCI) - Heavy equipment, dump trucks & materials – Lighting; Benton's Sand & Gravel - Heavy equipment, dump trucks & materials; Black Hawk Rental - Pumps, hoses, generators etc. Hupp Electric Motors – Electric motor repairs ASPRO Inc. – Trucks & materials Gierke Robinson Co. - Pumps, hose, etc. Murphy Equipment - Heavy equipment – loaders backhoes etc. UNI- Equipment School District- volunteers
Continue slip lining to reduce inflow and infiltration into the sanitary sewer system.	Active: There is an annual budget of approximately $200K-250K for these improvements. The locations of the updates are added to a database.
Continue to identify, purchase, and remove structures and populations in danger of being flooded; in addition to maintaining a list of properties that they deem as potential buyout candidates.	Active: A list is maintained and updated. In 2016, 13 properties in the SFHA were purchased. There is a budget set in the CIP with annual limited funding for this goal.
Elevate or relocate public structures in the floodplain, as needed.	Active: The City maintains a list of property buyouts. As properties come up for sale, the city has funds set up in the general fund to potentially purchase these properties. Public structures in the floodplain include: Beach House (flood proofing in place); parks with open shelters, Tourist Park Lift Station, Old PW building at 1500 Bluff (100 year), Transfer Station at 215 State (100 year), Water Reclamation Facility (surrounded); Fire Station at 18th & Main (100 year); 17th Street Lift station (floodway and 100 year).
Maintain, enforce, and update the local Floodplain Ordinance, as is necessary.	Active: Done on a daily bases through permitting system.
Continue membership in the National Flood Insurance Program (NFIP).	Active: Annual. The City of Cedar Falls is also part of the Community Rating System (CRS). New FIRMS anticipated for adoption by late 2020.
Protect or relocate the 18th Street Fire Station from future flood events.	Active: Construction of a new Public Safety Building is completed.
Explore potential mitigation steps that can be taken to protect the Cedar Falls Utilities (CFU) complex from future flood events.	Completed: Floodwall elevation was increased following the 2008 record flooding.

Cedar Falls - 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Continue to have a local supply of sandbags on hand for future flood events.	Active: Public Works has more than half a million sand bags on hand. These bags are occasionally inspected to make sure there is no rotting. Staff goes through Floodwall training every spring. Staff has Hesco barriers on hand for flood protection efforts.
Continue to evaluate public utilities for ways they can be further flood proofed or relocated; for instance, the City has constructed new lift stations in order to mitigate potential impacts of flooding.	Active: CFU flood protection improvements were completed following record 2008 flooding of the main CFU campus area. City increased level of protection of levee around wastewater plant.
Follow the Corps of Engineers operations and maintenance manual.	Active: The city follows the Corps operation and maintenance manual regarding the levee as it relates to inspection, maintenance, and corrective action.
Construction of a substation in North Cedar Falls to remove some of the electrical load from the substations at the Cedar Falls Utilities (CFU) office complex and provide redundant distribution voltage to the City of Cedar Falls if the substations at the CFU office complex are threatened with flooding.	Active: Streeter substation was redesigned to accommodate high water if the floodwall fails at the CFU office complex. A new substation was constructed west of south industrial park for system redundancy.
Ensure that all first responders are properly trained in the Incident Command procedures.	Active: Command Staff is trained to the highest level of NIMS training. All other fire personnel are trained to appropriate levels required by FEMA.
Establish standard operating procedures for naming a Public Information Officer in the event of a disaster.	Cedar Falls has a Public Information Officer: Through our City Administrator's Office, it is currently the Communications Specialist.
Recognize that language barriers may exist and develop policies and train personnel in ways to overcome these challenges.	City was not identified as a responsible agency, it was: Black Hawk County EMA.
Review the need for redundancy in the communication system.	Active: Communication system installation is designed with redundancy. Backup system at the Public Works complex exists. CFU prioritizes redundancy in all parts of the communication infrastructure. There are multiple connections to the Internet via distinct physical locations. The core routing is provided from two separate sites. Each of the five huts is fed from more than one fiber. Switching at each hut is in a redundant pair. Power to critical networking equipment has two feeds.
Create and update, as needed, a power outage notification system for electrical meters.	Active: Automated outage notification system is in use at CFU.
Update Multi-Hazard Emergency Operations Plan as needed.	Active: Updates are made when needed. The flood elevation information was updated in early 2016.

Cedar Falls - 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Create and implement a visual damage assessment procedure that includes all city departments.	Active: Staff uses the FEMA Damage Assessment Operations Manual and the Iowa Homeland Security & Emergency Management's Preliminary Damage Assessment Field Guide.
Improve and update centralized record keeping database for damage assessment/reporting.	Active: the GMBA financial and fixed asset systems are centrally stored on the iSeries. Each user has access to centralized storage on the Net App for data file storage and data replication and back up.
Install a redundant natural gas pipeline and boarder station between the Northern Natural Gas high pressure trunk line and the Cedar Falls Utilities natural gas distribution system.	Active: Second larger natural gas border station constructed and placed into service west of original border station. Original border station is on line as a backup station for redundancy.
Maintain inspection and enforcement of applicable fire codes.	Active: All commercial businesses are inspected annually. This process will be utilizing electronic inspection and recording in the near future. Rental properties are inspected every three years. New construction and major renovations are required to have a site plan review and fire inspection.
Maintain 28E agreement for HAZMAT response.	Active: The city maintains this agreement with the Northeast Iowa response group (Waterloo).
Work with Black Hawk County EMA to ensure that local Tier II Reports are being filed.	Active: Staff is currently exploring the options for the reporting methods.
Ensure that first responders are properly trained to recognize and respond to any potential HAZMAT event.	Active: The city has relevant employees take continual education on hazardous materials. The department reviews NFPA and OSHA standards every year. All relevant staff undergoes a four (4) hour refresher yearly. Staff is prepared to deal with operation level events. For more drastic HAZMAT events the Waterloo Fire Department NIRG (North Iowa Response Group) is in place.
Maintain Storm Water Management Utility Program.	Active: The City Engineering Division enforces storm water management ordinances and programs. NPDES programs are updated and implemented in a timely fashion. A storm water management assessment fee program has been imposed on local residents.
Identify potential areas of pollution sites and pursue cleanup efforts in identified areas.	Active: This is ongoing and acted on when needed. Recent projects include: 1. Rapp station was closed out of after 20 years of monitoring; 2. The Westminster Building, use the EPA superfund, has been cleaned up and reused; 3. River Place Weissman site has been capped, cleaned and new development is underway on the site. There are also industrial pretreatments in place.

Cedar Falls - 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Work with Black Hawk County Board of Health to monitor wells and septic tanks/fields.	No additional work with Black Hawk County Health Department regarding private well monitoring.
Replacement of wells and septic tanks/fields with public service, if funding becomes available.	Active: As available. No current public funding available for private well replacement.
Incorporate Best Management Practices (BMP) in order to control the release of runoff, reduce erosion, reduce the amount of silt in waterways, and reduce nitrates in runoff.	Active: BMP's are being utilized for any activity of this nature performed by PW/Parks. They are also required of any new development.
Maintain a policy on proper methods of household hazardous waste disposal.	Active: Work continues with the Solid Waste Commission providing two collection events per year. Policies are in place both at the CF Transfer Station and the BH Co Landfill.
Encourage public not to overuse fertilizer and/or pesticides in order to protect the health of the general public.	Active: Flyers are sent home to homeowner associations explaining the issues with overuse of fertilizer and/or pesticides. Currents articles and pamphlets have also been published on this topic. This is also required by CRS.
Restrict water usage as necessary in times of severe drought in order to maintain water supply.	Active: Water supply of sufficient quantity that no water usage restrictions have been necessary.
Maintain a well-trained and equipped law enforcement agency in order to identify and respond to potential threats and events.	Active: Staff undergoes training for perimeter security regularly. There is a technical team in place which is trained in barricading. All officers are trained in civil disturbances, policies, and procedures. Tactical equipment is available and replaced as needed.
Maintain a well-trained and equipped fire department in order to provide proper response during a hazard event.	Active: Fire Operations train in various methods of response and recovery annually. Command staff attends various training and disaster drills to maintain levels of preparedness.
Purchase and install closed circuit security cameras at critical locations around the community.	Active: CFU is working with the City of Cedar Falls to provide power to selected locations of security cameras.
Place automatic locks on critical facilities to enable lock down when threat level is elevated.	Active: Locks have been installed at City Hall, Public Works, Fire Stations, Water Reclamation's gate, Sewer's 309 building, Tourism, Bluff Street transfer station building, newer office building, Rec Center steam room, Community Center and the Beach House.
Maintain and upgrade security at public utility infrastructure.	Active: CFU completed a security assessment and is replacing key locks with electronic card readers with security entrance data collection and interior and exterior security cameras.

Cedar Falls - 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Prevent cyber terrorism through training, software, and protocol procedures and policies.	Active: CFU is regularly upgrading IT software and procedures for cyber terrorism. Monthly and annual employee training takes place.
Maintain mutual aid agreements.	Active: Water, electric, gas and communication utilities are members of the IAMU mutual aid programs. Natural gas utility recently joined the American Public Gas Association's mutual aid group as an additional mutual aid source. Cedar Falls has mutual aid agreements for emergency response with all surrounding communities and the County.
Enforce and update, as necessary, an open burning policy.	Active: Updated in 2010 and enforced. Open burning is allowed by the City Code with restrictions (bon fires).
Continue inspections and repairs of dams and levees.	Active: Public Works/Park staff works with Engineering to conduct inspections of Dams and Levees every late summer. The follow up report provides deficiencies that are used as guidelines by PW/Parks to make corrections. Two additional feet of freeboard is being added to the levee and wall system. This project was completed in 2019.
Consider performing HAZUS modeling to determine the potential impact of a dam failure or levee break.	Currently underway. In 2014 a Breach Analysis was completed by the US Army Corp.
Cooperate with the Duane Arnold Nuclear Plant in Palo, IA for advice on anticipated impact on the community should a radiological event occur.	Nothing has been done in this area yet. This priority will be explored in the next cycle.
Regularly evaluate building codes and consider additions in order to better prepare for a potential earthquake event.	The 2015 International Building Code was recently adopted. As Earthquakes are a very remote threat to Cedar Falls, specific building regulations for earthquakes are not needed.
Ensure proper response capabilities to respond to any potential transportation event.	Active: Fire personnel undergo annual training in transportation emergencies. Command staff also attends various additional training.
Ensure that proper signage is available and in place to facilitate a controlled flow of traffic.	Active: Public Works/Parks has a large collection of traffic devices and go through their inventory each winter to ensure they have enough signage available for emergency operations. New signage for flooding includes: "turn around don't drown" sign.
Purchase additional evacuation route signs.	Active, additional signs are kept on hand by Public Works/Parks.
Maintain and update an evacuation plan.	City was not identified as a responsible agency, it was: Black Hawk County EMA.* We have mapped roads covered at various flood elevations in Northern Cedar Falls. We also have maps of all public facilities, for exit routing.

Cedar Falls - 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Expand and update emergency vehicle preemption system.	Active: All signals in the city are EVP except for 6th at Main and at the Parkade. All local emergency vehicles along with Parkersburg (only outside entity) have access to the emitter code. A five-year goal is exploring a partnership with Waterloo.
Ensure regular inspections of water, sanitary sewer, and storm water lines for leaks and breakages.	Active: Inspection, maintenance and repair is on-going for water, electric, gas and communication distribution systems.
Encourage potential developers and the public to conduct due diligence of a site prior to building.	Active: This is ongoing and maintained through subdivision and site plan reviews.
Continue enforcement of current building codes.	Active: Completed on a daily basis through permitting system. Codes are updated every 3 years. BCEGS (Building Code Effectiveness Grading Schedule) rating of 4 in 2016.
Maintain and train personnel on NIMS protocol.	Active: All personnel are trained to the appropriate NIMS level. Training is on-going and reviewed on a regular basis.
Encourage Family Disaster Kits for all households.	Active: Flood preparedness information is available online and published in Currents; including a list of items needed in the vent that evacuation becomes necessary.
Maintain a continuity of operations plan.	Active: An operations plan is active and was approved in 2009 to be updated as needed. A Disaster Recovery Plan with the IT department exists along with a backup payroll system.

PREVIOUS MITIGATION ACTIONS – CEDAR FALLS COMMUNITY SCHOOL DISTRCIT

Cedar Falls Community School District- 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Construct tornado safe rooms in schools.	Active: Construction was recently completed at Aldrich, North Cedar and Orchard Hill elementary buildings.
Ensure that local schools maintain terrorism response plans.	The District Safety Committee annually updates and maintains terrorism response plans for each building.

PREVIOUS MITIGATION ACTIONS – UNIVERSITY OF NORTHERN IOWA

University of Northern Iowa 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Construct tornado safe rooms in schools.	Drop from Plan.
Encourage residents to sign up for emergency alerts services on their mobile phones.	Active.
Bury power and communications lines, as is possible.	Active. Near completion.
Purchase and install closed circuit security cameras at critical locations around the community.	Active; continually evaluated.
Consider installing permanent barricades around the UNI-dome.	Active.
Work with Black Hawk County EMA to ensure that local Tier II Reports are being filed.	Active.

PREVIOUS MITIGATION ACTIONS – CITY OF DUNKERTON

Dunkerton 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Encourage & Support Public Education and Awareness (i.e., proper steps to protect property & health for all hazards, purpose of warning system, Iowa One Call, flood insurance, regulations, HAZMAT education and disposal, vaccinations for humans and pets, Fire Prevention Week for Schools, importance of disaster kits/supplies, local ordinance requirements, smoke and carbon oxide alarms, nuisance abatement education, proper landscaping and building techniques to avoid erosion, etc.).	Active, repetitive: FD holds periodic trainings for hazmat training and disposal, meets with teachers and elementary students during Fire Prevention Week; City staff attends trainings on nuisance abatement, flood mitigation.
Maintain Mutual Aid (28E) Agreements.	Active, repetitive: Mutual Aid Agreements are renewed with surrounding communities every 2 years.
Encourage use of emergency notification services.	Active: City staff work closely with Black Hawk County Emergency Management.
Maintain a Well-Trained and Well-Equipped Police Department for all Potential Hazards - Training Plan and Equipment Rotation Plan.	Active: Current services are provided by the Black Hawk County Sheriff's office.
Maintain a Well-Trained and Well-Equipped Fire Department for all Potential Hazards - Training Plan and Equipment Rotation Plan.	Active: The Dunkerton Fire Department holds monthly training exercises for all staff members.
Maintain a Well-Trained and Well-Equipped First Responders for all Potential Hazards - Training Plan and Equipment Rotation Plan.	Active, repetitive: FD and Ambulance staff hold monthly training sessions.
Maintain a Well-Trained and Well-Equipped Public Works Department of all Potential Hazards - Training Plan and Equipment Rotation Plan.	Active, repetitive: Public Works staff attends annual training sessions on Water Distribution, Water Treatment and Wastewater Management; an equipment rotation plan is currently underway.
Maintain, Update/Purchase, as needed, City Equipment and Supplies (i.e., Snow Plows, Generators, Surge Protectors, Animal Rescue supplies, Sandbag supplies, Deicer, Technology equipment, etc.).	As needed: City purchased within the last year a wing plow for snow removal, a new pickup with a V-Plow, and will be applying for grants for a new truck with a plow. A generator is onsite. The City is currently creating a computer replacement plan to rotate out older technology.
Adopt, Review, Maintain, Enforce, and Update, as needed, Existing Policies, Regulations, and Ordinances (i.e, Floodplain, Zoning, Subdivision, Snow Removal, Animal Vaccination and Licensing, etc.).	As needed: Council reviews various regulations to remain compliant with building codes, floodplain management, and zoning.
Designate, Develop, Maintain and Distribute List of Shelter Sites (all types), Maintain Shelter Agreements with Red Cross, and Conduct Shelter Operation Training with Red Cross.	Not completed: The City provides a tornado shelter for residents at the Gospel Church. There is also a tornado shelter built into the Fire Department; agreements with the Red Cross are not complete.

Dunkerton 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Develop an Emergency Evacuation and Notification Plan (includes identifying detour and evacuation routes) and Regularly Evaluate Plan.	Not completed; lack of funding.
Maintain an Adequate Supply of Road Signage (i.e., detour, closure, snow routes, etc.).	As needed: City uses the DOT Sign Replacement Program and has a sufficient supply of signs on hand.
Continue Incident Management System Training (100, 200, 700), OSHA, and Certified Flood Manager Training for City Employees.	As needed: City staff has Incident Management System training in 100, 200 and 700 coursework. City staff has completed OSHA training.
Continue to Re-Evaluate Procedures after Major Incidents.	As needed: City will re-evaluate procedures after major incidents.
Maintain Outdoor Warning Sirens through Training Procedures for Maintenance and Identification of Who is In-Charge/Responsible for City.	Active, repetitive: Warning sirens are tested the 15th of every month, Black Hawk County also monitors and alerts the City if siren malfunctions.
Develop a Public Information/Media Plan/Procedure.	Not completed; lack of funding.
Develop and Maintain a Communication Plan (Inter-Departmental and communitywide).	Active: City staff is in communication with each other thru-out each day. City staff updates community via Facebook, local paper and publication sites within City.
Maintain Utility Contact Call List.	Active: Public Works staff maintains a utility contact list and updates other staff members with contact information.
Apply for Grants/Funding as they Become Available.	Active: City staff applies for grants when possible.
Review and Update Emergency Response Plan.	Not completed; lack of funding.
Ensure Adequate Coverage of Outdoor Warning Sirens - Relocate existing sirens and/or Purchase Additional Ones.	As needed: current sirens are adequate for City.
Continue Tree Trimming and Inspection Program/Policy.	Ordinance in place: City has a yearly inspection program for trees.
Work with Local Utility Provider to Develop Program to Bury Existing Utility Lines; Install Surge Protectors and Squirrel Guards on Major Electrical Lines; Place Lightning Arrestors on Utility Polices; and Upgrade Equipment to Locate and Identify Underground Utilities.	N/A

Dunkerton 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Encourage the Schools to Re-Evaluate Safe Tornado Shelters/Rooms.	Active.
Encourage the Construction of a Tornado Safe Shelter/Room for the General Public.	Not completed: lack of funding.
Maintain and Enforce Up-to-Date Building Codes.	Active, repetitive: Bremer County provides permits for buildings within City and Building Code ordinance is updated periodically.
Develop, Enforce, and Maintain Burn Order/Burn Ban Policy.	Active: Ordinance in place.
Identify and Remedy Sewer System Inflow and Infiltration Problems.	Active: City is implementing a 5-year Inflow & Infiltration plan with the DNR.
Continue to Flood Proof Existing City-Owned Parcels, Equipment, and Utilities Located in 100-Year Floodplain.	Active, repetitive: City equipment housed in the City Maintenance Shop is moved to City Hall during flooding events. The maintenance building itself is sandbagged.
Continue Acquisition, Removal, Relocation of Structures (residential, commercial, public) from 100-Year Floodplain.	Not completed; lack of funding.
Continue to Work on Clearing Crane Creek of Sand, Debris, Etc.	Active, as needed: City has reached out to the Army Corp of Engineers and the DNR regarding removal of sand bar and silt.
Remove Existing Bridge and Replace with High-Water Flow Crossing.	Drop from plan
Encourage the Use of Best Management Practices (BMP) to Manage Storm Runoff (Buffer Strips, Retention Basins for New Subdivisions, etc.).	Active: City is attempting to purchase land for a retention pond south of the City.
Pursue Projects related to Southwest Watershed Drainage Improvements.	Drop.
Conduct Regular Storm Sewer Cleaning (drainage grates) and Opening of Sewer for Brush and Debris.	Active, as needed: City performs storm sewer cleaning before and after each rain storm, removal of leaves in the fall.
Continue Fire Department's Annual Walk-Thru of Hazardous Material Sites and Support Building Inspector is Assuring Tanks are Adequately Contained.	Active; Fire Department.

Dunkerton 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Continue to Work with Black Hawk County EMA to Ensure local Tier II HAZMAT Reports are Filed.	Active; Fire Department.
Continue Working Relationship with Northeast Iowa Response Group.	Active; Fire Department.
Ensure Local Schools, Businesses, Industries, and the City have Terrorism/Crisis Response Plan in Place.	Not completed: lack of funding.
Maintain Proper Agency Contact Information for Proper Disposal of Radiological Materials.	Active; Fire Department.
Continue to Work with Local Industries (Co-Op) and Businesses with Training and Developing Policies and Procedures for Chemicals.	Active; Fire Department.
Regulatory Update and Maintain Firewall Protection Software, Viral Security Software, and Password Protected Encryption for System Users for all City Computers.	Active: City works with BerganKDV to maintain firewall, Premier Technologies for anti-virus security.
Continue to Cooperate with Black Hawk County Health Department and Local Medical Facilities to Help Ensure Effectiveness of Prevention, Detection, and Response Mechanisms.	Active.
Update Water Distribution System (i.e., Replace Existing 4-inch Water Supply Lines with Larger Lines).	Active: Future project for the City.
Maintain Pre-Plans, Walk-Thru, and Drills with Businesses and Schools.	Not complete; lack of funding.
Conduct Regular Inspections of Public Buildings and After a Fire to Ensure Structural Integrity.	Active; Fire Department.
Maintain List of Contractors for Hazardous Spills, etc.	Active; Fire Department.
Recruit and Train Volunteer Storm Watchers and Spotters.	Not complete; lack of funding.
Flood Proof Structures in or near Flood Hazard Areas.	Not complete; lack of funding.

Dunkerton 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Continue to Regularly Back-Up City Data and Store Back-up and Software Offsite (safe deposit box, etc.).	Active, repetitive: City data is stored on email server as well as the cloud through IDrive.
Identify At-Risk Residents who May Need Emergency Medical Assistance and/or Transportation and Develop and Maintain Procedures to Assist and Contact.	Active.
Identify a Building for use as a Public Safe Shelter / Tornado Safe Room.	Not complete; lack of funding.
Encourage the Installation of Back Flow Valves.	Active: Implemented as needed; update City ordinances as needed.
Maintain a List of Potential Storm Sewer Improvement Projects.	Not complete; lack of funding.
Continue to Test Local Drinking Water Supply to Monitor Quality.	Active, repetitive: City tests daily for chlorine and weekly for iron and polyphosphate; provides an annual DNR Water Quality Report for residents.
Identify Fixed HAZMAT Sites in Community.	Not complete; lack of funding.
Install Back-up Generators at City Hall, Wells, Schools, and Critical Facilities.	Not complete; lack of funding.
Develop and Maintain Continuing Education Plan/Procedures.	Active: City staff continues CEU training by attending yearly workshops.
Develop and Update, as needed, Contingency Operations Government Plan.	Not complete; lack of funding.
Update Local Ordinances and Regulations to Require Utilities for New Construction is Buried.	Active: update ordinances as needed.
Develop, Enforce, and Maintain Debris, Rubbish, and Brush Disposal Program (includes temporary sites for disposal).	Active: City contracts with Thomas James for disposal services.
Identify Bonded Contractors available for Affected Residents.	Active.

Dunkerton 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Explore Alternative Water Supply Options to Improve Water Supply System (i.e., either an Additional Well to Supplement System, Installation of an Emergency Hookup to Rural Water System, etc.).	Active: Two Wells service the City and a monthly draw down test is completed to determine how much water is in aquifer.
Develop and Enforce, when necessary, Water Restriction Ordinance.	Not completed; future ordinance to be written.
Develop and Enforce an Ordinance on Cleaning Up and Proper Disposal of Pet Waste in Public Areas.	Not completed; future ordinance to be written.
Spray as Needed for Mosquitoes and Other Insects.	Active, as needed: City sprays during spring and summer months.
Maintain Control and Protection of City Buildings and Utilities (Lockdown Policy, etc.).	Active, as needed: City buildings have push button entry and access codes are reset periodically.
Continue to Maintain a List of Railroad Personnel Contacts and Project Manufacturers.	Active.
Place Tile in Back of Curbs on New Construction.	Active; update ordinances as needed.
Maintain Relationship/Contract with Cedar Bend Humane Society and Black Hawk County.	Active; City contracts with Cedar Bend Humane Society for animals at large.
Work with Designated Authorities to Ensure Dead Animals are Properly Disposed.	Active; City staff works with Thomas James regarding disposal of animals.
Maintain Contact with Palo Nuclear Plan to Receive Procedural and Staff Changes.	Not completed: Palo Nuclear Plant will be ceasing energy production at the end 2020. Drop.

PREVIOUS MITIGATION ACTIONS – CITY OF ELK RUN HEIGHTS

Elk Run Heights 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Encourage & Support Public Education and Awareness (Encourage use of Emergency Notification System / Code Red, Use of Surge Protectors, NOAA radios, trim trees, HAZMAT handling and storage, Iowa One Call, 'Shelter in Place', public health news, current vaccinations for domestic animals, reducing production of mosquitoes, etc.) .	Active: City website.
Maintain Contract for Law Enforcement, Fire Protection, and EMS services.	Active: Evansdale covers Police Service. Waterloo covers Fire & EMT service.
Encourage and Support Emergency Notification System.	Active.
Enforce Local Regulations for New Development to Bury Utility Lines.	Active.
Maintain a well-equipment Street Department.	Active.
Continue to Back-up City Data Digitally and Store Offsite.	Active via contracted providers.
Continue bridge inspections.	Active.
Continue to Work with Black Hawk County EMA to Ensure local Tier II HAZMAT Reports are Filed.	Active.
Maintain Contract for Service with Northeast Iowa Response Group.	Active.
Maintain warning sirens.	Active.
Update and maintain security controls of IT and vulnerable targets.	Active via contracted providers.
Continue to encourage and /or require smoke detectors, sprinkler systems, and fire extinguishers.	Active.

Elk Run Heights 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Continue building inspections.	Active.
Identify and remove dangerous structures.	Active.
Maintain Routine Street Program.	Active.
Enforce Storm Water Management Program.	Active.
Continue proper handling of HAZMAT.	Active.
Continue to promote green space in floodplain.	Active.
Enforce Sedimentation and Erosion Control Program.	Active through Engineer and Inspector.
Continue Water Sampling Program.	Active.
Maintain current gas detectors.	Active.
Ensure gas lines are marked before digging (Iowa One Call).	Active through MidAmerican Energy.
Continue coordination and communication activities with Black Hawk County EMA.	Active.
Continue cooperation and communication with Black Hawk County Health Department.	Active.
Continue basic NIMS training.	Active.

Elk Run Heights 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Regularly Review and Update, and Enforce Existing Policies, Regulations, and Ordinances (i.e., Storm Sewer, Building Codes, Floodplain Management, etc.).	Active.
Ensure Back-Up Power Generation at Critical Facilities and Infrastructure.	Active.
Maintain water lines and repair/replace when needed.	Active.
Support redundant communication systems for emergency and city personnel.	Active.
Maintain community website to assist disseminate information to the public.	Active.
Continue Implementation of Contingency Operations Government Plan.	Active.
Manage storm water through monitoring residential modification to ditches.	Active: Street Department.
Consider the development of a Tornado Safe Room for the general public.	Drop
Maintain Membership to the NFIP.	Active.
Coordinate with Red Cross and EMA for Shelter.	Active / As needed.
Maintain backup fuel supplies or identify a ready source of supply.	In process.
Enforce the issuance of burn bans, when necessary.	Active.
Enforce water restrictions, when necessary.	Active.

Elk Run Heights 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Support the construction of a northeast bypass project.	Active.
Establish designated routes for the transportation of hazardous materials.	Active.
Maintain security at vulnerable targets.	Active / Police Department.
Enact a curfew, if necessary, per Code.	Active / As needed by Police Department.
Improve water distribution system when funding becomes available.	In Process.
Educate the public on how to identify approved/certified contractors.	Active.

PREVIOUS MITIGATION ACTIONS – CITY OF EVANSDALE

Evansdale 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Educate the public.	Active: Radio, Television, cellular telephones, landline telephones, newspapers, warning sirens, NOAA Radio Service and internet are available to the public at large. The city has access to alert information on its website.
Continue to work with MidAmerican's tree inspection and trimming program.	Active: Urban Forest Management Plan evaluation conducted by the IA DNR summer of 2016. MidAmerican Energy assisting the city with tree trimming.
Continue storm sewer drainage and emergency pumping capability improvement projects.	Active: Storm sewer drainage systems are inspected and leaned semi-annually and the city is replacing storm water inlets as needed. Current replacement average is 6 per calendar year.
Review and make updates, as needed, to storm water management program.	Active: The City of Evansdale has an active MS4 Storm Sewer Permit. Storm Sewer manager oversees storm sewer maintenance in the city and is an active member of the Middle Cedar Watershed Management Authority. Design study completed on Meyers Lake Weir.
Purchase new generators to provide emergency power in times of need. (for pumping station, lift station, sewer and water treatment plants).	Active: The City is building a new Waste Water Treatment Plant on the dry side of the levee and is to be considered Phase I of pumping station upgrades. The new WWTP will be equipped with a generator. Phase II will include generator implementation for lift stations.
Encourage local utility to install surge protectors on major electric lines.	Active: MidAmerican regulates at sub-station with 5% - that is alarmed. +/-
Install new rotating warning siren to replace existing.	Active: New rotating warning siren installed on 6th Street, November 2014.
Maintain, enforce and update Building Codes as needed.	Active: Building code updated to the 2003 version of International Code March 2018. Building Code is maintained and enforced daily.
Identify locations and encourage the construction of "Tornado Safe" shelters at popular outdoor recreation sites or at sites utilized by at risk populations (senior housing, multi-family housing, trailer parks).	Not completed; lack of funding.
Develop a "Tornado Safe Room" awareness program.	Not completed; lack of funding.

Evansdale 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Maintain participation in the emergency notification system.	Active: Evansdale is active with emergency notification system and public awareness.
Encourage the public to sign up for emergency alerts services.	Active: Participate in the Alert Iowa program; link on website; reminders listed in annual newsletter.
Construct storm water pump stations at various locations within the city.	Not completed: Lack of funding; placed in Capital Improvement Plan.
Maintain the clearing of drainage ditch northwest of the Community.	Active: Working in partnership with the City of Waterloo to keep cleared.
Purchase a sandbagging machine.	Not completed. Lack of funding; placed in Capital Improvement Plan.
Maintain and update sandbagging plan.	Not Applicable – drop.
Maintain, enforce, and update Zoning and Floodplain Ordinances as needed.	Active: Codification of Ordinances was completed in 2018. All required State/Local updates were completed.
Acquisition and removal of homes from the floodplain.	Active: Flood buy-out and demolition of properties completed in 2012.
Elevate houses in the floodplain.	Active.
Construct additional levees on the east side of Elk Run Creek.	Not completed: Lack of funding. However, Duckbill valves have been installed in the storm water system to assist in the prevention of storm water back-up.
Upgrade pumps in the Michigan Avenue lift station.	Active: Pumps were replaced in 2017; however, it is on the city's Phase II Capital Improvement Plan to replace the lift station.
Elevate wastewater treatment facility buildings above 100-year base flood elevation.	Active: Phase I Capital Improvement to build a new wastewater treatment plant on the dry side of the levee. To be completed by December 1, 2021.
Continue to provide necessary training to Fire Department personnel, Police Department personnel, and ambulance crews.	Active.

Evansdale 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Maintain existing Mutual Aid agreements with surrounding communities and the Northeast Iowa Response Group for mutual aid emergency assistance.	Ongoing; agreement in place.
Hire additional drivers to aid in snow removal.	Active: One additional driver was hired to assist with snow removal.
Designate official "Heat Shelters" that have back-up generator power and can be made available for those in need during a winter storm.	Active: Radiant heat to be installed.
Stockpile sufficient sand and salt supplies for use on snowy/icy roads.	Active: Sand and salt supplies are ordered annually, prior to snow/ice events.
Continue to encourage the installation of sprinkler systems in multi-family dwellings, industrial buildings, and public buildings (schools included).	Active: Enforced by building inspector to current international building code specifications.
Upgrade radio communications equipment as needed.	Active: Complete system upgraded in 2018.
Enforce City guidelines for burning.	Active.
Encourage the installation of carbon monoxide detectors in houses and public buildings.	Active: Building code requires all new homes to have carbon monoxide detectors installed.
Install Global Positioning Systems in all emergency vehicles.	Active: Radio communications available.
Recruit and retain volunteers.	Active: Volunteers completed resource manager personnel application and have received volunteer identification.
Review and improve evacuation plans and file with LEPC.	Active: Countywide evacuation plan in place.
Purchase a portable public address system.	Active: Equipment installed on police and fire vehicles.
Regularly review and update Incident Command process as needed.	Active: Policy is 80% completed.

Evansdale 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Support the National Incident Management System (NIMS).	Active.
Continue dike inspection program.	Active: Completed annually by USACE.
Continue to maintain dike as needed.	Active: maintained as required by USACE.
Establish local "Cooling Sites" for at risk populations such as the elderly and/or disabled.	Active: Work with Red Cross when / if situations arise by utilizing Community Response Center.
Consult the Natural Resources Conservation Service (NRCS) soil survey for the location of unstable soils.	Not Applicable.
Ensure that MSDS forms are updated on a regular basis.	Active: Manuals have been prepared for each department and are accessible by all employees.
Inform city employees of any hazardous materials they may encounter in the workplace.	Active: SDS manuals in place.
Encourage residents to fill and cap old septic tanks to prevent sinkholes.	Active: Residents complete fill process as issues arise.
Cap old wells to prevent contamination.	Active: Residents complete fill process as issues arise.
Identify any sinkholes that develop with proper warning signage.	Active: The Public Works Department oversees any sinkholes the city may have on public property and proper signage would be installed until the issue was repaired.
Evaluate current terrorism mitigation efforts.	Active: 80% complete.
Plan for water conservation or rationing should the conditions warrant such action.	Active.
Continue contract with Black Hawk County Health Department on a larvicide program.	Active: Utilizing a private contractor as needed; Black Hawk County places a mosquito surveillance trap within the city to check for West Nile virus.

Evansdale 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Regularly review and amend Fire, Medical, and Hazardous Material response standard operating procedures.	Active: Black Hawk County Hazard Mitigation Plan and Planning.
Adopt a recovery ordinance.	Active: 80% complete.
Develop a Continuity of Operations Plan.	Active: 80% complete.
Update Emergency Response Plan.	Active: 80% complete.
Cooperate with the metropolitan evacuation plan.	Active: County-wide plan is in place.

PREVIOUS MITIGATION ACTIONS – CITY OF GILBERTVILLE

Gilbertville 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Encourage & Support Public Education and Awareness (i.e., proper steps to protect property & health for all hazards, purpose of warning system, Iowa One Call, flood insurance, regulations, HAZMAT education and disposal, vaccinations for humans and pets, Fire Prevention Week for Schools, importance of disaster kits/supplies, local ordinance requirements, smoke and carbon oxide alarms, nuisance abatement education, proper landscaping and building techniques to avoid erosion, etc.).	Active: Fire Prevention week the Fire Department brings burn trailer in and does other activities with the school. The Fire & Police conduct annual walk through of school and businesses.
Maintain Mutual Aid (28E) Agreements.	Active: The City has mutual aid agreements for emergency services. (Fire, police, ambulance and hazmat)
Encourage use of emergency notification services.	Active: EMG warning siren used for emergency notifications. Website has a link for emergency notifications from Emergency Management.
Maintain a Well-Trained and Well-Equipped Police Department for all Potential Hazards - Training Plan and Equipment Rotation Plan.	Active: Ongoing training and up-to-date equipment including a 2017 Ford Explorer.
Maintain a Well-Trained and Well-Equipped Fire Department for all Potential Hazards - Training Plan and Equipment Rotation Plan.	Active: Fire Department has ongoing training and up to date equipment. New Pumper Truck.
Maintain a Well-Trained and Well-Equipped First Responders for all Potential Hazards - Training Plan and Equipment Rotation Plan.	Active; underway: Working on a plan to have all Fire Personnel trained as First Responder's.
Maintain a Well-Trained and Well-Equipped Public Works Department of all Potential Hazards - Training Plan and Equipment Rotation Plan.	Active: Ongoing training/safety training and up to date equipment.
Continue Incident Management System Training (100, 200, 700), OSHA, and Certified Flood Manager Training for City Employees.	Active; underway: Working towards all city staff, elected, and appointed officials having training.
Continue to Re-Evaluate Procedures after Major Incidents.	Active: Work in conjunction with EMG and other agencies.
Maintain Outdoor Warning Sirens through Training Procedures for Maintenance and Identification of Who is In-Charge/Responsible for City.	Active; underway: Work with EMA on testing the siren to ensure it works and maintenance when/if any problems are discovered. Plan to replace and install an added siren in the future.
Install Back-up Generators at City Hall, Wells, Schools, and Critical Facilities.	Active: Critical Facilities have backup generators and work towards one for city hall.

Gilbertville 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Apply for Grants/Funding as they Become Available.	Active: The City applies for grants and has successfully received many grants for equipment and vehicles.
Develop and Update, as needed, Contingency Operations Government Plan.	Not completed.
Review and Update Emergency Response Plan.	Active: The city will evaluate and update the emergency response plan.
Encourage the Schools to Re-Evaluate Safe Tornado Shelters/Rooms.	Not completed.
Encourage the Construction of a Tornado Safe Shelter/Room for the General Public.	Active: Possible tornado room when public safety building is built.
Regulatory Update and Maintain Firewall Protection Software, Viral Security Software, and Password Protected Encryption for System Users for all City Computers.	Active: City hall and police store on clouds. City hall is password protected.
Continue to Cooperate with Black Hawk County Health Department and Local Medical Facilities to Help Ensure Effectiveness of Prevention, Detection, and Response Mechanisms.	Active: Ongoing.
Update Water Distribution System (i.e., Replace Existing 4-inch Water Supply Lines with Larger Lines).	Active: City continues to work on upgrading the water distribution system. New well 2016. Capped old well.
Conduct Regular Inspections of Public Buildings and After a Fire to Ensure Structural Integrity.	Active: As needed.
Remain a Member of National Flood Insurance Program.	Active; annual: City is a member.
Identify At-Risk Residents who May Need Emergency Medical Assistance and/or Transportation and Develop and Maintain Procedures to Assist and Contact.	Active: Marion Housing Residents, elderly, students.
Identify a Building for use as a Public Safe Shelter / Tornado Safe Room.	Not completed.
Continue to Test Local Drinking Water Supply to Monitor Quality.	Active: Per DNR requirements.

Gilbertville 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Maintain, Update/Purchase, as needed, City Equipment and Supplies (i.e., Snow Plows, Generators, Surge Protectors, Animal Rescue supplies, Sandbag supplies, Deicer, Technology equipment, etc.).	Active: Ongoing as needed.
Adopt, Review, Maintain, Enforce, and Update, as needed, Existing Policies, Regulations, and Ordinances (i.e, Floodplain, Zoning, Subdivision, Snow Removal, Animal Vaccination and Licensing, etc.).	Updated as needed.
Designate, Develop, Maintain and Distribute List of Shelter Sites (all types), Maintain Shelter Agreements with Red Cross, and Conduct Shelter Operation Training with Red Cross.	Not completed.
Develop an Emergency Evacuation and Notification Plan (includes identifying detour and evacuation routes) and Regularly Evaluate Plan.	Not completed.
Maintain an Adequate Supply of Road Signage (i.e., detour, closure, snow routes, etc.).	Active: Street signs kept up to date.
Develop a Public Information/Media Plan/Procedure.	Active: City web site, Fire and Police Face book pages and local media.
Develop and Maintain a Communication Plan (Inter-Departmental and communitywide).	Not completed.
Develop and Maintain Continuing Education Plan/Procedures.	Active; ongoing: The City supports continuing education for all departments.
Maintain Utility Contact Call List.	Active: The City will compile a list.
Acquire Land and Build new Fire Station to Accommodate Department Needs.	Active: Fire Association has purchased land and has plans drawn up. Working on funding.
Continue Tree Trimming and Inspection Program/Policy.	Active: Conducted by Public Works as needed.
Work with Local Utility Provider to Develop Program to Bury Existing Utility Lines; Install Surge Protectors and Squirrel Guards on Major Electrical Lines; Place Lightning Arrestors on Utility Polices; and Upgrade Equipment to Locate and Identify Underground Utilities.	Not completed.

Gilbertville 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Maintain and Enforce Up-to-Date Building Codes.	Active: City contracts with an Inspector to ensure codes are enforced.
Develop, Enforce, and Maintain Debris, Rubbish, and Brush Disposal Program (includes temporary sites for disposal).	Active: City has implemented a burn pile for brush and a yard waste dumpster for grass and leaves.
Identify Bonded Contractors available for Affected Residents.	Active: Through INRCOG program.
Identify and Remedy Sewer System Inflow and Infiltration Problems.	Active: Contract for yearly inspection and cleaning on a rotating basis.
Ensure Local Schools, Businesses, Industries, and the City have Terrorism/Crisis Response Plan in Place.	Active: Police have worked with the school for an active shooter plan.
Maintain Control and Protection of City Buildings and Utilities (Lockdown Policy, etc.).	Active: Cameras have been installed and all city property is locked.
Encourage the Use of Best Management Practices (BMP) to Manage Storm Runoff (Buffer Strips, Retention Basins for New Subdivisions, etc.).	Not completed.
Conduct Regular Storm Sewer Cleaning (drainage grates) and Opening of Sewer for Brush and Debris.	Active; annual: Contract for yearly inspection and cleaning on a rotation plan.
Continue to Work with Black Hawk County EMA to Ensure local Tier II HAZMAT Reports are Filed.	Active; Fire Department completes, as needed.
Continue Working Relationship with Northeast Iowa Response Group.	Active: 28E with Waterloo Fire and Rescue.
Maintain Pre-Plans, Walk-Thru, and Drills with Businesses and Schools.	Active; annual: Conducted by Fire and Police.
Continue to Maintain a List of Railroad Personnel Contacts and Project Manufacturers.	Drop.
Recruit and Train Volunteer Storm Watchers and Spotters.	Active: Gilbertville Fire & Rescue and Emergency.

Gilbertville 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Continue to Regularly Back-Up City Data and Store Back-up and Software Offsite (safe deposit box, etc.).	Active; ongoing: City hall software information is stored on a cloud.
Place Tile in Back of Curbs on New Construction.	Completed.
Identify any Language Barriers in Community and Develop Procedures to Address the Barriers (i.e, Translators, etc.).	Drop.
Ensure Adequate Coverage of Outdoor Warning Sirens - Relocate existing sirens and/or Purchase Additional Ones.	Underway: Planning to add a new siren closer to the new development and update the old one.
Update Local Ordinances and Regulations to Require Utilities for New Construction is Buried.	Active: All lines in the new addition were buried.
Develop, Enforce, and Maintain Burn Order/Burn Ban Policy.	Active; Per order of Fire Chief.
Continue to Flood Proof Existing City-Owned Parcels, Equipment, and Utilities Located in 100-Year Floodplain.	NA
Explore Alternative Water Supply Options to Improve Water Supply System (i.e., either an Additional Well to Supplement System, Installation of an Emergency Hookup to Rural Water System, etc.).	Active: A new well was dug and put into use in 2016.
Develop and Enforce, when necessary, Water Restriction Ordinance.	Active; As needed.
Maintain Proper Agency Contact Information for Proper Disposal of Radiological Materials.	Drop.
Develop and Enforce an Ordinance on Cleaning Up and Proper Disposal of Pet Waste in Public Areas.	Completed; Ordinance in place.
Spray as Needed for Mosquitoes and Other Insects.	Active; Mosquito control was implemented in 2017.
Continue to Work with Local Industries (Co-Op) and Businesses with Training and Developing Policies and Procedures for Chemicals.	Active: Public works staff are licensed to spray chemicals and have training to keep license current.

Gilbertville 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Maintain List of Contractors for Hazardous Spills, etc.	Active: Contract with Black Hawk County Hazmat.
Construct Levees to Protect People and Property.	Drop.
Flood Proof Structures in or near Flood Hazard Areas.	Drop.
Identify and Maintain List of Fall Out Shelters.	Not completed.
Maintain Relationship/Contract with Cedar Bend Humane Society and Black Hawk County.	Active: Contact on an as needed basis.
Identify Fixed HAZMAT Sites in Community.	Drop.
Work with Designated Authorities to Ensure Dead Animals are Properly Disposed.	Active: PW disposes of dead animals.
Encourage the Installation of Back Flow Valves.	Active.
Maintain a List of Potential Storm Sewer Improvement Projects.	In process: Plan to make repairs and improvements yearly as funds are available.
Maintain Contact with Palo Nuclear Plan to Receive Procedural and Staff Changes.	Drop.
Evaluate and replace aging city water lines on an annual basis.	In process: Plan to continue the program when funds are available.
Build a new well.	Completed in 2016.
Build a new wastewater treatment plant.	Completed in 2016/2017.

PREVIOUS MITIGATION ACTIONS – CITY OF HUDSON

Hudson 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Encourage & Support Public Education and Awareness (i.e., proper steps to protect property & health for all hazards, purpose of warning system, Iowa One Call, flood insurance, regulations, HAZMAT education and disposal, vaccinations for humans and pets, Fire Prevention Week for Schools, importance of disaster kits/supplies, local ordinance requirements, smoke and carbon oxide alarms, nuisance abatement education, proper landscaping and building techniques to avoid erosion, etc.).	Active; as needed.
Maintain Mutual Aid (28E) Agreements.	Active; per each 28e agreement stipulations.
Encourage Use of emergency notification services.	Retained; no timeline established.
Maintain a Well-Trained and Well-Equipped Police Department for all Potential Hazards - Training Plan and Equipment Rotation Plan.	Active; as budget and volunteer availability allows.
Maintain a Well-Trained and Well-Equipped Fire Department for all Potential Hazards - Training Plan and Equipment Rotation Plan.	Active; as budget and volunteer availability allows.
Maintain a Well-Trained and Well-Equipped First Responders for all Potential Hazards - Training Plan and Equipment Rotation Plan.	Active; as budget and volunteer availability allows.
Maintain a Well-Trained and Well-Equipped Public Works Department of all Potential Hazards - Training Plan and Equipment Rotation Plan.	Active; as budget allows.
Maintain, Update/Purchase, as needed, City Equipment and Supplies (i.e., Snow Plows, Generators, Surge Protectors, Animal Rescue supplies, Sandbag supplies, Deicer, Technology equipment, etc.).	Active; as budget/funding allows.
Adopt, Review, Maintain, Enforce, and Update, as needed, Existing Policies, Regulations, and Ordinances (i.e, Floodplain, Zoning, Subdivision, Snow Removal, Animal Vaccination and Licensing, etc.).	In process; Working on a replacement structure.
Designate, Develop, Maintain and Distribute List of Shelter Sites (all types), Maintain Shelter Agreements with Red Cross, and Conduct Shelter Operation Training with Red Cross.	Active.
Develop an Emergency Evacuation and Notification Plan (includes identifying detour and evacuation routes) and Regularly Evaluate Plan.	In process: Reviewing citywide plan for 2019-2020.

Hudson 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Continue Incident Management System Training (100, 200, 700), OSHA, and Certified Flood Manager Training for City Employees.	As needed: Train new employees and elected officials as they start their tenure.
Continue to Re-Evaluate Procedures after Major Incidents.	Ongoing as incidents arise.
Maintain Outdoor Warning Sirens through Training Procedures for Maintenance and Identification of Who is In-Charge/Responsible for City.	Active.
Work with Local Utility Provider to Develop Program to Bury Existing Utility Lines; Install Surge Protectors and Squirrel Guards on Major Electrical Lines; Place Lightning Arrestors on Utility Polices; and Upgrade Equipment to Locate and Identify Underground Utilities.	Active.
Update Local Ordinances and Regulations to Require Utilities for New Construction is Buried.	Ordinance passed by Council in June 2019.
Encourage the Schools to Re-Evaluate Safe Tornado Shelters/Rooms.	Active conversations with schools.
Encourage the Construction of a Tornado Safe Shelter/Room for the General Public.	Active conversations.
Develop, Enforce, and Maintain Debris, Rubbish, and Brush Disposal Program (includes temporary sites for disposal).	Active; When a major wind event happens, the City will allow debris, rubbish & brush to be deposited at the Recycle Center.
Identify and Remedy Sewer System Inflow and Infiltration Problems.	Active; evaluating.
Conduct Regular Storm Sewer Cleaning (drainage grates) and Opening of Sewer for Brush and Debris.	Active.
Continue Fire Department's Annual Walk-Thru of Hazardous Material Sites and Support Building Inspector is Assuring Tanks are Adequately Contained.	Active.
Continue to Work with Black Hawk County EMA to Ensure local Tier II HAZMAT Reports are Filed.	Active.
Continue Working Relationship with Northeast Iowa Response Group.	Active.

Hudson 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Maintain Proper Agency Contact Information for Proper Disposal of Radiological Materials.	Active.
Spray as Needed for Mosquitoes and Other Insects.	Active: Spray twice per week in 2019.
Maintain Control and Protection of City Buildings and Utilities (Lockdown Policy, etc.).	Underway: Updating a plan in 2019-2020
Continue to Work with Local Industries (Co-Op) and Businesses with Training and Developing Policies and Procedures for Chemicals.	Active.
Regulatory Update and Maintain Firewall Protection Software, Viral Security Software, and Password Protected Encryption for System Users for all City Computers.	Active: All IT operations are contracted with an outside vendor.
Continue to Cooperate with Black Hawk County Health Department and Local Medical Facilities to Help Ensure Effectiveness of Prevention, Detection, and Response Mechanisms.	Active.
Maintain Pre-Plans, Walk-Thru, and Drills with Businesses and Schools.	Active.
Conduct Regular Inspections of Public Buildings and After a Fire to Ensure Structural Integrity.	Active.
Maintain List of Contractors for Hazardous Spills, etc.	Active.
Recruit and Train Volunteer Storm Watchers and Spotters.	Active.
Flood Proof Structures in or near Flood Hazard Areas.	Active.
Remain a Member of National Flood Insurance Program.	Active. Backups occur daily offsite.
Continue to Regularly Back-Up City Data and Store Back-up and Software Offsite (safe deposit box, etc.).	Active.

Hudson 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Identify and Maintain List of Fall Out Shelters.	Active.
Identify a Building for use as a Public Safe Shelter / Tornado Safe Room.	Not completed: discussions have taken place but needs to be revisited.
Identify Fixed HAZMAT Sites in Community.	Active.
Encourage the Installation of Back Flow Valves.	Underway: this effort is starting to take place on a more regular basis with current developments.
Continue to Test Local Drinking Water Supply to Monitor Quality.	Active: regular testing.
Maintain an Adequate Supply of Road Signage (i.e., detour, closure, snow routes, etc.).	Active: Replace signage as needed.
Identify any Language Barriers in Community and Develop Procedures to Address the Barriers (i.e, Translators, etc.).	Active.
Install Back-up Generators at City Hall, Wells, Schools, and Critical Facilities.	Recently purchased generators for city hall and sewer plant / city building.
Develop and Maintain a Communication Plan (Inter-Departmental and communitywide).	Active: Updated as needed.
Develop and Maintain Continuing Education Plan/Procedures.	Active: Updated as needed.
Maintain Utility Contact Call List.	Active: Updated as needed.
Apply for Grants/Funding as they Become Available.	Active.
Develop and Update, as needed, Contingency Operations Government Plan.	Active: Updated as needed.

Hudson 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Review and Update Emergency Response Plan.	Active.
Ensure Adequate Coverage of Outdoor Warning Sirens - Relocate existing sirens and/or Purchase Additional Ones.	Active. Updated or replaced as needed.
Continue Tree Trimming and Inspection Program/Policy.	Active.
Maintain and Enforce Up-to-Date Building Codes.	Underway: City is updating building codes to 2015.
Develop, Enforce, and Maintain Burn Order/Burn Ban Policy.	Active: updated when needed.
Identify Bonded Contractors available for Affected Residents.	Active: updated when needed.
Explore Alternative Water Supply Options to Improve Water Supply System (i.e., either an Additional Well to Supplement System, Installation of an Emergency Hookup to Rural Water System, etc.).	Active plans.
Enforce, when necessary, Water Restriction Ordinance.	Active; Enforce if needed.
Develop and Enforce an Ordinance on Cleaning Up and Proper Disposal of Pet Waste in Public Areas.	Active; Enforce when needed.
Ensure Local Schools, Businesses, Industries, and the City have Terrorism/Crisis Response Plan in Place.	Active.
Update Water Distribution System (i.e., Replace Existing 4-inch Water Supply Lines with Larger Lines).	Active. Planning and implementation.
Construct Levees to Protect People and Property.	Planning underway.
Identify At-Risk Residents who May Need Emergency Medical Assistance and/or Transportation and Develop and Maintain Procedures to Assist and Contact.	Active.

Hudson 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Place Tile in Back of Curbs on New Construction.	Active.
Maintain Relationship/Contract with Cedar Bend Humane Society and Black Hawk County.	Active.
Work with Designated Authorities to Ensure Dead Animals are Properly Disposed.	Active.
Maintain a List of Potential Storm Sewer Improvement Projects.	Planning underway.
Maintain Contact with Palo Nuclear Plan to Receive Procedural and Staff Changes.	Active.
Acquire Land and Build new Fire Station to Accommodate Department Needs.	This was completed in the 80's. There are no plans to update the fire station location at this time.
Continue to Flood Proof Existing City-Owned Parcels, Equipment, and Utilities Located in 100-Year Floodplain.	Active.
Continue Acquisition, Removal, Relocation of Structures (residential, commercial, public) from 100-Year Floodplain.	Active.
Encourage the Use of Best Management Practices (BMP) to Manage Storm Runoff (Buffer Strips, Retention Basins for New Subdivisions, etc.).	Active.

PREVIOUS MITIGATION ACTIONS – La Porte City

La Porte City 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Educate the public.	Active. City provides information on City website, local newspaper and social media as necessary.
Maintain and improve outdoor warning siren network.	Active. City will continue to maintain existing sirens as necessary
Recruit and train additional storm/tornado spotters.	Active. Fire Department members are trained weather spotters. Training done as necessary
Continue tree trimming/maintenance procedures.	Ordinance in place. City trims or removes trees as necessary
Place all utility lines underground.	Active, ongoing. Utility lines are being placed underground as time and funding allows.
Identify areas to construct public tornado shelters or safe rooms.	Not completed.
Construct public tornado safe rooms in areas the city determines to be appropriate.	Not completed. Lack of funding
Improve the existing storm sewer system.	To be implemented as funding allows during street improvement projects.
Study the impacts of further development uphill.	Active, ongoing. No development planned at this time.
Require new developments to account for any increased runoff (e.g. detention basins).	Ordinance in place.
Identify locations for buffer strips to be constructed and maintained; build terraces in areas surrounding the community.	Not completed. Lack of funding.
Enforce the local ordinance that prohibits swimming in Wolf Creek.	Active, ongoing.

La Porte City 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Erect barricades near Wolf Creek during flood events.	Active, barricades are placed during flood events
Maintain water rescue equipment and training.	Active, ongoing. Dry suits purchased in 2019.
Protect critical facilities.	Active, ongoing. Dependent on funding availability
Maintain membership in the National Flood Insurance Program (NFIP).	Completed, ongoing. City maintains membership in NFIP
Construct an elevated access to the sewer plant.	Not completed. Included in plans for sewer treatment plant upgrades to be completed in 2020.
Construct an upstream dam/detention pond to control the rate of water release on the community.	Not completed. Lack of funding
Maintain the channel of Wolf Creek.	Active, ongoing. City/County cleared channel in 2018
Consider the construction of flood walls.	Not completed. Lack of funding
Continue to identify, purchase, and remove structures and populations in danger of being flooded; in addition to maintaining a list of properties that they deem as potential buyout candidates.	Active, ongoing. Dependent on funding.
Elevate or relocate public structures in the floodplain, as needed.	Not completed. Lack of funding.
Maintain a well-trained and well-staffed Public Works department.	Active, ongoing. Public works staff receives training as necessary.
Consider purchase new radios for Public Works personnel so that they may communicate with first responder agencies.	Not completed.
Maintain an official standard operating procedure for order in which streets are to be cleared.	Not completed

La Porte City 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Monitor water mains to guard against freezing.	Active, ongoing
Maintain a well-trained and well-equipped fire department.	Active, ongoing. FD personnel received all necessary training.
Ensure the fire department's needs are met.	Active, ongoing. City purchased new grass truck in 2018, dry suits and bunker gear in 2019. Need to replace SCBAs
Enforce, maintain, and update the fire codes as deemed necessary.	Active, ongoing
Encourage installation of smoke detectors in all structures in the community.	Active, as funding allows.
Upgrade radio equipment for fire department.	Active – new radios will be purchased in 2019.
Follow the National Incident Management System (NIMS) protocol.	Active, ongoing. Fire Department, Public Works and Police personnel all received necessary training
Maintain generators at critical facilities throughout the community.	Completed. Generators are available for all critical facilities.
Maintain the power plant.	Active, ongoing
Maintain and enforce local building and zoning codes.	Active, ongoing. Updated to IBC/IRC 2015
Ensure that proper signage is in place and in working order at all railroad crossings.	Active, ongoing.
Consider drafting a local evacuation plan.	Not completed.
Maintain mutual aid agreements for HAZMAT response with the Northeast Iowa Response Group.	Active, ongoing. HAZMAT agreements maintained and updated as necessary

La Porte City 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Encourage improving safety at all railroad crossings.	Active, ongoing. City monitors crossings and reviews accident data provided by IDOT annually.
Maintain viable first responder agencies to ensure an effective and efficient response.	Active, ongoing.
Maintain a well-trained and well-equipped law enforcement agency.	Active, ongoing. Training provided as necessary. Equipment purchases including body cams and in car cameras purchased as necessary.
Evaluate lighting along roadways throughout the community.	Active, ongoing by La Porte City Utilities.
Use fuel tanks that are specifically designed to withstand impacts of collisions.	Active, ongoing.
Install warning alarms on tanks containing explosive materials.	Not completed
Perform spot-inspections at areas businesses and residences to check for unsafe storage procedures.	Not completed.
Encourage the local grain elevator to maintain its facility.	Active, ongoing. Fire Department personnel tour local elevator annually and update facility data.
Work with the county to develop a household hazardous materials waste disposal program.	Active, ongoing. County has developed program. City promotes disposal events through website, social media and local newspaper.
Practice storm water management.	Active, ongoing.
Enforce DNR regulations.	Active.
Remove leaky underground storage tanks.	Not completed.
Foster regional cooperation to limit pollution into lakes, rivers, and creeks.	Active, ongoing. City is member of Upper and Middle Cedar River Watershed groups.

La Porte City 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Ensure that all known storage sites are filing proper Tier II reports.	Not completed.
Ensure that MSDS forms are updated on a regular basis.	Active, ongoing. City will be purchasing MSDS document service to allow staff to maintain and easily access current safety data sheets.
Develop and update as necessary City Emergency Plans.	Not completed.
Evaluate communications system with the local school system.	Active, ongoing. Local police department communicates regularly with local school district.
Ensure the local schools have Emergency Response Plans in place.	Completed, active. Local school as Emergency Response Plan.
Ensure that local public safety personnel receive anti-terrorism training.	Active, ongoing. Training is provided to City staff as necessary.
Enforce curfew for minors.	Active, ongoing.
Place lightning arrestors on all lift stations.	Completed. Lighting arrestors placed on all lift stations.
Improve storm water systems in areas deemed to be currently inadequate.	Not completed. Lack of funding.
Maintain the municipal swimming pool.	Active, ongoing.
Identify locations that can be used as cooling shelters.	Completed. Community Center identified as local cooling shelter.
Identify service agencies that provide fans and air conditions to the underprivileged.	Completed, ongoing.
Consider inspection of the fire station and other critical public facilities for earthquake resistance.	Not completed.

La Porte City 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Investigate the possibility of providing radioactivity detection devices to the fire department.	Not completed.
Implement and enforce burn bans when severe drought occurs.	Active, ongoing. Burn bans are enforced when necessary.
Manage areas of heavy vegetation.	Active, ongoing.
Cooperate with the Health Department and the State Veterinary Office for monitoring and responding to any perceived epidemic.	Not completed.
Provide flue, hepatitis A/B, and tetanus shots to city employees.	Active, ongoing. Immunizations available to all City employees.
Maintain clean public facilities.	Active, ongoing. Janitorial services are utilized at all City facilities.
Consider the use of expansion joins in all new construction.	Not completed.
Place tiles behind street curbs when construction takes place.	Not completed
Ensure that proper warning signage is placed around sinkholes.	Active, as necessary.
Foster cooperation with neighboring land owners.	Not completed.

PREVIOUS MITIGATION ACTIONS – City of Raymond

Raymond 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Educate the public.	Active.
Develop/renew agreements for temporary emergency shelter/safe room locations.	Active: Keep current siren operational and test monthly.
Identify evacuation/rescue procedures.	Retain in Plan.
Encourage participation in emergency notification systems.	Active: Alert Iowa is listed on City website.
Systematically review, make necessary updates to, and enforce building code requirements.	Active: Reviewed annually.
Continue enforcement of snow ordinance.	Active.
Purchase and maintain backup generators to provide emergency power in times of need (including portable generators).	Active: Generators exist at both lift stations.
Continue to recruit volunteer first responders and fire volunteers, and market opportunities.	Active.
Regularly review and amend Fire, Medical, and Hazardous Material response standard operating procedures.	Active.
Enhance coordination of disaster plans in the community.	Active.
Continue to provide necessary education/certification/training to Fire Department personnel and first responders.	Active
Provide hazardous materials education.	Active

Raymond 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Conduct regular inspections.	Active
Maintain existing agreements with surrounding communities for mutual aid assistance.	Active: Contract with City of Evansdale.
Identify/update evacuation procedures/plans.	Retain in Plan.
Enforce existing laws.	Active.
Incorporate the use of GPS systems in emergency vehicles.	Retain in Plan.
Identify alternative water sources.	Active.
Enforce burn bans when necessary.	Active.
Conduct periodic hydrant inspections.	Active.
Establish local “Cooling Sites” for at risk populations such as the elderly and/or disabled.	Retain in Plan.
Monitor the transportation of radioactive chemicals, to the best of city’s ability.	Active.
Evaluate, maintain, and update emergency equipment and personnel capacity.	Active.
Conserve water when needed.	Planned.
Develop the proper steps to be taken in the event of an earthquake. Communicate these procedures to the public.	Active.

Raymond 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Follow monitoring requirements set forth by the Iowa Department of Natural Resources.	Active.
Begin looking at water quality from a regional level.	Retain in Plan.
Continue Participation in the National Flood Insurance Program.	Active.
Maintain, enforce, and update Zoning and Floodplain Ordinances as needed.	Active.
Continue to address inflow and infiltration issues.	Planned.
Evaluate current terrorism mitigation efforts.	Active.
Increase measures taken to protect and secure the city's critical infrastructure.	Active.
Create community awareness for "cyber terrorism".	Active.
Discourage the clearing of trees and shrubbery from cliffs and steep sloping hills.	Active.
Develop a Continuity of Operations Plan.	Planned.

PREVIOUS MITIGATION ACTIONS – City of Waterloo

Waterloo 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Maintain and improve outdoor warning siren system.	Active; regular testing and maintenance
Educate the public.	Active; as opportunity allows and funding becomes available
Encourage construction of tornado safe rooms in homes, businesses, etc.	Retained; no timeline established
Encourage the public to sign up for emergency alerts services.	Active; as opportunity allows
Consider the adoption of local ordinances requiring local tornado shelters in new mobile home parks and multifamily units.	Active; City reviews and updates ordinances as needed.
Maintain tree-trimming policies to reduce the likelihood of falling branches.	Active; Mid-American Energy contractor; Leisure Services
Continue to recruit and train individuals in the proper storm watching techniques in order to increase potential warning time.	Active; coordinated through County EMA.
Review building code and consider adding more protective requirements.	Active.
Purchase and maintain backup generators to be used during a hazard event, as needed.	Active: Water Works
Bury utility lines to avoid damage from falling branches, etc.	Ongoing per development
Encourage new buildings without basements to design for compact, interior spaces that can serve as possible shelter areas.	Active; as new developments occur
Continue program zone maintenance for sidewalks and tree trimming.	Active; Mid-American Energy contractor; Leisure Service; Public Works
Maintain a list of potential storm sewer improvement project to mitigate potential flash flooding associated with a heavy rain event.	Active; ongoing; Zone One in progress
Placement of lightning arrestors on power lines.	MidAmerican Energy.
Protect critical electronic equipment with surge protection devices.	Active; IT department

Waterloo 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Evaluate designated snow routes on a regular basis to ensure effectiveness.	Active; Public Works department
Continue to support (equipment, finances, personnel, etc.) Public Works Department.	Active; City Council.
Identify shelters that can be used in the event of a winter storm.	Retained; no timeline established.
Continue to cooperate with local medical facilities and Health Department officials to increase the likelihood of detection and proper response.	Active; County Health Department and Public Safety work together for response.
Continue to test local drinking water supply in order to monitor water quality.	Active; routinely.
Properly communicate possible dangers and train employees to maintain continuity of government operations through a continuity of operations plan.	Retained; no timeline established.
Educate and encourage enrollment in emergency notification systems.	Active.
Ensure that all first responders are properly equipped and trained in the Incident Command procedures.	Active; regularly.
Maintain standard operating procedures for a Public Information officer in the event of a disaster.	Active; Public Works department.
Recognize that language barriers may exist and develop policies and train personnel in ways to overcome these challenges.	Ongoing; City provides some information in different languages.
Consider establishing redundancy in T1 lines.	No change.
Maintain communications for proper traffic signal timing.	Active; Traffic Operations.
Provide smoke detectors to property owners who are low income and critical populations, as funding is available.	Active.
Maintain inspection and enforcement of applicable fire codes.	Active; code enforcement.
Require sprinkler systems in structures of certain size.	Active; through Building Inspections and Fire Marshall.
Maintain a well-equipped and well-trained fire department capable of appropriate and effective response.	Active; Fire protection is equipped and maintained as needed.

Waterloo 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Encourage the public to use and maintain smoke detectors and, when appropriate, sprinkler systems.	Required per Building, Residential and Property Maintenance Codes.
Elevate and/or flood proof structures in the floodplain.	Active; as funding and opportunities become available.
Construct detention basins in areas deemed beneficial to the community.	Active; as funding and opportunities become available.
Maintain, enforce, and update the local Floodplain Ordinance as necessary.	Active; City continues to maintain and enforce floodplain ordinance as needed to stay compliant.
Continue membership in the National Flood Insurance Program (NFIP).	Active; as necessary and required.
Clear brush and debris from creeks in order to ensure proper flow of streams.	Public Works and Leisure Services completes as required.
Identify areas in the community, along stream banks, that need some type of bank stabilization, such as rip-rap, in order to reduce the amount of debris entering the stream (i.e. trees, brush, etc.)..	Active; as part of CIP.
Continue to evaluate critical public utilities (e.g. lift stations, wells) for ways they can be further flood proofed.	Active; regularly; Public Works.
Require the installation of back flow valves in structures in order to reduce the risk of sewer backup damage.	Active; as funding and opportunities become available.
Consider areas where buffer strips can be placed in order to control release of runoff and capture debris.	Ongoing during site plan approval process for development.
Encourage residents to follow public directives, such as warnings and evacuations.	Active; warnings and evacuation instruction is provided, as needed.
Increase the number and capacity of pumping stations at critical points along Black Hawk Creek and the Cedar River.	Six new stations came online since 2015.
Continue to identify, purchase, and remove structures and populations in danger of being flooded.	Active.
Maintain the city's sandbagging machine to expedite the filling of sandbags during a flood event.	Active: City maintains a minimum of 60,000 bags on hand to be filled to meet emergency plan for levee operations.

Waterloo 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Explore alternative to sandbagging machines such as Hesco barriers and water bladder devices.	Ongoing as part of CIP.
Continue to have a local supply of sandbags on hand for future flood events.	Active; City maintains a minimum 60,000 bags on hand to meet USACE Requirements.
Evaluate flood gates for permanent closure.	Active; Reviewed every year.
Retrofit flood gates and lift stations (storm water pumping lift stations).	Active; as part of CIP.
Combine gate wells.	Reviewed every year.
Retrofit gate wells with automated closures.	In progress: City continually evaluates this option, as funding is available.
Protect against theft and vandalism of flood control infrastructure.	All gates and lift stations are secured by padlock and visited at a minimum every spring and fall.
Increase flood protection of sewer treatment plant.	In progress; City continues to evaluate this need, as funding is available.
Consider bridge replacements in order to increase flow capacity.	Ongoing as part of CIP.
Maintain flood response operations manuals for Black Hawk Creek and the Cedar River.	Active; updated yearly.
Repair and/or replace downtown floodwalls.	Ongoing as part of CIP.
Maintain annual Army Corps of Engineers Inspection Program.	Active: Inspection program is determined by USACE.
Maintain a well-trained and well-equipped law enforcement agency in order to identify and respond to potential threats and events.	Active: Police Department continues to train and provide high quality services.
Encourage the public to purchase or develop disaster supply kits to be used in the event of a terrorist attack.	Active; Public Safety provides information and specific directions.
Purchase, install, and maintain security cameras at critical locations around the community.	Active; as part of CIP.

Waterloo 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Consider locking down critical facilities when threat level is elevated.	In progress; City reviewing as part of a city-wide building audit.
Place automatic locks on critical facilities.	Active.
Purchase and install motion detectors at critical locations in the city.	Active.
Support local schools to regularly review terrorism response plans.	Active; Public Safety meets with the school district regularly to review operating procedures.
Maintain the mass casualty trailer.	Active; Stored at Fire Station #1.
Consider installing exterior security improvements (e.g. fences, walls, bollards, barbed wire) at critical facilities.	Active.
Maintain 28E (mutual aid) agreements.	Active; these agreements are maintained and updated by Public Safety, as needed.
Work with Black Hawk County EMA to ensure that local Tier II Reports are being filed.	Active; EMA.
Periodically review and update MSDS forms.	Active.
Review and update the policy on proper methods of household hazardous waste disposal.	Active; the City conducts periodic hazardous waste material collection days for the public.
Continue to implement storm water management program.	Active; the City continually reviews and updates the program as needed.
Identify potential areas of pollution sites and pursue cleanup efforts.	Ongoing.
Consider regulation of geothermal heating systems.	City reviews its ordinance as needed.
Encourage public to not overuse fertilizer and/or pesticides, in order to protect the health of the general public.	Ongoing as part of Stormwater Program.
Ensure that proper signage is in place to facilitate a controlled flow of traffic.	Active; managed by Public Works.
Continue to purchase and maintain backup batteries for traffic signals, red light cameras, opticom equipment, and solar and battery-operated warning signs and signal timing devices.	Ongoing.
Update the metropolitan evacuation plan as needed.	Ongoing.

Waterloo 2015-2020 Implementation Strategy Update	
Mitigation Action	**Project/Program Status**
Consider developing and maintaining a list of fallout shelters.	EMA response.
Cooperate with Palo, IA for advice on the anticipated impact on communities should a radiological event occur.	Soon to be closed and decommissioned
Restrict water usage as necessary in time of severe drought in order to maintain water supply.	Consider policy
Put in place, as necessary, burning bans during severe drought.	As needed; Public safety reviews and implements as necessary.
Maintain a list of sites that could be used as cooling shelters for the public during extreme heat events.	Ongoing
Consult the National Resources Conservation Service (NRCS) soil survey for the locations of expansive soils.	Active; this is generally completed during engineering design for both public and private projects.
Continue to repair roads that have been deteriorated from expanding soils underneath.	Engineering reconstructs roads as needed.
Maintain and perform annual Army Corps of Engineers Inspection program.	Active; maintained by the USACE.
Notify residents of a levee break via an Emergency Notification System.	As needed: City would work with EMA and Alert Iowa.
Continue to inspect all local dams for stability, including the Virden Creek Dam north of Waterloo, maintaining the annual inspections program.	Active; Dams are inspected every year by the USACE and every other year by the IDNR.
Notify the treatment plant, Cedar Terrace, Cedar View, and the City of Evansdale in the event the Cedar River dam fails.	As needed; press releases and notifications will take place, as required.
Encourage residents to notify the fire department before engaging in a controlled burn.	Active.
Identify any sinkholes that develop with proper warning signage.	As needed; Public Works will sign and barricade.
Encourage residents to fill and cap old septic tanks to prevent sinkholes.	Active; Plumbing ordinance requires anyone within 200 feet to hook up to public sewer and not use septic tanks. Old septic tanks are abandoned and capped, as needed.
Maintain National Incident Management System (NIMS) compliance.	Active.

OVERALL HMP UPDATE CHANGES

The HMP updates included in this Plan include updates to data sets, minor changes to community hazard rankings, and updates to mitigation actions. The goals presented were also consolidated into a total of 8 common goals which were advanced by various mitigation actions in each community.

APPENDIX M: PLANNING COMMITTEE & PUBLIC INVOLVEMENT MATERIALS

Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan

2020 Plan Update | Task Force Meeting #1

Date: September 19, 2019

Time: 4:30 P.M.

Location: Black Hawk County EMA Office
Emergency Operations Center (Basement)
1925 Newell Street
Waterloo, IA 50707

Agenda:

1. Welcome and Introductions
2. Overview of the planning process
3. Provide updates on existing mitigation actions
4. Review and update community profiles
5. Adjourn

Note: This is a public meeting. Members of the community are invited to attend and participate in this meeting.

BLACK HAWK COUNTY HAZARD MITIGATION PLAN

Meeting 1

September 19, 2019

Jurisdictions participating in the 2020 Black Hawk County Hazard Mitigation Plan must review and update their community profiles and report on their existing mitigation actions.

Please return responses to INRCOG by October 3, 2019.

If you have questions, please contact
Brian Schoon at Bschoon@inrcog.org
or Lisa Ahern at Lahern@inrcog.org
319-235-0311

---

1. **Update your Existing Mitigation Actions from the 2015 Plan**.

    a. These updates can be written in the blue-colored table.

    b. Please review the handout which provides guidance for suggested wording to use when updating your previous Mitigation Actions.

2. **Review and update your Community Profile.**

    Your *community profile* section from the 2015 Plan was printed for you.

    a. Review and update your *community profile document*, as applicable for your jurisdiction. You may make your edits by hand on the document itself. Please make sure all edits are legible.

    b. Identify any updates for the *Utilities*, *Planning Documents, Designated Shelters*, *Vulnerable Populations* or *Critical Facilities* in your planning area.

COMMUNITY PROFILE INFORMATION

INRCOG is conducting research and updating each community profile and developing a composite description including, socio-economic, historic, and geographic profiles to provide a context for understanding the mitigation actions that will be implemented to reduce vulnerability within the planning area. Participating jurisdiction(s) will provide information, review drafts, and approve. The Multi-Jurisdictional HMP will have a composite profile at the beginning and individual jurisdictions in the appendices.

Information from each participating jurisdiction will focus on:

- Natural Environment
- Transportation – major transportation routes, traffic, types
- Community Services – Providers for Telephone, Cable, Natural Gas, Electricity, Water/Sewer, etc.
- Population Identification and Trends – U.S. Census
    - At Risk Groups- more likely to require assistance during times of disaster, therefore are considered, generally speaking, more "at-risk" than the remaining population
- Housing & Residential Development Trends: building permits, existing number, valuations
- Commercial and Industrial Development Trends: building permits, existing number, valuations, and planned developments
- Government Owned Buildings, Facilities, and Infrastructure: existing number and valuations or replacement cost
- Critical Facilities: Name, Location (i.e., mobile homes, healthcare facilities, daycares, infrastructure, government buildings, nursing homes/retirement communities, shelters, etc.)
- Existing Local Programs, Policies, Ordinances, and Regulations
- Current or Previous Mitigation Activities: Prevention, Property Protection, Public Education/Awareness, Structural Projects, Emergency Services, and Natural Resource Protection.
- Fire Insurance Rating
- National Flood Insurance Program: participate or not
    - Special Flood Hazard Area
        - Identification of Residential, Commercial, and Industrial structures located in the Special Flood Hazard Area (# only)
        - National Flood Insurance Program participation
        - Identification of Repetitive Loss Structures (# only)
        - Identification of National Flood Insurance Program policies in effect (#only)
- Previous Plans and Studies
- City Services – Police, Fire, Medical services, Warning systems, HAZMAT

EVALUATING PREVIOUSLY IDENTIFIED HAZARD MITIGATION ACTION STEPS

Hazard mitigation plan updates must reflect the progress of previously identified local mitigation efforts. The plan must describe the status of hazard mitigation actions in the previous plan by identifying those that have been completed or not completed. For actions that have not been completed, the updated plan needs to indicate the current status. Uncompleted action steps must either describe whether the action is no longer relevant or be included as part of the updating action plan.

This evaluation demonstrates the progress made in the past five years in achieving goals and implementing action outlined in mitigation strategies.

Below is some sample language to describe existing action steps. As necessary, include a few brief sentences for action step updates.

Example Status Updates

- Active (When / How often)
- Active, Repetitive (how often)
- To be implemented as needed (under what circumstances)
- Not completed (actions taken, % done, holdup)
- Last updated (Date)
- Last maintenance (Date)
- Completed (Date)
- Completed, will be continued
- Dropped (Why)

STATUS UPDATES MUST A BRIEF DESCRIPTION (1-2 SENTENCES) OF WHAT HAS BEEN ACCOMPLISHED OR WHY THE ACTION WAS NOT BEEN COMPLETED.

From: mmehmen bhciaema.com
To: Lisa Ahern
Subject: Attendance List for BHC Commission mtg
Date: Monday, October 7, 2019 2:27:31 PM
Attachments: image001.png
image003.png
image004.png

Hello Lisa, the following is the attendance record for the Commission Mtg of 9/19/2019

Name	Organization	Assignment
Vick, Gary	City of Raymond	Checked In
Wiersma, Chrissi	City of Hudson	Checked In
Dolf, Jason	Raymond FD	Off Sene
Bostwick, John	Cedar Falls Fire Rescue	Off Sene
Schoon, Brian	INRCOG	Off Sene
Ahern, Lisa	INRCOG	Off Sene
Neil, David	La Porte City	Off Sene
Amos, Jerome	City of Waterloo	Off Sene
Faas, Doug	City of Evansdale	Off Sene
Glover, Lorie	Black Hawk Co EMA	Off Sene
Jessen, Ed	City of Dunkerton	Off Sene
Laylin, Linda	Black Hawk County	Off Sene
Mehmen, Maureen	Black Hawk Co EMA	Off Sene
Thome, Mark	City of Gilbertville	Off Sene
Thompson, Tony	BLACK HAWK COUNTY SHERIFF	Off Sene

Maureen Mehmen
Assistant Coordinator
Black Hawk County
1925 Newell Street, Waterloo IA 50707
mmehmen@bhciaema.com
Phone: 319-291-4373
Cell: 319-242-1074
FAX: 319-291-6104

COURIER COMMUNICATIONS

FIRST INVOICE

Courier Communications
PO Box 540
Waterloo, IA 50704
Phone: 800-798-1717
Fax: 319-291-4014

INRCOG - Legal

229 E PARK AVE.
WATERLOO IA 50703

Customer Nbr: 60010372
Phone: (319) 235-0311
Date: 09/11/2019
Page: 1

Amount Paid: _____ Card # : _____ Exp Date: ____/____

Check # : _____ Signature: _____

Date: 09/10/2019 **Ref #:** 169215 **Total:** 17.04

Lee Enterprises no longer accepts credit card payments sent via e-mail. Emails containing credit card numbers will be blocked. Please use the coupon above to send credit card payment to the remittance address located in the upper right corner.
You may also send the coupon to a secure fax at 319-291-4014.

Date	Reference #	Type	Description	Lines	Total
09/10/19	169215	INV	BHC Multi-Jurisdictional Hazard Mitigation Plan meeting	34	17.04

Remarks:

Total Due: 17.04

www.WCFCourier.com

STATE OF IOWA, }

Black Hawk County, SS

BLACK HAWK COUNTY
MULTI-JURISDICTIONAL HAZARD
MITIGATION PLAN
KICK-OFF PLANNING SESSION
MEETING

Black Hawk County is beginning the process of updating its 2015 Hazard Mitigation Plan. The purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by the Federal Emergency Management Agency (FEMA). FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.

This first meeting will review the purpose and benefits of a multi-jurisdictional hazard mitigation plan, project budget, planning process/scope of work, updating information from the existing plan, and the dates and locations of future meetings. The meeting will take place on Thursday, September 19, 2019 at 4:30 PM at the Black Hawk County Emergency Office, Emergency Operation Center, Waterloo, Iowa 50707.

If you have any questions, please feel free to contact Lori Glover, (319) 291-4373.

I do solemnly swear that the annexed copy of legal

INRCOG
Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan Meeting

Notice was published in the Waterloo-Cedar Falls Courier, a daily newspaper printed in Waterloo, Black Hawk County, Iowa, once commencing on the 10th day of September, 2019 in the name of said newspaper, and that the annexed rate of advertised is the regular legal rate of said newspaper, and that the following is a correct bill for publishing said notice.

Printer's Bill $17.04

Laurie Keller
Signed

Subscribed and sworn to before me this 12

Day of September A.D., 2019

Brenda L Huntley
Notary Public

Received of _____

_____

the sum of _____

_____ Dollars.

In full for publication of the above notice.

NOTARIAL SEAL IOWA
BRENDA L HUNTLEY
COMMISSION NO. 841570
MY COMMISSION EXPIRES
9/12

Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan

2020 Plan Update | Task Force Meeting #2

Date: October 17, 2019

Time: 4:30 P.M.

Location: Black Hawk County EMA Office
Emergency Operations Center (Basement)
1925 Newell Street
Waterloo, IA 50707

Agenda:

1. **Welcome and Introductions**

2. **Overview of previous planning meeting**
   a. Updated Mitigation Actions to date
   b. Community profile information

3. **Review and Update Hazard Risk Assessments** (page 3-6)

4. **Review and Update Hazard Mitigation goals** (yellow sheet)

   a. Review 2015 Goals
   b. Identify 2020 Goals

5. **Identify potential mitigation actions** (page 7-8)
   a. Review Table
   b. Keep or Drop Existing Action
   c. Add new Actions if needed

6. **NEXT STEPS**
   a. Electronic file sent to Communities
   b. Return updates by November 11 to lahern@inrcog.org

Note: This is a public meeting. Members of the community are invited to attend and participate in this meeting.

Hazard Analysis/Risk Assessment

HAZARD IDENTIFICATION

The 2015 Iowa Hazard Mitigation Plan updated the number and types of hazards for the state since the previous Buchanan County Multi-Jurisdictional Hazard Mitigation Plan was updated. The scoring criterion has also changed. The new list of hazards is in the table below.

The Iowa Hazard Mitigation Plan identified twenty hazards in three categories. This includes fourteen natural hazards, five technological hazards, and one human caused hazard.

2015 Iowa Hazard List	
Natural	**Technological**
Animal/Plant/Crop Disease	HAZMAT Incident
Drought	Infrastructure Failure
Earthquake	Levee/Dam Failure
Expansive Soils	Radiological Incident
Extreme Heat	Transportation Incident
Flash Flood	
Grass/Wild land Fire	**Human Caused**
Human Disease	Terrorism
Landslide	
River Flooding	
Severe Winter Storm	
Sinkholes	
Thunderstorm/Lighting/Hail	
Tornado/Windstorm	

In order to properly assess current mitigation strategies, develop new future mitigation strategies, and identify needed mitigation projects, the Committee needs to determine the hazards that impact their community. It is important to note that the focus of mitigation is on reducing long-term risks of damage or threats to public health and safety caused by hazards and their effects. Thus, in some cases the hazards identified for mitigation will not include all of, or the same hazards, identified for preparedness, response or recovery. Also, not all hazards will impact all the participating communities or will in different magnitude.

Hazard Risk Assessment Summary for: _____

Hazards	Probability	Magnitude/Severity	Warning Time	Duration
Natural Hazards	--	--	--	--
Animal/Plant/Crop Disease				
Drought				
Earthquake				
Expansive Soils				
Extreme Heat				
Flash Flood				
Grass/Wild land Fire				
Human Disease				
Landslide				
River Flooding				
Severe Winter Storm				
Sinkholes				
Thunderstorm/Lighting/Hail				
Tornado/Windstorm				
Technological Hazards	--	--	--	--
HAZMAT Incident				
Infrastructure Failure				
Levee/Dam Failure				
Radiological Incident				
Transportation Incident				
Human Caused Hazards	--	--	--	--
Terrorism				

Completed by: _____

Please complete the scores for Probability, Magnitude/Severity, Warning Time, and Duration based on the numeric criteria provided above. The weights in the assessment formula will be factored in later to generate the final risk assessment score.

HAZARD RISK ASSESSMENT METHODOLOGY

The risk assessment identifies how people, properties, and structures would be damaged by one of the listed hazard events. If the hazard can harm people or damage their homes and other structures, they are vulnerable. Finding the weak points in the system, for example, identifying building types that are vulnerable to damage and anticipating the loss in high risk areas, will help the community decide what mitigation measure should be undertaken and how to implement the activities they select.

The Hazard Mitigation Planning Committee will use the following factors in determining the hazard risk assessment. The Planning Committee needs to consider the following each identified hazard:

- Probability
- Magnitude / Severity
- Warning Time
- Duration

The scores for each of the factors will be weighted using the formula below to develop the final hazard assessment score.

(Probability x.45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10) = Final Hazard Assessment Score

Probability

The probability score reflects the likelihood of the hazard occurring again in the future, considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year. Many times the historical occurrence can be extrapolated into the future using best available data, but others, due to the nature of the hazard are more difficult to estimate the probability of future occurrence. If a hazard or its impacts have been mitigated against, the probability of future occurrences decreases. Conversely, hazards that have not occurred in the past may present themselves to the community in the future.

PROBABILITY		
Score	**Description**	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2	Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3	Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33% or the event is likely to occur.
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.

Magnitude / Severity

The magnitude of the impact of a hazard event (past and perceived) is related directly to the extent that hazards affect the State and is measured using technical measures specific to the hazard. This is also a function of when the event occurs (year-round, seasonal), the location affected (both geographically and non-geographically determined), the resilience of the community, and the effectiveness of the emergency response and disaster recovery efforts.

MAGNITUDE / SEVERITY		
Score	**Description**	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least two weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

Warning Time

The speed of onset is the amount of warning time available before the hazard occurs. This should be taken as an average warning time. For many of the atmospheric natural hazards there is a considerable amount of warning time as opposed to the human caused accidental hazards that occur instantaneously or without any significant warning time.

WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

Duration

This consists of the typical amount of time that the jurisdiction is impacted by the hazard. As an example, a snowstorm will likely last several hours, whereas a lightning strike would last less than a second.

DURATION	
Score	**Description**
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

REVIEW & UPDATE FUTURE MITIGATION ACTIVITIES

During our prior meeting, each community updated the status of their mitigation activities from the 2015 Plan. Please review your future mitigation activities. Identify if you will "keep or drop" the activity. Add new activities as needed.

Estimated Cost

- **Minima**l: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- **Low**: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- **Moderate**: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- **High**: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Timeline

Under this column indicate the time period the proposed mitigation activity will occur.

- **On-Going**
- **Short-Term** – within the next 1-5 Years
- **Mid-Term** – within the next 5-10 years
- **Long-Term** – within the next 10+Years

Priority

Rank the communities priority of the proposed mitigation activity. This can be based off a variety of factors

- **High**
- **Medium**
- **Low**

Agencies Responsible: Identify the agencies responsible for implementation.

With the potential benefits of implementing the activity there will be some hurdles that the community may face in implementing the action step, and the drawbacks that make effect the priority.

Below, is a copy of the STAPLEE criteria, a suggested FEMA suggested method to consider in evaluation. This tool can be used to help assess the priority, if needed. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental (see definitions below).

STAPLEE Elements	
S – Social	• Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the populations, • Actions do not cause relocation of lower income people, • Actions are compatible with the community's social and cultural values.
T- Technical	• Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	• Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	• Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	• It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	• Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E - Environmental	• Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, • Are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

Hazard Definitions

The following hazards are those identified in the statewide 2015 Iowa Hazard Mitigation Plan. The hazards are divided into three types: Natural, Technological, and Human Caused. The specific hazards for each type are listed alphabetically.

Natural Hazards

Animal/Plant/Crop Disease

Disease is any impairment of normal physiological function affecting all or part of an organism, esp. a specific pathological change caused by infection, stress, etc., producing characteristic symptoms; illness or sickness in general *(Collins).* Also it is any medical, health, or sanitation threat to plants, wildlife, domestic animals. For purposes of this discussion the topic will be contained to only communicable diseases and will largely with generalities.

Communicable diseases can have devastating effects on a health of the population of a community, the health of wild and domestic animals, and on the wide variety of plant life that is present in and around the community. Some of these diseases are considered to be a greater risk to the community than others.

Some diseases that affect livestock may include (but not limited to) West Nile Virus, Equine Infectious Anemia, Johne's Disease, Foot Rot, Coccidiosis, Pinkeye, Anaplasmosis, Anthrax, Bluetongue, Brucellosis, Trichomoniasis, Tuberculosis, Pseudorabies, Brucellosis, Porcine Reproductive Respiratory Syndrome, Brucella ovis, Ovine Progressive Pneumonia, Scrapie, Micoplasma, Newcastle, Vesicular Stomatitis, Chronic Wasting Disease (CWD), Exotic Newcastle Disease and Rabit calicivirus disease.

Some common plant diseases include Emerald Ash Borer, cedar-apple and related rusts, anthracnose, oak wilt, Verticillium wilt, ash decline, Sphaeropsis blight of pine, Rhizosphaera of spruce, Cytospora of spruce, black knot of plum, and environmental or abiotic disease, and Dutch Elm disease among others.

Drought

Drought is defined as a period of prolonged abnormally low precipitation producing severe dry conditions. There are four (4) types of drought conditions relevant to Iowa: Meteorological drought, which refers to precipitation deficiency; Hydrological drought, which refers to declining surface and groundwater supplies; Agricultural drought, which refers to soil moisture deficiencies; and socioeconomic drought, which refers to when physical water shortages begin to affect people.

The highest occurrences of drought conditions with recorded events in Iowa are associated with agricultural and meteorological drought as a result of either low soil moisture or a decline in recorded precipitation. Droughts can be spotty or widespread and last from a few weeks to a period of years. A prolonged drought can have a serious impact on a community's water supply and economy. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged or destroyed by a loss of crops or livestock. While droughts are generally associated with extreme heat, droughts can and do occur during cooler months.

According the National Climatic Data Center, there have been three recorded drought events with impact on areas within Black Hawk County from August 2001 to August 2015. Recorded drought dates include: August 2001, August 2003, and July-October 2012.

Earthquake

An earthquake is any shaking or vibration of the earth caused by the sudden release of energy that may impose a direct threat on life and property. It is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. This shaking can cause buildings and bridges to collapse; disrupt gas, electric, and phone service; it sometimes triggers landslides, flash floods, and fires. The three (3) general classes of earthquakes are, tectonic, volcanic, and artificially produced.

Iowa as a whole has experienced the effects of only a few earthquakes in the past 175 years. The epicenters of 12 earthquakes have been located in the state. The first known occurrence was in 1867 near Sidney in southwest Iowa; the most recent occurrence was in 2004 near Shenandoah in southwest Iowa. The largest Iowa earthquake (Mercalli magnitude VI) occurred near Davenport in southeast Iowa in 1934. None of these events were instrumentally recorded.

Expansive Soils

Expansive soils are soils and soft rock that tend to swell or shrink excessively due to changes in moisture content. The effects of expansive soils are most prevalent in regions of moderate to high precipitation, where prolonged periods of drought are followed by long periods of rainfall. The hazard occurs in many parts of the Southern Central, and Western United States. However, because the

hazard develops gradually and seldom presents a threat to life, expansive soils have received limited attention, despite their costly effects**.** Similar to every other community in Iowa, the roadways in this planning area are affected by expansive soils. This hazard is most evident by potholes that cause damage to local roadways and vehicles.

Extreme Heat

Conditions for extreme heat are defined by summertime weather that is substantially hotter and/or more humid than average for a location at that time of year. This includes temperatures (including heat index) in excess of 100 degrees Fahrenheit for at least three (3) successive days of 90+ degrees Fahrenheit. The heat index is a number in degrees Fahrenheit that tells how hot it really feels when relative humidity is factored into actual air temperature. Exposure to full sunshine can increase the heat index by at least 15 degrees. The National Weather Service can issue a Heat Advisory or Excessive Heat Warning. Between 1995 and 2010 Iowa experienced 30 extreme heat events.

Flash Flood

A flash flood is an event that occurs with little or no warning where water levels rise at an extremely fast rate. Flash flooding results from intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area. The table to the right is data from the National Climatic Data Center. No deaths or injuries have been recorded with these events.

Grass/Wild land Fire

A grass or wild-land fire is an uncontrolled fire that threatens life and property in a rural or a wooded area. Grass and wild-land fires are more likely to occur when conditions are favorable, such as during periods of drought when natural vegetation is drier and more combustible. According to the National Climatic Data Center, no wildfires have been recorded in Iowa since record keeping began in 1950.

Human Disease

An incident related to human disease is defined as a medical, health, or sanitation threat to the general public including contamination, epidemics, plagues, or infestations. Public health action to control infectious diseases in the 21st century is based on the 19th century discovery of microorganisms as the cause of many serious diseases (e.g., cholera and TB). Disease control resulted from improvements in sanitation and hygiene, the discovery of antibiotics, and the implementation of universal childhood vaccination programs. Scientific and technologic advances played a major role in each of these areas and are the foundation for today's disease surveillance and control systems.

The historical occurrence of the outbreak of communicable diseases in the planning area is difficult to determine. There were no known historical occurrences of the outbreak of communicable diseases in Black Hawk County. However, there are the typical seasonal episodes of influenza, also known as the flu, within the county.

Landslide

Landslides occur when susceptible rock, earth, or debris moves down a slope under the force of gravity and water. Landslides may be very small or very large, and can move at slow to very high speeds. A natural phenomenon, landslides have been occurring in slide-prone areas of Iowa since long before the state was created. Landslides can occur due to rainstorms, fires, or human activities that modify slope and drainage. There have been no occurrences of landslides in the planning area.

R**iver Flooding**

River flooding is a rising or overflowing of a tributary or body of water that covers adjacent land not usually covered by water when the volume of water in a stream exceeds the channel's capacity.

River floods are the most common and widespread of all natural disasters, except fire. Most communities in the U.S. can experience some kind of flooding after spring rains, heavy thunderstorms, winter storm thaws, waterway obstructions, or levee or dam failures. Often it is a combination of these elements that causes damaging floods. Floods can be slow-, or fast-rising but generally develop over a period of days. Flooding is a natural and expected phenomenon that occurs annually, usually restricted to specific streams, rivers or watershed areas. There have been 13 flooding events in Black Hawk County since 2001 causing $926.57 thousand in property damage and $20.453 million in crop damage.

Severe Winter Storm

Severe winter weather conditions that can affect day-to-day activities include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold. Winter storms are common during the months of October through April in Iowa.

Black Hawk County has experienced winter storms of some type every winter on record. According to the National Climatic Data Center, there have been 21 heavy snow and ice events reported in Black Hawk County since 2001. Over that same time, there have been three reported "extreme" low temperature and wind-chill events reported in the county.

Sinkholes

A sinkhole is the loss of surface elevation due to the removal of subsurface support. Sinkholes range from broad, regional lowering of the land surface to abrupt localized collapse. The primary causes of most subsidence are human activities such as underground mining of coal, groundwater/petroleum withdraw, or drainage of organic soils. Sinkholes can aggravate flooding potential, collapse of an abandoned mine may destroy buildings, roads and utilities.

It was determined that the probability of sinkholes in the planning area is unlikely. The area does not have the soil classifications for sinkholes.

Thunderstorm/Lighting/Hail

Thunderstorms are common in Iowa and can occur singly, in clusters, or in lines. Thunderstorms can result in heavy rains, high winds (reaching or exceeding 58 mph), tornados, or hail. Thunderstorms are created from a combination of moisture, rapidly raising warm air, and the lifting mechanism such as that caused when warm and cold air masses collide. From 2001 to 2015, the NCDC lists 25 hail events, 1 lightning event, and 9 heavy rain events that have caused property or crop damage in Black Hawk County.

Thunderstorms occur in the community on an annual basis. According to the National Climatic Data Center, since 2001, there have been 51 recorded Thunderstorm and High Wind events in Black Hawk County. During these events there was there was approximately $1.783 million worth of property damage and $263,000 dollars of crop damage.

Tornado/Windstorm

A tornado is a violent whirling wind characteristically accompanied by a funnel shaped cloud extending down from a cumulonimbus cloud that progress in a narrow, erratic path. Rotating wind speeds can exceed 300 mph and travel across the ground at average speeds of 25-30 mph. A tornado can be a few yards to around a mile wide where it touches the ground. An average tornado is a few hundred yards wide

Windstorms, other than tornados, are experienced in all regions of the United States. It is difficult to separate the various wind components that cause damage from other wind-related natural events that often occur with or generate windstorms. Unlike tornadoes, windstorms may have a destructive path that is miles wide and duration of the event could range from hours to days. These events can produce straight line winds in excess of 64 knots (73 mph) causing power outages, property damage, impaired visibility, and crop damage. It is often difficult to separate windstorms and tornado damage when winds get above 64 knots.

Windstorms occur in the planning area on an annual basis. High winds are often associated with thunderstorms, but can be produced during severe snow storms or tornados. According to the National Climatic Data Center, the County has had 19 high wind events reported since 2001. These events caused $650,110 in property damage and $25 thousand in crop damage.

Since 2001 there have been 8 recorded occurrences of tornado events in the planning area. The estimated total of property damage from these tornadoes is $804,000 while crop damage totaled $68,000. The most notable of these events occurred in 2008 when a tornado passed over Fern resulting in $300,000 in property damage and $2,000 in crop damage.

Technological Hazards

HAZMAT Incident

This hazard encompasses fixed hazardous materials, pipeline transportation, and transportation hazardous materials. This can include the accidental release of flammable or combustible, explosive, toxic, noxious, corrosive, oxidizable, irritant, or radioactive substances or mixtures that can pose a risk to life, health, or property possibly requiring evacuation.

A fixed hazardous materials incident is the accidental release of chemical substances or mixtures which presents a danger to the public health or safety during production or handling at a fixed facility. Fixed hazardous material incidents usually affect a localized area, and the use of planning and zoning can minimize the area of impact. During the period 2000-2010, fixed facilities experienced 4,972 incidents according to the Iowa Department Natural Resources (DNR). Fixed facility releases accounted for 57.6% of total releases. (Note: the number of trips to drug related operations has risen sharply in the state.) There are 4,057 sites in Iowa that because of the volume or toxicity of the materials on site are designated as Tier Two facilities under the Superfund Amendments and Reauthorization Act.

Despite increasing safeguards, more and more potentially hazardous materials are being used in commercial, agricultural, and domestic activities. This situation is further complicated by the density of people and hazardous materials in Iowa.

A pipeline transportation incident occurs when a break in a pipeline creates the potential for an explosion or leak of a dangerous substance (oil, gas, etc.) possibly requiring evacuation. A pipeline incident can be caused by environmental disruption, accidental damage, or sabotage. Incidents can range from a small slow leak to a large rupture where an explosion is possible. Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure can lessen the risk to those near to the pipelines.

According to the Iowa Utilities Board (IUB) and the United State Department of Transportation Pipeline and Hazardous Materials Safety Administration, 56 pipeline accidents, incidents, or service outages were reported between 2002 and 2015, resulting in a total of 9 injuries and no fatalities.

Infrastructure Failure

This hazard encompasses a variety of occurrences including communication failure, energy failure, structural failure, and structural fire. This includes an extended interruption, widespread breakdown, or collapse (part or all) of any public or private infrastructure that threatens life and property. One potential cause of infrastructure failure is space weather/solar flare.

Communication failure is the widespread breakdown or disruption of normal communication capabilities. Major telephone outages, loss of local government radio facilities, long-term interruption of electronic broadcast services, emergency 911, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Business and industry rely heavily on various communication media as well. Mechanical failure, traffic accidents, power failure, line severance, solar flares, and severe weather can affect communication systems and disrupt service. Disruptions and failures can range from localized and temporary to widespread and long-term. If switching stations are affected, the outage could be more widespread.

The collapse (partial or total) of any structure including roads, bridges, towers, and buildings is considered a structural failure. A road, bridge, or building may collapse due to the failure of the structural components or because the structure was overloaded. Natural events such as heavy snow may also cause the roof of a building to collapse (under the weight of snow).

The age of the structure is sometimes independent of the cause of the failure. Enforcement of building codes can better guarantee that structures are designed to hold-up under normal conditions. Routine inspection of older structures may alert inspectors to weak points. The level of damage and severity of the failure is dependent on factors such as the size of the building or bridge, the number of occupants of the building, the time of day, day of week, amount of traffic on the road or bridge, and the type, and amount of products stored in the structure. There have been structural failures across the state in the past as mentioned above. They have included homes, commercial structures, and communications towers. There is no central collection point for this information, but news articles document infrastructure failure.

Civil structures may fail for a variety of reasons. These include fire, excessive vibrations, explosion, high-energy piping failures, missiles, and earthquakes. With some possible exceptions (misuse, accidental or environmental loads), the causes of failure may be found in deficiencies of design, detailing, material, workmanship, or inspection. With the aging structures in the country and problems with new materials discussed above, structural failures will continue to occur. Efforts to inspect and maintain these structures will lessen the probability of failure, but not guarantee that it will not occur.

A structural fire is an uncontrolled fire in a populated area that threatens life and property and is beyond normal day-to-day response capability. Structural fires present a far greater threat to life and property and the potential for much larger economic losses. Modern fire codes and fire suppression requirements in new construction and building renovations, coupled with improved fire-fighting equipment, training, and techniques lessen the chance and impact of a major urban fire. Most structural fires occur in residential structures, but the occurrence of a fire in a commercial or industrial facility could affect more people and pose a greater threat to those near the fire or fighting the fire because of the volume or type of the material involved. Less severe structural fires are almost a common occurrence in some communities. Nearly all are extinguished by on-site personnel or local fire departments. There have been 284 deaths in Iowa from fires from 2006 to March of 2015 according to the State Fire Marshall Division.

Levee/Dam Failure

Dam/Levee failure is the uncontrolled release of water resulting from a structural failure in a dam, wall, dike, berm, or area of elevated soil that causes flooding. Possible causes of the breach could include flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, terrorism, erosion, piping, saturation, or under seepage. According to the National Inventory of Dams, there is one dam in Black Hawk County: Holland Marsh Dam to the west of Holland.

Radiological Incident

A radiological incident is an occurrence resulting in a release of radiological material at a fixed facility or in transit. An incident resulting in a release of radiological material at a fixed facility includes, but is not limited to, power plants, hospitals, and laboratories. Although the term "nuclear accident" has no strict technical definition, it generally refers to events involving the release of significant levels of radiation.

Emergency classifications are divided into four categories. Each calls for a certain level of response from plant and government personnel. From least to most severe, the classifications are: Unusual Event, Alert, Site Area Emergency, and General Emergency. From 1990 to 2010, the Duane Arnold Energy Center which is located in the closest proximity to the community in Palo, has had 5 Unusual Events, no Alerts, and no Site Area Emergencies or General Emergencies.

Transportation Incident

This hazard encompasses air transportation, highway transportation, railway transportation, and waterway incidents. A transportation incident is described as an accident involving any mode of transportation that directly threatens life, property damage, injury, or adversely impacts a community's capabilities to provide emergency services.

According to the Iowa DOT, rural Black Hawk County saw 1043 various types of vehicular crashes from 2007 to 2011 resulting in 488 injuries and 13 fatalities. Of these accidents, 330 were related to icy, snowy or slushy surface conditions resulting in 149 injuries and 3 fatalities.

Human Caused Hazards

Terrorism

This hazard encompasses a wide variety of human caused threats including enemy attack, biological terrorism, agro-terrorism, chemical terrorism, conventional terrorism, cyber terrorism, radiological terrorism, and public disorder. This includes the use of multiple outlets to demonstrate unlawful force, violence, and/or threat against persons or property causing intentional harm for purposes of intimidation, coercion or ransom in violation of the criminal laws of the United States. These actions may cause massive destruction and/or extensive casualties.

TO: The Courier

FROM: Lori Glover
Black Hawk County EMA Coordinator
(319) 291-4373

(Note: Please publish this press release in the next edition of your newspaper. Thank you.)

BLACK HAWK COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
SECOND PLANNING SESSION MEETING

Black Hawk County is continuing its process of updating its 2015 Hazard Mitigation Plan by conducting a second planning meeting. As was stated in prior notices and the first meeting, the purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by the Federal Emergency Management Agency (FEMA). FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.

This second meeting will include assessing hazard risks, updating information from the existing plan, including goals and action steps, and the dates and locations of future meetings. The meeting will take place on Thursday, October 17, 2019 at 4:30 PM at the Black Hawk County Emergency Office, Emergency Operation Center, Waterloo, Iowa 50707.

If you have any questions, please feel free to contact Lori Glover, (319) 291-4373.

STATE OF IOWA, }

Black Hawk County, SS

BLACK HAWK COUNTY
MULTI-JURISDICTIONAL HAZARD
MITIGATION PLAN
SECOND PLANNING
SESSION MEETING

Black Hawk County is continuing its process of updating its 2015 Hazard Mitigation Plan by conducting a second planning meeting. As was stated in prior notices and the first meeting, the purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by the Federal Emergency Management Agency (FEMA). FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.

This second meeting will include assessing hazard risks, updating information from the existing plan, including goals and action steps, and the dates and locations of future meetings. The meeting will take place on Thursday, October 17, 2019 at 4:30 PM at the Black Hawk County Emergency Office, Emergency Operation Center, Waterloo, Iowa 50707.

If you have any questions, please feel free to contact Lori Glover, (319) 291-4373.

I do solemnly swear that the annexed copy of legal

INRCOG
Multi-Jurisdictional Hazard Mitigation Plan
Second Planning Session Meeting

Notice was published in the Waterloo-Cedar Falls Courier, a daily newspaper printed in Waterloo, Black Hawk County, Iowa, once commencing on the 8th day of October, 2019 in the name of said newspaper, and that the annexed rate of advertised is the regular legal rate of said newspaper, and that the following is a correct bill for publishing said notice.

Printer's Bill $16.54

Lynne Keller
Signed

Subscribed and sworn to before me this 11

Day of October A.D., 20 19

Jodie McKinstry
Notary Public

Received of _____

_____

the sum of _____

_____ Dollars.

In full for publication of the above notice.

JODI E MCKINSTRY
COMMISSION NO.782413
MY COMMISSION EXPIRES
1/30/20

Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan

2020 Plan Update | Final Planning Meeting

Date: March 19, 2020

Time: 4:00 P.M.

Location: Black Hawk County, EMA

Agenda:

1. Welcome and Introductions
2. Overview of previous meeting
3. Review and make necessary changes to draft plan
4. Address any missing information needed for plan
5. Discuss next steps of planning process
    a. Plan development
    b. Plan adoption (Black Hawk County / Cities / School Districts)
    c. Submittal to IHSEM & FEMA
6. Adjourn

Note: This is a public meeting. Members of the community are invited to attend and participate in this meeting.

ATTENDANCE RECORD

Meeting: Black Hawk County Hazard Mitigation Plan

Date: 3/19/20 **Time:** 4:00 p.m. **Location:** Black Hawk County EMA

Name	Representing
Troy Beatty	Evansdale
Tony T Thompson	BHCSO
Mark Thomas	Gilbertville
Jared Speed	LPC
JOHN DORNOFF	WATERLOO
	BHCo
Joshua Pihora	Black Hawk County Health Dept
John Bostwick	Cedar Falls
Michael Deharen	Dunkerton
Gary Vick	Raymond
JASON DOLF	RAYMOND
Kristy Lundy	Elk Run Heights
	Hudson
	BHCHD

TO: Courier

FROM: Lorie Glover
Black Hawk County EMA Coordinator
(319) 291-4373

(Note: Please publish this press release in the next edition of your newspaper. Thank you.)

BLACK HAWK COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
THIRD PLANNING SESSION MEETING

Black Hawk County is continuing its process of updating its 2015 Hazard Mitigation Plan by conducting a third and final planning meeting. As was stated in prior notices and meetings, the purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by the Federal Emergency Management Agency (FEMA). FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.

This final meeting will include finalizing and prioritizing mitigation actions, and finalizing community profiles. The meeting will take place on Thursday, March 19, 2020 at 4:00 PM at the Black Hawk County Emergency Office, Emergency Operation Center, Waterloo, Iowa 50707.

If you have any questions, please feel free to contact Lorie Glover, (319) 291-4373.

*** Proof of Publication ***

Courier Communications
100 East 4th Street, Waterloo, Iowa 50703
Black Hawk County

I do solemnly swear that the annexed copy of notice was published in the WATERLOO/CEDAR FALLS COURIER, a daily newspaper printed in WATERLOO, Black Hawk County, Iowa, and that the annexed rate of advertising is the regular legal rate of said newspaper, and that the following is a correct bill for publishing said notice.

INRCOG - Legal

229 E PARK AVE.
WATERLOO IA 50703

ORDER NUMBER 179227

BLACK HAWK COUNTY
MULTI-JURISDICTIONAL HAZARD
MITIGATION PLAN
THIRD PLANNING SESSION MEETING

Black Hawk County is continuing its process of updating its 2015 Hazard Mitigation Plan by conducting a third and final planning meeting. As was stated in prior notices and meetings, the purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by the Federal Emergency Management Agency (FEMA). FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions. This final meeting will include finalizing and prioritizing mitigation actions and finalizing community profiles. The meeting will take place on Thursday, March 19, 2020 at 4:00 PM at the Black Hawk County Emergency Office, Emergency Operation Center, Waterloo, Iowa 50707. If you have any questions, please feel free to contact Lorie Glover, (319) 291-4373.

Signed

Subscribed and sworn to before me this 10 day of March, 2020

Notary Public

Received of _____

the sum of _____ Dollars in full
for publication of the above invoice.

Notary Seal:

NOTARIAL SEAL IOWA
JODI E MCKINSTRY
COMMISSION NO.782413
MY COMMISSION EXPIRES
1-30-23

Section: Legals
Category: 950 Legal Notice
PUBLISHED ON: 03/06/2020

TOTAL AD COST:	15.04
FILED ON:	3/10/2020

APPENDIX N: PLAN EVALUATION FORMS

Jurisdiction: Black Hawk County; Cities of Cedar Falls, Dunkerton, Elk Run Heights, Evansdale, Gilbertville, Hudson, La Porte City, Raymond, Waterloo, University of Northern Iowa, Cedar Falls Community School District.	**Title of Plan:** 2020 Updated Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan	**Date of Plan:** 4/14/20
Local Point of Contact: Lisa Ahern **Title:** Community Development Specialist **Agency:** Iowa Northland Regional Council of Governments	**Address:** 229 E. Park Avenue, Waterloo, IA 50703	
Phone Number: 319-235-0311	**E-Mail:** Lahern@inrcog.org	
Funding Source: Local		
State Reviewer: Mat Noble	**Title:** Planner	**Date:** 4/30/2020
FEMA Reviewer: Patrick Marchman Justin Sorg	**Title:** CERC Mitigation Champion HM Community Planner	**Date:** 6/3/2020 6/8/2020
Date Received in FEMA Region VII	1 May 2020	
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved	8 June 2020	

Jurisdiction:	NFIP Status*	
	Y	**NP**
1. Black Hawk County *(Adopted 4/14/20)*	Y	
2. Cedar Falls	Y	
3. Dunkerton	Y	
4. Elk Run Heights	Y	
5. Evansdale	Y	
6. Gilbertville	Y	
7. Hudson	Y	
8. La Porte City	Y	
9. Raymond	Y	
10. Waterloo	Y	
11. Cedar Falls School District		NP
12. University of Northern Iowa		NP
13. Waterloo School District		NP

*** Notes: Y = Participating NP = Not Participating in NFIP S- Sanctioned R-Rescinded**

SECTION 1: REGULATION CHECKLIST

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Sec. 1, pp. 5-10 / Table 1	✓	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Sec. 1, pp. 5-9, Sec. 5, p. 135	✓	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Sec. 1, p. 8	✓	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Sec. 1, p. 9	✓	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Sec. 1, p. 10 Sec. 5, pp. 134-136	✓	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Sec. 5, pp. 134-135	✓	

ELEMENT A: REQUIRED REVISIONS

None.

Plan Strengths:

- Very thorough description of planning process; bulleted list of documents used to develop plan very useful as a reference for readers of the plan.

Opportunities for Improvement:

- Expand on planning documents section (p.9) to explain how the documents were incorporated – i.e., identify what sections in the plan each identified source document helped inform.
- To further support how the planning process was developed and who contributed to planning efforts, the next plan update should include the title/position and agency/department of planning team members and stakeholders.

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Sec. 3, pp. 22 -Hazard Identification / Table 11 & Table 12; App. A-1, "Hazards & Risk Assessment"	✓	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Sec. 3, pp. 22-116	✓	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Sec. 3, pp. 22-116, App. A-I "Vulnerability – Identifying Assets (Critical Facilities) & Social Asset Populations"	✓	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Sec. 3, p. 116 / Table 45	✓	

ELEMENT B: REQUIRED REVISIONS

None.

Plan Strengths:

- Excellent discussion of hazard and risk assessment. Each risk assessment profile follows the same structure, which assists the reader in following the flow of information as it relates to each hazard.
- Exemplary map section in Appendix M. Maps are well-developed and labelled.
- Flood vulnerability analyses identify parcels and infrastructure at risk in SFHAs for each jurisdiction. Great job!

Opportunities for Improvement:

- Consider including discussion on future conditions or climate change impacts.
- When the information becomes available, future plans should identify the types of repetitive loss structures (residential, non-residential, commercial, industrial, etc.) in each community.

ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Sec. 4, p. 117 App. A-I "Current Mitigation Action"	✓	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Sec. 4, p. 116 / Table 45 App. A-I "Current Mitigation Action"	✓	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Sec. 4, p. 117 / Figure 13 App. A-I, "Mitigation Goals"	✓	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Sec. 4, pp. 124-133 App. A-I, "Future Mitigation Actions" and "Implementation Strategy"	✓	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Sec. 4, pp. 124-133 App. A-I, "Future Mitigation Actions" and "Implementation Strategy"	✓	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Sec. 5, p. 135 App. A-I, "Current Mitigation Actions".	✓	

ELEMENT C: REQUIRED REVISIONS

None.

Plan Strengths:

- Mitigation actions and their prioritization are clear and descriptive.

Opportunities for Improvement:

- Mitigation actions are "*specific actions, projects, activities or process taken to reduce or eliminate long-term risk".* In general, mitigation strategies should avoid beginning with "encourage", "ensure" or "continue/maintain" as these are not specific actions, nor can their progress be measured. Planning teams are encouraged to reformulate these statements into measurable actions.
- Many of the actions identified are routine maintenance, operational preparedness or emergency response in nature. While these need not be removed, they are not eligible activities for FEMA mitigation funding. In future plan updates, the planning team is encouraged to focus efforts on developing mitigation strategies that reduce long-term vulnerability and are eligible for FEMA mitigation grants. While actions should not be reliant solely on federal funds to implement, jurisdictions are encouraged to use the mitigation planning process to develop actions/projects with enough information to allow them to be able to take advantage of a variety of funding streams as they become available.

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Sec. 2, pp. 11-20, App. A-I, "Future Development" App. L, p. 416	✓	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	App. L, p. 416-476	✓	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	App. L, p. 416-476	✓	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**

ELEMEN.T D: REQUIRED REVISIONS

None.

Plan Strengths:

- Excellent presentation, both narratively and graphically, of demographic data, both in overall summary and individual community sections.

Opportunities for Improvement:

- Consider marking how demographic changes specifically impacted plan development more explicit, such as in its own paragraph/section.
- Demographic data for communities largely taken from 2013-2017 ACS Survey. While comprehensive, it would be useful to see how data changed over time in charts or through side-by-side comparisons of data over time. Some exists for population but consider expanding this in other areas.

ELEMENT E. PLAN ADOPTION

E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	App. K, p. 414	✓	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	App. K, p. 414 (Resolutions to Adopt are currently being scheduled by jurisdictions)	pending	

ELEMENT E: REQUIRED REVISIONS

E2: Written proof that all jurisdictions' governing bodies have formally adopted the plan (usually a resolution) must be submitted to FEMA.

Note: If the plan is not adopted by a participating jurisdiction, that jurisdiction would not be eligible for project grants under the following hazard mitigation assistance programs: HMGP, PDM and FMA.

SECTION 2: PLAN ASSESSMENT

A. Overall Plan Strengths and Opportunities for Improvement

Overall Plan Strengths

- The base plan provides an excellent overview of risk and vulnerability to the planning areas and community profiles focus on local areas of greatest concern.

Overall Opportunities for Improvement

- Continue to refine mitigation strategies that connect identified hazard vulnerabilities (problems) to a variety of actions and projects (solutions).

B. Resources for Implementing Your Approved Plan

FEMA

- The FEMA Hazard mitigation planning site contains the official guidance to meet the requirements of the Stafford Act, as well as other resources and procedures for the development of hazard mitigation plans.
- FEMA Hazard Mitigation Planning Online Webliography: This compilation of government and private online sites is a useful source of information for developing and implementing hazard mitigation programs and plans.
- FEMA Climate Change: Provides resources that address climate change.
- FEMA Library: FEMA publications can be downloaded from the library website. These resources may be especially useful in public information and outreach programs. Topics include building and construction techniques, NFIP policies, and integrating historic preservation and cultural resource protection with mitigation.
- FEMA RiskMAP: Technical assistance is available through RiskMAP to assist communities in identifying, selecting, and implementing activities to support mitigation planning and risk reduction. Attend RiskMAP discovery meetings that may be scheduled in the state, especially any in neighboring communities with shared watersheds boundaries.
- FEMA Mitigation Best Practices Portfolio: Communities can learn from others' successes, share their own successes, use the FEMA library, find detailed information and maps on hazards, read case studies, and find other resources for becoming a more resilient community:

Other Federal

- EPA Drinking Water and Wastewater Resilience: Provides a comprehensive list of accessible materials for managing emergency plans, trainings, and response and recovery efforts
- EPA Soak Up the Rain: Soak Up the Rain is a public outreach campaign focused on stormwater quality and flooding. The website contains helpful resources for public outreach and easy implementation projects for individuals and communities.

State

- Various funding programs are available from several state and federal agencies to assist local jurisdictions in accomplishing their mitigation activities and goals. A detailed listing of programs, information on each program, and contact information is also available from the 2018 Iowa State Hazard Mitigation Plan (available by email request; Chapter 5 available at

https://www.homelandsecurity.iowa.gov/documents/hazard_mitigation/IowaHMPSection5-508-Compliant.pdf).

- Iowa DNR Low Head Dams Grants: Intended to reduce accidents at dams through cost-share funds that are available to all dam owners on navigable streams
- Iowa Watershed Resources: Clean water grants that can be used for river restoration or other kinds of hazard mitigation implementation projects.

Not for Profit

- Kresge Foundation Online Library: Reports and documents on increasing urban resilience, among other topics.
- Naturally Resilient Communities: A collaboration of organizations put together this guide to nature-based solutions and case studies so that communities can learn which nature-based solutions can work for them.

Funding Sources:

- Review of the FEMA HMA guidance is encouraged as guidance provides information about application and eligibility requirements. This guidance is available from FEMA's grant applicant resources page at http://www.fema.gov/government/grant/hma/grant_resources.shtm.
- Federal Grants Resource Center and Grants.gov: Lists of grant opportunities from federal agencies (HUD, DOT/FHWA, EPA, etc.) to support rural development, sustainable communities and smart growth, climate change and adaptation, historic preservation, risk analyses, wildfire mitigation, conservation, Federal Highways pilot projects, etc.
- FEMA Hazard Mitigation Assistance (HMA): FEMA's Hazard Mitigation Assistance provides funding for projects under the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM), and Flood Mitigation Assistance (FMA). States, federally recognized tribes, local governments, and some not for profit organizations are eligible applicants.
- GrantWatch: The website posts current foundation, local, state, and federal grants on one website, making it easy to consider a variety of sources for grants, guidance, and partnerships. Grants listed include The Partnership for Resilient Communities, the Institute for Sustainable Communities, the Rockefeller Foundation Resilience, The Nature Conservancy, The Kresge Climate-Resilient Initiative, the Threshold Foundation's Thriving Resilient Communities funding, the RAND Corporation, and ICLEI Local Governments for Sustainability.
- USDA Natural Resource Conservation Service (NRCS) and Rural Development Grants: NRCS provides conservation technical assistance, financial assistance, and conservation innovation grants. USDA Rural Development operates over fifty financial assistance programs for a variety of rural applications.

APPENDIX O: PLAN REVIEW TOOL

Jurisdiction: Black Hawk County; Cities of Cedar Falls, Dunkerton, Elk Run Heights, Evansdale, Gilbertville, Hudson, La Porte City, Raymond, Waterloo, University of Northern Iowa, Cedar Falls Community School District, Waterloo Community School District.	**Title of Plan:** 2020 Updated Black Hawk County Multi-Jurisdictional Hazard Mitigation Plan	**Date of Plan:** 4/14/20
Local Point of Contact: Lisa Ahern **Title:** Community Development Specialist **Agency:** Iowa Northland Regional Council of Governments	**Address:** 229 E. Park Avenue Waterloo, IA 50703	
Phone Number: 319-235-0311	**E-Mail:** Lahern@inrcog.org	
Funding Source: Local		
State Reviewer:	**Title:**	**Date:**
FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region VII		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

Jurisdiction:	NFIP Status*	
	Y	**NP**
Black Hawk County	Y	
Cedar Falls	Y	
Dunkerton	Y	
Elk Run Heights	Y	
Evansdale	Y	
Gilbertville	Y	
Hudson	Y	
La Porte City	Y	
Raymond	Y	
Waterloo	Y	

Cedar Falls School District	Y	
University of Northern Iowa	Y	
Waterloo Community School District	Y	

*** Notes: Y = Participating NP = Not Participating in NFIP S- Sanctioned R-Rescinded**

SECTION 1: REGULATION CHECKLIST

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Page 5-10 / Table 1	x	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Page 5-9	x	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Page 8	x	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Page 9	x	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Page 10 Page 134-136	x	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Page 135	x	
ELEMENT A: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Page 22 -Hazard Identification / Table 11 & Table 12	x	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Page 22 - 116 Appendices A- I	x	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Page 22-116 Appendices A-I	x	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Page 116 / Table 45	x	
ELEMENT B: REQUIRED REVISIONS			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Page 117 Appendices A-I	x	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Page 116 Table 45 Appendices A-I	x	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Page 117 / Figure 13 Appendices A-I	x	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Page 124-133 Appendices A-I	X	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Page 124-133 Appendices A-I	X	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Page 135 Appendices A-I	X	
ELEMENT C: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Appendices A-I Appendix L - p. 416	x	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Appendix L - p. 416	x	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Appendix L - p. 416	x	
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Appendix K - p. 414	x	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Appendix K - p. 414 (Resolutions to Adopt are currently being scheduled by jurisdictions)	x	
ELEMENT E: REQUIRED REVISIONS Written proof that all jurisdictions' governing bodies have formally adopted the plan (usually a resolution) must be submitted to FEMA. *See Local Multi-Hazard mitigation Planning Guidance (July 2008) pages 17-18.* **Note:** If the plan is not adopted by a participating jurisdiction, that jurisdiction would not be eligible for project grants under the following hazard mitigation assistance programs: HMGP, PDM, FMA, and SRL.			

SECTION 2: PLAN ASSESSMENT

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

Plan Strengths

Opportunities for Improvement

Element B: Hazard Identification and Risk Assessment

Plan Strengths

Opportunities for Improvement

Element C: Mitigation Strategy

Plan Strengths

Opportunities for Improvement

B. Resources for Implementing Your Approved Plan

A variety of mitigation resources are available to communities. The Iowa Homeland Security & Emergency Management website: http://www.iowahomelandsecurity.org/disasters/hazard_mitigation.html provides planning and project related information as well as details on how major FEMA mitigation programs are implemented in the State.

HSEMD's training website provides information on upcoming training opportunities within the State: http://homelandsecurity.iowa.gov/training/.

Review of the FEMA HMA guidance (FY11 is the most current) is also encouraged as guidance provides information about application and eligibility requirements. This guidance is available from http://www.iowahomelandsecurity.org/grants/HMA.html or through FEMA's grant applicant resources page at http://www.fema.gov/government/grant/hma/grant_resources.shtm.

The FEMA Hazard mitigation planning site http://www.fema.gov/plan/mitplanning/index.shtm contains the official guidance to meet the requirements of the Stafford Act, as well as other resources and procedures for the development of hazard mitigation plans.

Various funding programs are available from several state and federal agencies to assist local jurisdictions in accomplishing their mitigation activities and goals. A detailed listing of programs, information on each program, and contact information is also available from the 2010 State Hazard Mitigation Plan.