City of Auburn
Hazard Mitigation Plan 2023

U.S. Department of Homeland Security
FEMA Region 7
11224 Holmes Road
Kansas City, MO 64131

FEMA

April 4, 2023

Director Benson
Iowa Department of Homeland Security and Emergency Management
7900 Hickman Rd. Suite 500
Windsor Heights, IA 50234

Subject: Approval of the City of Auburn Hazard Mitigation Plan

Director Benson:

In accordance with applicable[1] laws, regulations and policy, the Risk Analysis Branch, Mitigation Division, Federal Emergency Management Agency (FEMA) has approved the City of Auburn, Iowa Hazard Mitigation Plan. As indicated in the attached Local Mitigation Plan Review Tool the City of Auburn is the only jurisdiction participating in this plan and has submitted required adoption documentation for approval.

The approval period for this plan is from March 30, 2023, through March 29, 2028.

An approved mitigation plan is one of the conditions for applying for and receiving FEMA mitigation grants from the following programs:

- Hazard Mitigation Grant Program
- Building Resilient Infrastructure and Communities
- Flood Mitigation Assistance

Having an approved mitigation plan does not mean that mitigation grant funding will be awarded. Specific application and eligibility requirements for the programs listed above can be found in each FEMA grant program's respective policies and annual Notice of Funding Opportunities, as applicable.

To avoid a lapsed plan, the next plan update must be approved before the end of the approval period, including adoption by the participating jurisdictions. Before the end of the approval period, please allow sufficient time to secure funding for the update, including the review and approval process. Please include time for any revisions, if needed, and for the jurisdiction to formally adopt the plan after the review, if not adopted prior to submission. This will enable them to remain eligible to apply for and receive funding from FEMA's mitigation grant programs with a mitigation plan requirement.

[1] Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and National Dam Safety Program Act, as amended; 44 CFR Part 201, Mitigation Planning; and Local Mitigation Plan Review Guide.

We look forward to discussing options for implementing this mitigation plan. If you should have any questions or concerns, please contact Joe Chandler, Planning Team Lead, at (816) 808-9016 or joe.chandler@fema.dhs.gov.

Sincerely,

For Catherine R. Sanders, Director
Mitigation Division

Attachment: Local Mitigation Plan Review Tool

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Chapter 1: Introduction

Purpose

FEMA defines mitigation as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event. The goal of mitigation is to decrease the need for response as opposed to simply increasing the response capability. For the purpose of this plan, mitigation discussions focus on specific actions taken to reduce loss of life and property from hazards by modifying the built environment and undertaking other actions to reduce the risk and potential consequences of these hazards.

Section 322 of the Stafford Act, 42 U.S.C. 5165 as amended by DMA 2000 (Public Law 106-390), provides for states, tribes, and local governments to undertake a risk-based approach to reducing risks of natural hazards through mitigation planning. FEMA implemented hazard mitigation planning provisions through regulations at 44 CFR Part 201. This plan was prepared in accordance to the regulations set forth in 44 CFR §201.6. Under this regulation, local governments must have an approved plan to apply for and/or receive funding through the Hazard Mitigation Grant Program, Pre-Disaster Mitigation, Flood Mitigation Assistance, and Severe Repetitive Loss programs.

The purpose of the City of Auburn Hazard Mitigation Plan is to reduce the effects that hazards have on people and property within the City of Auburn. Hazard mitigation planning is the process through which hazards that threaten jurisdictions are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are identified, prioritized, and implemented. This document will be used to plan and prioritize future mitigation projects within the City of Auburn. This plan will comply with the appropriate Federal and State laws and planning requirements while making the community eligible for certain federal disaster assistance, specifically the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities (BRIC), and the Flood Mitigation Assistance Program.

Two of the most important components of emergency management deals with disaster recovery and hazard mitigation. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage, reconstruction, and repeated damage. This plan demonstrates the City of Auburn's commitment to reduce risks due to hazards, and serves as a tool to help decision makers facilitate mitigation activities and resources.

Assurance to Compliance with FEMA Requirements

This hazard mitigation plan complies with Iowa Homeland Security and Emergency Management Division's and FEMA's planning guidance; FEMA regulations, rules, guidelines, and checklists; Code of Federal Regulations; existing Federal and State laws; and such other reasonable criterion as the President/Governor, Federal/State legislatures and IHSEMD/FEMA may establish in consultation with local governments while the plan is being developed. This plan also helps with the minimum planning requirements for all FEMA mitigation programs,

such as the Flood Mitigation Assistance (FMA) Program, the Building Resilient Infrastructure and Communities (BRIC), and the Hazard Mitigation Grant Program (HMGP), and where appropriate, other FEMA mitigation related programs such as the National Earthquake Hazards Reduction Program (NEHRP), the National Flood Insurance Program (NFIP), and the Community Rating System (CRS).

Planning Process

Region XII Council of Governments was hired by the City of Auburn to facilitate the development of the Hazard Mitigation Plan. Region XII used the FEMA prescribed process to complete this plan. The plan was developed by the Planning Team which included representatives from the city, local businesses and organizations, and local residents. Participants in the planning process and measures taken to solicit and encourage public participation are identified in the public participation section. Planning guidance from FEMA and IHSEMD has established a framework used to complete the planning process. This plan is organized around the four-phase process that includes: organizing resources, assessing risks, developing the mitigation plan, and implementing the plan. This plan is an update and looks different from previous plans as planning processes have changed, the planning team has more experience, good examples have been examined and plan update requirements are found throughout.

Meetings

Section 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.

Region XII moderated the committee meetings. There was no set time limit for each meeting, but most lasted approximately one hour, which was dependent on the committee's discussion. The City of Auburn held meetings to discuss the plan and potential changes/updates and then held a separate meeting to adopt the plan.

The first meeting of the planning committee was an introductory meeting as well as a productive one held on Monday, April 25, 2022. This introductory meeting allowed Region XII staff to present an overview of the plan requirements as outlined in FEMA guidance, with particular note of the plan's requirements. A second meeting was held on August 8, 2022 where the draft community profile was handed out the committee was asked to read the profile and note any additional information they would like to see added. The previous critical facility map was also handed out along with the community profiles, and committee members were asked to add or remove facilities as necessary. To ensure accuracy, these maps were also sent to the city to check in further detail after the meeting. Discussion about which hazards should be included in the plan were held and the hazards identified in the 2018 State of Iowa Hazard Mitigation Plan was referenced. Committee members scored hazards based on probability, severity, warning time, and duration.

During the meeting, city staff and elected officials were given the community profile, previous hazard ranking, and the previous action plan. These items were handed out to determine any large changes within the community demographically and within the action plan, what projects have been completed since the last plan, and to determine if the goals included in the last plan are still pertinent to the community. Handing out the previous action plan makes it easier for the committee to brainstorm new ideas as they see what was previously included. The evaluation led to adding new goals, and the determination of what goals the committee wanted to include was completed. Along with the discussion of the goals were the mitigation actions, as these ensure that the city meets their goals. The city's goals are located in Chapter 4.

Participation

To be a participating jurisdiction, certain guidelines needed to be met. These guidelines include:

- An official of the jurisdiction must attend the planning team meetings;
- Participate in surveys and data collection activities;
- Participate in a local planning session in the jurisdiction, as needed, to finalize local elements of the plan;
- Review the plan draft and provide applicable feedback;
- Adopt the final plan.

As the City of Auburn was the only jurisdiction included in the planning process, the city meets the requirements needed to be a "participating jurisdiction."

Auburn Planning Committee	
Name	**Position**
Deb Ludwig	City Council Member
Linda Rath	City Council Member
Nick Meister	City Council Member
Bob Theulen	City Council Member
Jane Barto	City Council Member

Other organizations were invited to participate in the planning process and develop projects within the jurisdiction. The Sac County EMA representatives and Sac County EMS representatives were invited to participate in the plan development along with other neighboring fire departments, as sometimes fire calls overlap with other jurisdictions. All community meetings were open to the public according to Iowa Open Meetings Laws and allowed for comment to those living in and outside of the designated cities. The following table lists people who attended at least one meeting in addition to the committee members. The input from the following individuals helped fully develop the Hazard Mitigation Plan.

Additional Plan Contributors	
Name	**Position**
James Wissler	County Supervisor
Andy Koob	DGR Engineering
Richard Heim	Mayor
Tammy Nuckolls	City Clerk

Public Involvement

44 CFR 201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (1) An opportunity for the public to comment on the plan during the drafting stage and prior to planning approval.

Committee and additional meetings were open to the public. Agendas were posted at City Hall/Auburn Library prior to each meeting. Additional parties were contacted to encourage attendance at the meetings, but very little additional input was received from outside the city. Public outreach was strongly sought after at the

mitigation action meeting, as well as during the draft plan period. All meetings were conducted in compliance with Chapter 21 of the Code of Iowa.

The hazard mitigation plan was discussed during various city council meetings which are all conducted in compliance with the Iowa Open Meeting Law-Iowa Code Chapter.

When the plan reached draft stage, the public was encouraged to view it online and leave comments and criticisms. Since there was extremely limited input in the planning process from outside the city, the survey was distributed via email link to the Sac County Emergency Manager, neighboring fire departments, and the Sac County EMS, as well as posted publicly on Facebook, to receive additional input. The plan was uploaded online for viewing as a draft which was regularly updated so the most recent revisions were viewable. A SurveyMonkey survey was distributed for residents to give feedback, and there was no feedback received via the SurveyMonkey link. A few residents had conversations with city staff regarding the purpose of the plan, and staff informed these residents of the plan's purpose. These residents were also informed and encouraged to attend the city council meeting in December 2022 where the council considered and adopted the plan.

Plan Content

This plan evaluates all aspects of hazard mitigation. The plan is split into six chapters, which serve as an overview for the plan. The first chapter is an introductory chapter which explains the planning process used in development of the plan. The City of Auburn's general background is given in chapter two. The planning process is put in motion by explaining the specific steps taken to generate each jurisdiction's risk assessment (chapter 3), vulnerability assessment and loss estimates (chapter 4), and mitigation strategies (chapter 5). The final chapter of the plan explains how the plan was adopted and how it will be maintained in the future.

Section 201.6 (c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan. For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Plan Content Updates/Changes

In all phases of the planning process, the planning team reviewed the existing sections of the plan and provided comments on necessary changes. Planning requirements from FEMA and other applicable bodies become increasingly stringent, requiring new and updated data.

Referenced Plans

Referenced plans throughout the planning process and within this document include:

- Iowa State Hazard Mitigation Plan, 2018
- 2014 Sac County Multi-Jurisdictional Hazard Mitigation Plan
- Carroll, Crawford, Greene, and Sac Counties Multi-Jurisdictional Hazard Mitigation Plan 2020
- FEMA State and Local Hazard Mitigation Planning How-to Guides
- 2020 Sac County Housing Needs Assessment
- 2009 Auburn Code of Ordinances
- Local Mitigation Planning Handbook

Chapter 2: City Profile

City of Auburn

History

The City of Auburn was platted by the Western Town Lot Company and named for Auburn, New York in the early 1880's during construction of the railroad through the area. The City was incorporated in 1887. In the 1930's, Auburn was known for the superior clay building tile and drainage pipe that was manufactured in a local plant. Raw materials were taken from beds of clay and carried by cars suspended from wire cables for a distance of a quarter of a mile through Raccoon Valley.

Today Auburn is a very tidy, neat, and vibrant small community with a strong business district and active local leaders. The community is known for being the childhood home of Roy Reiman, who founded Reiman Publications that is now a part of the Reader's Digest group. Mr. Reiman has contributed significantly to local efforts in Auburn including a major streetscape project along U.S. Highway 71 through town.

Geography and Environment

Auburn is located in the southeast corner of Sac County in Western Iowa. Auburn is approximately 15 miles north of Carroll on U.S. Highway 71, which intersects with Iowa Highway 175 as it runs along the north border of the community. Auburn's topography is generally flat with the exception of a large ravine area on the western edges of the City along a tributary to the Raccoon River. Map 2.1 displays Auburn's topography and elevations.

Map 2.1: City of Auburn Elevation

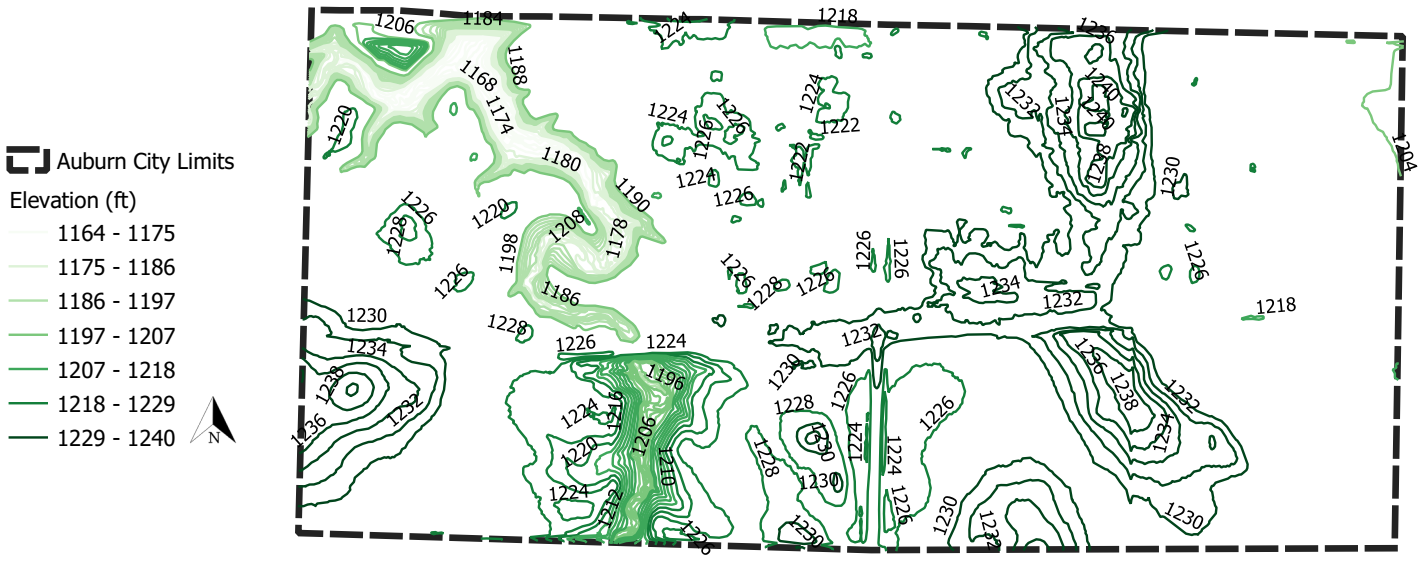


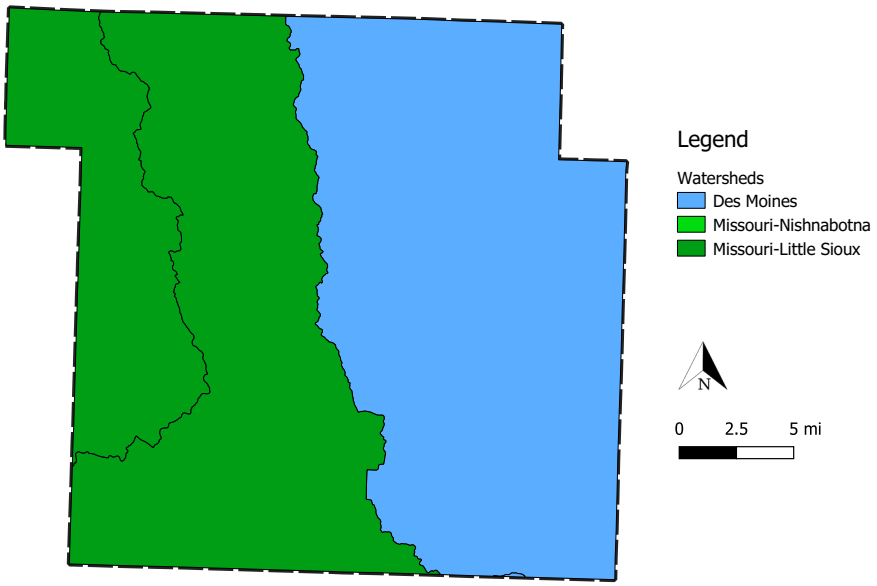
Table 2.1: Soils of Sac County

Soil Association	% of County	Description
Canisteo-Clarion-Nicollet	48%	Found in the eastern part of the county, these soils are well drained to poorly drained, loamy, nearly level to strongly sloping soils on uplands.
Galava-Primghar-Sac	12%	Found in a band about 3 miles wide along the east side of the Boyer River, these soils are well drained to somewhat poorly drained, silty, and nearly level to moderately sloping soils on uplands.
Galva-Primghar-Afton	25%	Found west of the Boyer River, these soils are well drained to poorly drained, silty, nearly level to moderately sloping soils on uplands and in drainage ways
Marshall	9%	Found in the southwestern, most sloping part of the county, these soils are well drained, silty, and gently sloping to strongly sloping soils on uplands.
Colo-Galva	3%	Found in the Boyer River Valley, these soils are poorly drained to well drained, nearly level and gently sloping soils on bottom lands and stream benches.
Coland-Alluvial land-Spillville	3%	Found in the Raccoon River Valley, these soils are well drained to poorly drained, sandy and loamy, nearly level and gently sloping soils on bottom lands.

Unfortunately, soil data for the city area was unavailable, but the city felt it was important to evaluate the soil data that was available. Chart 2.1 above displays the soils of Sac County with the descriptions of each soil.

Sac County is bisected almost down the middle by the Missouri-Mississippi River Divide, meaning watersheds in the western part of the county flow to the Missouri River and watersheds in the eastern part of the county flow to the Mississippi River. Auburn, located in the eastern portion of the County sees their waters ultimately flow to the Mississippi River and the city is a part of the Des Moines watershed. The highest elevations in the county can be found along this divide and along the western edges of the county, where the geography tends to be hillier than the more gently rolling eastern portions of the county.

Map 2.2: Sac County Watersheds



Transportation

The principal highways in Sac County are listed in Table 2.2, in addition to the approximate mileage of farm-to-market and secondary roads in the county. Sac County contains two U.S. Highways and four State Highways. Outside city limits, the average daily traffic on Highway 71 is between 1,340 and 3,750. Outside city limits, the average daily traffic on Highway 20 is between 3,250 and 4,750.

The participating communities in Sac County have roads to all developed areas. Most of the roads in the incorporated communities are seal coated or paved. Most communities have gravel roads as well. Western Iowa Transit provides public transit using an "on-demand" service throughout the county.

The Sac City Municipal Airport is the only airport located in Sac County. It is owned and operated by the City of Sac City. The *Iowa Aviation System Plan* identifies the Sac City Municipal Airport as a basic service airport. Basic Service Airports have runways 3,000 feet or greater in length with facilities and services customized to meet local aviation needs. The Sac City Municipal Airport has two runways with lengths of 4,100 ft. and 2,330 ft. The airport has 11 single engine air crafts that are based there.

Table 2.2: Sac County Transportation Network

Roadway	Mileage (approximate)	Communities Served
U.S. Highway 20	28 miles	Lytton, Sac City, Early, Schaller
U.S. Highway 71	37 miles	Auburn, Sac City
IA Highway 39	7 miles	Odebolt
IA Highway 110	6 miles	Schaller
IA Highway 175	37 miles	Auburn, Lake View, Odebolt
IA Highway 471	20 miles	Early
Farm-to-Market	328 miles	All
Secondary Roads (area serviced)	1,020 miles	All

Demographics

Over the past 50 years, the City of Auburn has seen both increases and decreases in it's population size. In 1960, Auburn had a population of 367 residents. Since then, the City's population has decreased 27.8% (102 residents) to 265 according to the 2020 Census. The most dramatic change happened between 2010 and 2020 when the city lost 57 residents. Figure 2.1 shows the City of Auburn's population trend since 1960.

The age distribution of Auburn's population can be found in figure 2.2. The chart shows the age distribution in both 2020 and 2010. From 2010 to 2020, the City of Auburn saw an increase of nearly 8% of residents aged 25 to 29 years, there was also a large increase (8%) of the residents aged 80 to 84 years. The cohorts of 40 to 44, 45 to 49, and 70 to 74 years all saw large decreases.

Figure 2.1: City of Auburn Population 1960-2020

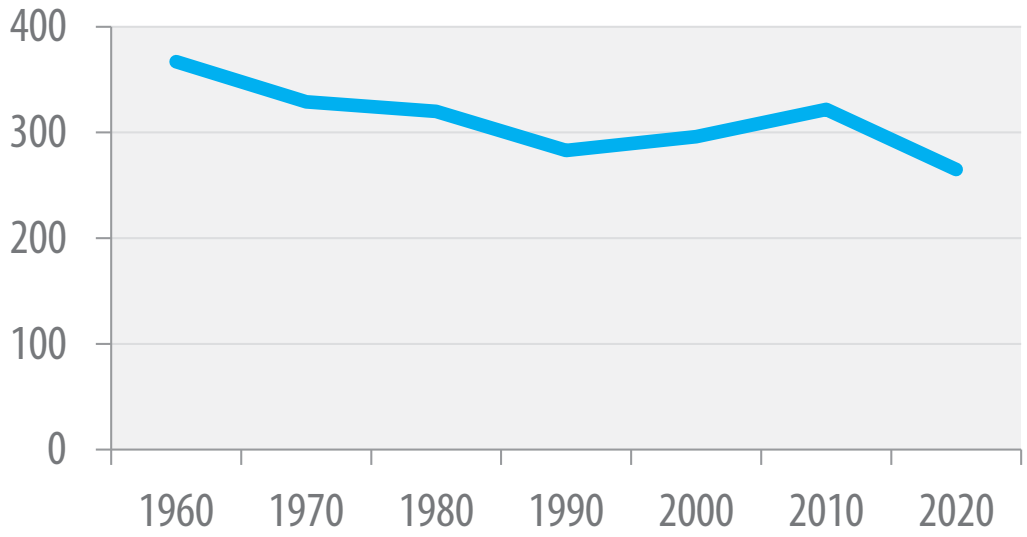
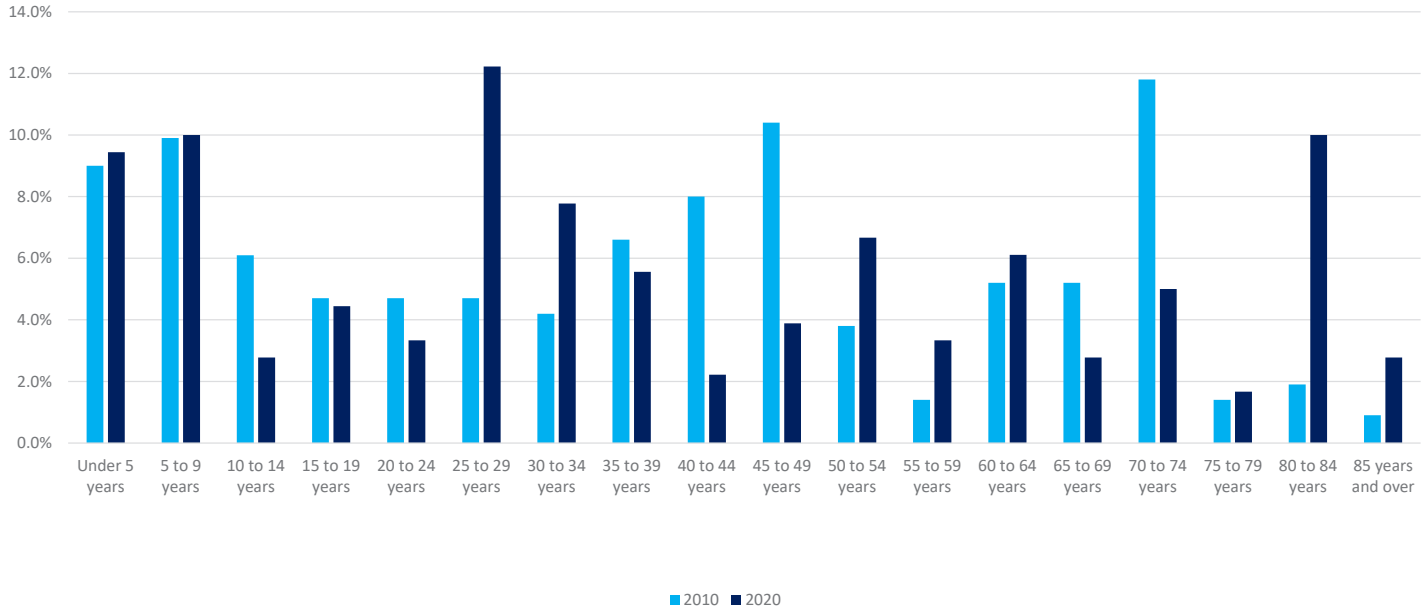


Figure 2.2: City of Auburn Age Distribution



Housing

An important aspect to drawing in new residents is housing. As many rural Iowa Communities and Counties are losing population, having an attractive housing stock to draw new residents in and to retain current residents is important. The current housing stock, type of homes, and housing availability and affordability can all be determining factors for potential residents.

According to the American Community Survey Estimates in Table 2.3, the City of Auburn experienced a decrease of 7 housing units between 2010 and 2020. During the same time frame, the number of occupied units increased from 86.99% in 2010 to 91.37% in 2020.

Table 2.3: City of Auburn Housing Units, 2010 & 2020

	2010		2020	
	Number	**Percent**	**Number**	**Percent**
Occupied Housing Units	127	86.99%	127	91.37%
Owner Occupied	100	78.74%	105	82.68%
Renter Occupied	27	21.26%	22	17.32%
Vacant Housing Units	19	13.01%	12	8.63%
Total Housing Units	146	100%	139	100%

Auburn, like many other small rural towns in Iowa, has a lower median housing value of $70,000. The State of Iowa has a median housing value of $137,200. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2020 American Community Survey Estimates, 72.4% of the city's homes are valued less than $100,000. A complete breakdown of the value of homes in Auburn can be found in table 2.4. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

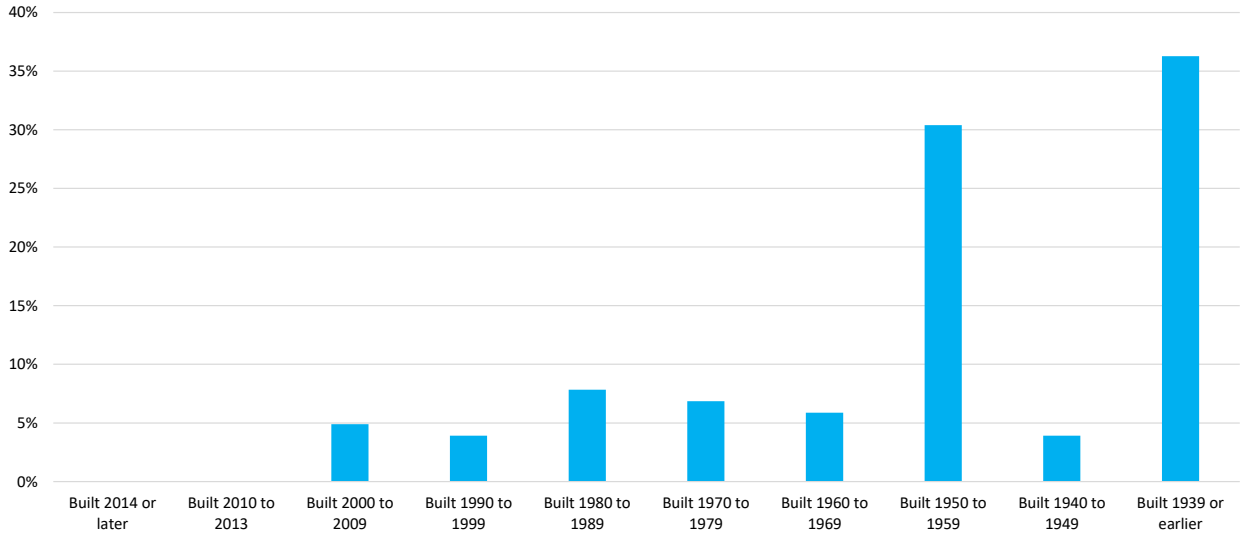
Table 2.4: City of Auburn Owner-Occupied Housing Units, 2020

Value of Housing Unit	Percent of Homes
Less than $50,000	19.0%
$50,000 to $99,999	53.4%
$100,000 to $149,999	10.3%
$150,000 to $199,999	5.2%
$200,000 to $299,999	1.7%
$300,000 to $499,999	3.4%
$500,000 to $999,999	6.9%
$1,000,000 or more	0.0%

Source: American Community Survey

Figure 2.3 showcases the year housing units within the City of Auburn were constructed. Like most of the county, Auburn has a large portion (36%) of the homes constructed in 1939 or earlier. The city also experienced a spike in construction from 1950-1959. During this time, 30% of the city's homes were built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure 2.3: City of Auburn Year Structure Built



Economics

Household income is an important indicator of the economic base in Sac County. In Auburn, the median household income is $41,250. Table 2.5 breaks down the city's households by income. The City of Auburn's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. The leading industry for employment of Auburn residents is manufacturing. Many employees commute to other larger neighboring cities like Carroll or Sac City where more employment opportunities are present.

Table 2.5: City of Auburn Household Income, 2020

Income (In 2016 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	3	3.7%
$10,000-$14,999	8	9.9%
$15,000-$24,999	7	8.6%
$25,000-$34,999	13	16.0%
$35,000-$49,999	19	23.5%
$50,000-$74,999	10	12.3%
$75,000-$99,999	12	14.8%
$100,000-$149,999	6	7.4%
$150,000-$199,999	2	2.5%
$200,000 or more	1	1.2%
Median Household Income	$41,250	-
Mean Household Income	$56,764	-

Auburn, overall, is a small rural community in a small rural county. A large percent of the businesses within the county serve the largely agricultural economy. Table 2.6 breaks down what industry Auburn's residents work in. Educational services, and health care, and social assistance industries employ the largest cohort of residents with 23.26% of the city's residents being employed in this industry. Wholesale trade is the second largest industry employing 13.95% of the city's residents.

Table 2.6: City of Auburn Employment by Industry, 2020

Industry	Estimate	Percent
Civilian employed population 16 years and over	86	100.0%
Agriculture, forestry, fishing and hunting, and mining	0	0.0%
Construction	9	10.47%
Manufacturing	10	11.63%
Wholesale trade	12	13.95%
Retail trade	10	11.63%
Transportation and warehousing, and utilities	4	4.65%
Information	0	0.00%
Finance and insurance, and real estate and rental and leasing	4	4.65%
Professional, scientific, and management, and administrative and waste management services	3	3.49%
Educational services, and health care and social assistance	20	23.26%
Arts, entertainment, and recreation, and accommodation and food services	6	6.98%
Other services, except public administration	8	9.30%
Public administration	0	0.0%

Existing Documents

The current planning and regulatory documents along with the year they were last updated for the City of Auburn can be found in Table 2.7.

Table 2.7: City of Auburn Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2014
Comprehensive Plan	No	-
Building Code	No	-
Zoning Ordinance	No	-
Strategic Plan	Yes	1996
Housing Needs Assessment	Yes	2020
NFIP Participant	No	-
Floodplain Regulations	No	-

NFIP Participation

There have not been instances of major flooding within the City of Auburn in the past. Because of this, the City of Auburn does not participate in the NFIP. Even though the City does not participate in the NFIP, the City and its immediate surrounding areas FIRMs were updated in 2022.

Outlook and Future Development

Since the last update, there has been development on a limited scale. One new restaurant opened on the City's Main Street. The city continues to make necessary improvements to the streets, water system, sewer

system and electrical grid. There have not been any large expansions of these services within the period since the last plan update. From 2010 to 2020, the city saw a decrease in population. So while the population has decreased, there has been development on a very limited scale. This development, while beneficial for the City, is not anticipated to continue.

Critical Facilities

Critical Facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Examples of critical facilities include, but are not limited to: hospitals and other medical facilities, police and fire stations, emergency operations centers, evacuation shelters, public works facilities, schools and colleges, transportation systems (airways, highways, railways, waterways), lifeline utility systems (potable water, wastewater, oil, natural gas, electricity, communication systems), high potential loss facilities (nuclear power plants, dams, military installations), and hazardous material facilities (corrosives, explosives, flammable materials, radioactive materials, toxins, etc.). The critical facilities for the City of Auburn can be found in map 2.3 and are listed in table 2.8.

Table 2.8: City of Auburn Critical Facilities

Number on Map	Name	Address	Type
1	Auburn City Hall/ Auburn Public Library	209 Pine Street	Essential Facility
2	Auburn Fire Department	101 Pine Street	Essential Facility
3	Auburn City Park	2nd Street	Vulnerable Population
4	City Well/Pump House	E 1st Street	Utility
5	Water Tower	Third & Spruce St	Utility
6	Martin's Welding	104 2nd Street	Hazardous Materials
7	Presbyterian Church	210 Elm Street	Vulnerable Population
8	Sparky's One Stop	402 Pine Street	Hazardous Materials
9	St. Mary's Catholic Church	301 E 4th Street	Vulnerable Population
10	Zion Lutheran Church	212 Ash Street	Vulnerable Population

Map 2.3: City of Auburn Critical Facilities

Essential Infrastructure and Services

Knowing what services and infrastructure serve the community as a whole can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation detours. The City's essential infrastructure and services can be found in Table 2.9.

Table 2.9: Essential Infrastructure and Services

Major Arterials	U.S. Highway 71 IA Highway 175	**Air Service**	Sac City Municipal Airport
Water Service	Auburn Municipal	**Sewer Service**	Auburn Municipal
Electric Service	Auburn Municipal	**Gas Service**	None
Sanitation/Solid Waste	Local Hauler	**Landfill**	Sac County Transfer Station
Phone and Internet	Wireless, Mediacom, Western Iowa Networks	**Law Enforcement**	Sac County Sheriff
Fire Service	Auburn Volunteer Fire Department	**Ambulance Service**	Sac County Ambulance

Chapter 3: Local Hazard Analysis & Risk Assessment

The hazard analysis and risk assessment is a process for determining the emergency management needs for a jurisdiction. The determination is possible when the knowledge of the hazards is combined with the knowledge of the impact it would have on citizens and property within the jurisdiction. The HARA process includes four steps and shows the jurisdictions how frequently damage from a particular event could occur; the extent of damage; and which portions of the jurisdiction could be impacted during an event.

Step 1: Identify Hazards – determine which hazards can affect the jurisdiction.
What kinds of hazards can affect the jurisdiction? What happened in the past that the jurisdiction should have known about?

Many people are only aware of the most obvious risks, usually as a result of a disaster that affected their community in recent years such as a tornado or flood. In many cases, a large majority of the population is not aware of certain hazards because they have not affected the jurisdiction during their lifetime.

Step 2: Community Profile – determine if and to what extent these hazards will affect the assets of the jurisdiction.
What will be affected by these hazards? Are there buildings, roads, utilities, or other facilities in the jurisdiction that will be damaged or destroyed by these hazards? Are there concentrations of certain populations in the hazard area that are especially vulnerable, such as elderly, children, or non-English speaking people? Are there unique or symbolic characteristics about the jurisdiction that will be impacted adversely by a hazard? How will the economy of the jurisdiction or region be impacted by the occurrence of the hazard?

An inventory will help identify the assets that can be damaged or affected by the hazard event. In many cases, jurisdictional assets may be vulnerable to more than one type of hazard, in which the jurisdiction may need to look at different characteristics of the same asset to understand its vulnerability to each type of hazard. For example, if a building is subject to both floods and tornadoes, the jurisdiction will be interested in the location and elevation of the building in order to determine how much of the structure and its contents will be damaged by flooding. The jurisdiction will also be interested in the construction of the building and its ability to resist physical damage caused by high winds and debris during a tornado.

Step 3: Profile Hazard Events – determine how impactful a hazard can be
How "big" is each hazard's potential impact? Will it affect every area the same or will certain areas get hit harder than others? How often will each type of hazard impact the jurisdiction?

It is important to know the location and amount of land area that may be affected by certain hazard types. For example, there may be areas that can be affected repeatedly by a hazard in one part of the jurisdiction such as floodplains adjacent to streams and rivers or areas around chemical facilities, or there may be potential jurisdiction-wide impacts from events such as windstorms or winter storms.

Hazards can create direct damages, indirect effects, and secondary hazards to jurisdictions. Direct damages

are caused immediately by the event itself, such as a bridge washing out during a flood. Indirect effects usually involve interruptions in asset operations and community functions. For example, when a bridge is washed out due to a flood, traffic is delayed or rerouted, which then impacts individuals, businesses, and public services that depend on the bridge for transportation. Secondary hazards are caused by the initial hazard event, such as when flooding causes a dam break. While this is a disaster in its own right, its consequent damages should be included in the damage calculations of the initial hazard event. Loss estimations will include a determination of the extent of direct damages to property and indirect effects on functional use.

Step 4: Prioritizing Hazards – determine which hazards need to be addressed through mitigation planning
Which hazards are priorities for planning? Which hazards are candidates for special attention for response planning? Which hazards should mitigation efforts be focused on? Which hazards require further planning for post-disaster recovery?

Through completion of steps 1, 2, and 3, the hazards can be sorted by their composite score. The hazards with a higher score represent a higher risk to the jurisdiction. At first glance, the top third can be taken as the first priority group, the following third as the second priority group, and the remaining third as the third priority group. Adjustments can be made to this preliminary ranking by the planning team.

Since the last plan update, there have been four separate disaster declarations in the planning area. The first declaration (DR-4184) happened in June 2014 was due to severe storms, tornadoes, straight-line winds, and flooding. The total public assistance grant dollars obligated totaled $17,806,184.12 due to the incidents that occurred from June 14, 2014 through June 23, 2014 in 26 counties in Iowa. The second declaration (DR-4421) happened in March 2019 and was due to severe storms and flooding. The total public assistance grant dollars obligated totaled $26,631,967.40 due to incidents that occurred from March 12, 2019 to June 15, 2019 in 80 counties in Iowa. The third and still ongoing disaster declaration (DR-4483) was declared on March 23, 2020 for the incident period of January 20, 2020 and continuing. This disaster declaration is due to the Covid-19 Pandemic. Current public assistance dollars obligated, as of October 21, 2022, total $255,873,613.31. This declaration covers all 99 counties in Iowa. It is unknown when this incident period will end, and it is anticipated that the public assistance grant dollar amount will rise the longer this pandemic lasts. The latest disaster declaration (DR-4642) was declared on February 23, 2022 for severe storms, straight-line winds, and tornadoes on December 15, 2021. The total public assistance grant dollars as of October 13, 2022 totaled $1,161,391.58 in 25 Iowa counties.

The hazard identification portion of the hazard analysis and risk assessment is an inventory of the hazards that could potentially affect the jurisdiction. Table 3.1 is a list is from the State of Iowa's 2018 Hazard Mitigation Plan, and includes twenty hazards in two categories.

Table 3.1: State of Iowa Hazards

Natural	Human Caused/Biological
Dam/Levee Failure	Animal/Plant/Crop Disease
Drought	HAZMAT Incident
Earthquake	Infrastructure Failure
Expansive Soils	Pandemic/Human Disease
Extreme Heat	Radiological Incident
River Flooding	Terrorism
Flash Flooding	Transportation Incident
Grass or Wildland Fire	
Landslides	
Severe Winter Storms	
Sinkholes	
Thunderstorm/Lightning/Hail	
Tornado/Windstorm	

Hazard Scoring Methodology

The assessment of the risk to people and property throughout the jurisdiction requires a great deal of data from the government and the private sector. To accomplish this task, a number of factors were taken into account: probability of occurrence in any given year; magnitude and severity of impact in terms of life, property, infrastructure, etc.; amount of warning time available before the hazard occurs; and duration of the hazard on the jurisdiction.

Each hazard is rated on a scale of one through four in four different categories. Each category holds a different weight, which provides an overall rating for each hazard. A scale of one through four is used because of the large variation in historical occurrences and probabilities, percentages of vulnerabilities and spatial extent, the number of casualties and the value of property damaged. The used scale provided the best option for comparison of vastly different types of hazards, and the weighted criteria allows priorities to be reflected in the final scoring of the hazards and allows higher priority to be placed on hazards that have higher occurrences in the jurisdiction and have a high potential for adverse impacts. Using the factors listed, it was decided that the probability of a hazard is the highest priority for mitigation efforts with the duration of a hazard being the lowest. The formula used for this risk assessment is as follows:

(probability x .45) + (magnitude/severity x .30) + (warning time x .15) + (duration x .10)= Final Hazard Assessment Score

Probability

Probability is the chance that a given event will occur. Each hazard may or may not have a comprehensive documented historical record. Local, state, and federal government agencies have made improvements on record keeping with respect to incidents, accidents, and disasters, which affect people and property.

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, historical data can be used to guess future occurrences; however, due to the nature of some hazards, historical data is difficult to use to estimate future occurrences. In addition, if a hazard has been addressed through mitigation, the probability of future occurrences decreases and historical data projections will not be accurate. Hazards that have occurred in the past may present themselves to the community in the future, further negating historical data. The probability scoring criteria is listed in table 3.2 below.

Table 3.2: Probability Scoring Criteria

Score		Description
1	Unlikely	Event is possible within the next ten years. History of events is less than 10% likely per year.
2	Occasional	Event is probable within the next five years. History of events is between 10% and 19% likely per year.
3	Likely	Event is probable within the next three years. History of events is between 20% and 33% likely per year.
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.

Magnitude/Severity

The magnitude of impact a hazard event has is related directly to the extent that hazard affects the jurisdiction 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, the resilience of the community, and the effectiveness of the emergency response and disaster recovery efforts. When determining the magnitude/severity, a typical storm scenario should be taken into account and extremes should not determine magnitude/severity. Table 3.3 describes how magnitude/severity of a hazard is determined. Only one of the three criteria needs to be met in order to receive that score.

Table 3.3: Magnitude/Severity Scoring Criteria

Score		Description
1	Negligible	Less than 10% of property severely damaged. Shutdown of facilities and services for less than 24 hours. Injuries/illnesses treatable with first aid.
2	Limited	10% to 20% of property severely damaged. Shutdown of facilities and services for more than a week. Injuries/illnesses that do not result in permanent disability
3	Critical	26% to 50% of property severely damaged. Shutdown of facilities and services for at least two weeks. 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. Multiple deaths.

Warning Time

The speed of onset is the amount of warning time available before the hazard occurs, and this should be taken as the average warning time. For many of the natural hazards there is some amount of warning as opposed to the human caused accidental hazards that occur instantaneously or without any significant warning. Table 3.4 uses the average warning time to score warning times.

Table 3.4: Warning Time Scoring Criteria

Score	Description
1	More than 24 hours
2	12 to 24 hours
3	6 to 11 hours
4	Less than 6 hours

Duration

This category examines 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. The duration does not include any necessary cleanup and the criteria are listed in table 3.5.

Table 3.5: Duration Scoring Criteria

Score	Description
1	Less than 6 hours
2	More than 6 hours, less than 1 day
3	More than 1 day, less than 1 week
4	More than 1 week

Hazard Profiles

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

This plan's risk assessment was completed on the jurisdiction as whole. School districts were analyzed based on where the school building was located, therefore the school district of East Sac where Auburn students attend is located in a different plan.

The hazard analysis identified potential hazards that could affect the City of Auburn for the purpose 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.

To identify the hazards that threaten the planning area, the Hazard Mitigation Committee reviewed hazard data from the National Centers for Environmental Information among other sources, and discussed the impacts of each hazard required by FEMA, and natural and human-caused hazards that were included in the 2018 State of Iowa Hazard Mitigation Plan. Hazards that the committee determined could affect the City of Auburn are shown in table 3.6.

Not all of the hazards were determined to affect the City of Auburn. The hazards shown in table 3.7 were eliminated.

Table 3.6: Hazards Affecting the City of Auburn

Natural Hazards		Combination Hazards
Animal/Plant/Crop Disease	Grass/Wild Land Fire	HAZMAT Incident
Drought	Human Disease	Infrastructure Failure
Earthquake	Severe Winter Storm	Radiological
Expansive Soils	Thunderstorm/Lightning/Hail	Terrorism
Extreme Heat	Tornado/Windstorm	Transportation Incident
Flash Flood		

Table 3.7: Hazards Not Affecting the City of Auburn

Hazard	Reason for Omission
Landslides	There is no known agency that documents historical data on landslides. The best available data was personal knowledge of the committee. The committee decided to eliminate landslides due to their limited occurrences and impacts.
Sinkholes	There is no history of sinkholes in the county. Source: IADNR, Iowa Geological Survey
Levee/Dam Failure	There are no levees/dams north of the City of Auburn for at least 30 miles, and the dam that is over 30 miles away is a low risk dam. There have been no instances to the committee's knowledge of levee/dam failure, therefore they opted to omit this hazard.

Hazard	Reason for Omission
River Flooding	The closest river is nearly 1 mile north of the Auburn City limits. In nearly 30 years, the City of Auburn has not had a recorded flood due to the North Raccoon River. Source: National Centers for Environmental Information

Table 3.8 displays an overview of all potential hazards for the City of Auburn, if they previously occurred, if the city was likely to experience it, the probability, magnitude/severity, warning time, duration, and a hazard score.

Table 3.8: Jurisdictional Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Severe Winter Storm	Yes	Yes	4	2	2	3	3.00
Grass/Wild Land Fire	Yes	Yes	4	1	4	1	2.80
Transportation Incident	Yes	Yes	3	2	4	2	2.75
Thunderstorm/ Lightning/Hail	Yes	Yes	4	1	3	1	2.65
Tornado/ Windstorm	Yes	Yes	3	2	4	1	2.65
Animal/Plant/Crop Disease	Yes	Yes	2	3	2	4	2.50
Drought	Yes	Yes	3	2	1	4	2.50
Flash Flood	Yes	Yes	3	1	4	1	2.35
HAZMAT Incident	Yes	Yes	4	2	4	2	2.30
Infrastructure Failure	Yes	Yes	2	2	4	2	2.30
Terrorism	Yes	Yes	1	3	4	3	2.25
Human Disease	Yes	Yes	2	2	2	4	2.20
Extreme Heat	Yes	Yes	3	1	1	3	2.10
Radiological	Yes	Yes	1	2	4	3	1.95
Earthquake	No	No	1	1	4	1	1.45
Expansive Soils	Yes	Yes	1	1	1	4	1.30

Animal/Plant/Crop Disease

An outbreak of disease that can be transmitted from animal to animal or plant to plan represents and animal/plant/crop disease. A disease outbreak will likely have economic implications, cause crop production losses, and possibly have environmental damages.

A plant disease is any abnormal condition that alters the appearance or function of a plant. It is a physiological process that affects some or all plant functions and may reduce the quality and/or quantity of the harvested product.

Fungi are the largest and perhaps most well-known group of plant pathogens. The vast majority of fungi do not cause disease. However, numerous fungi can cause plant disease, and a relatively small number of them cause disease in humans and livestock.

Bacteria are perhaps more familiar as the cause of human and animal diseases, such as tuberculosis and pneumonia. Nonetheless, some bacteria can also be destructive plan pathogens. Like bacteria, viruses are probably most familiar as the cause of human and animal diseases, such as influenza, polio, rabies, smallpox, and warts. Viruses, however, also cause several plant diseases.

Nematodes are microscopic, non-segmented, round, slender worms. Several thousand species of nematodes are found in soil, fresh and salt water, animals, and within or on plants throughout the world. Some nematodes are parasites on animals, plants, insects of fungi (Soybean Diseases-ISU Extension Office).

Table 3.9: Animal/Plant/Crop Disease Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	2	3	2	4	2.50

Table 3.10 displays some common plant and crop diseases found in Iowa. The animal diseases are either found in Iowa or could potentially be found in Iowa.

Table 3.10: Animal, Plant, and Crop Diseases

Animal	**Plant**	**Crop**	
Avian Influenza	**Trees**	**Corn**	**Soybean**
BSE "mad cow"	Anthracnose	Anthracnose Leaf Blight	Anthracnose Stem Blight
Brucellosis	Bur Oak Blight	Common Rust	Asian Soybean Rust
Chronic Wasting Disease	Cankers	Common Smut	Bacterial Blight
Epizootic Hemorrhagic Disease	Dutch Elm Disease	Ear Rot	Bacterial Pustule
Exotic Newcastle Disease	Emerald Ash Borer	Eyespot	Bean Pod Mottle

Animal	Plant	Crop	
Foot and Mouth Disease	Leaf Spot	Gray Leaf Spot	Brown Spot
Johne's Disease	Oak Wilt	Nematodes	Cercospora Leaf Blight
Pseudorabies	Pine Wilt	Northern Leaf Blight	Downy Mildew
Rabies	Thousand Cankers Sisease	Northern Leaf Spot	Frogeye Leaf Spot
Scrapie	Verticillium Wilt	Southern Rust	Root Rot
Tuberculosis	**Ornamental (Garden)**	Salk Rot	Soybean Cyst Nematode
West Nile Virus	Anthracnose	Stewart's (Wilt) Disease	Soybean Mosaic Virus (SMV)
	Black Spot	**Alfalfa**	Stem Rot
	Crown Gall	Bacterial Wilt	Sudden Death Syndrome (SDS)
	Crown Rot	Crow Rot	
	Gray Mold	Fusarium Wilt	
	Leaf Spot	Nematodes	
	Nematodes	Root Rot	
	Powdery Mildew	Verticillium Wilt	
	Rose Mosaic		
	Tomato Spotted Wilt Virus		
	Verticillium Wilt		

Avian Influenza

Found amongst poultry, most Avian Influenza strains are classified as low pathogenicity and cause few clinical signs in infected birds. In contrast, high pathogenicity is a severe and extremely contagious strain that leads to death. This disease is of concern in Iowa because the state leads the nation in egg production. Production operations randomly test for the disease and will notify the Iowa Department of Agriculture and Land Stewardship (IDALS) if there is a sign of the disease.

Emerald Ash Borer

Emerald Ash Borer (EAB) is a small green invasive wood-boring beetle that attacks and kills ash trees. The adults live on the outside of ash trees, feeding on the leaves during the summer. The larvae feed on the living plant tissue by tunneling underneath the bark of the trees, which disrupts the vascular flow and ultimately leads to the tree's death. EAB attacks native ash trees of any size, age, or stage of health and trees that have been attacked can die within two years.

Much of Iowa's forestland is densely populated with ash trees and Iowa's community street trees are heavily planted with ash cultivars. Iowa has an estimated 50 million rural ash trees and 3 million urban ash trees (USFS, 2008). EAB was first introduced to Iowa in May of 2010, when they were found on an island in the Mississippi River in Allamakee County. By 2012, EABs were caught in separate locations in Allamakee County, confirming that they had moved inland. EAB has since spread to 57 Iowa counties and have killed millions of ash trees.

Rabies

Rabies is a deadly viral disease found in mammals that infects the central nervous system, ultimately causing disease in the brain and death. It is most often transmitted by animal bites, specifically in bats, skunks, coyotes, foxes, and raccoons. The Rabies infection is nearly always fatal unless prompt treatment is administered before symptoms begin. In Iowa, the two most common strains are bat and skunk, and many different species can be infected with them. In 2012, thirty-one cases of animal rabies were reported in Iowa, consisting of 17 bats, 9 skunks, 3 bovine, and 1 feline. It is important to note that data is greatly influenced by the number of animals tested (Iowa Department of Public Health).

Soybean Cyst Nematode (SCN)

The SCN is the most important pathogen of soybean in Iowa. Damage may not be obvious; however, yield losses up to forty percent on susceptible varieties are possible. Infected plants usually occur in patches within a field. SCN survives in the soil as eggs within dead females called cysts. These eggs can survive several years in the absence of a soybean crop. The second stage juvenile hatches from the eggs and infects soybean plants. Unfortunately, conditions that favor soybean growth are also favorable for SCN development. The number of SCN in afield can be greatly reduced through proper management, but it is impossible to eliminate SCN from a field once it is established (ISU Extension).

Stewart's (Wilt) Disease

Caused by bacteria, this disease is generally more destructive on sweet corn than on popcorn or dent corn. It is unique because its spread depends almost completely on an insect: the corn flea beetle. High levels of ammonium nitrogen and phosphorus tend to increase susceptibility, while high levels of calcium and potassium tend to decrease susceptibility. High temperatures also enhance development of the disease (ISU Extension).

Drought

Droughts are defined as periods of prolonged dry weather that lasts long enough to cause serious problems such as crop damage and/or water supply shortages. The severity of the drought depends upon the degree of moisture deficiency, the duration, and the size of the affected area. The four ways droughts can be defined are meteorological, hydrological, agricultural, and socioeconomic. A meteorological drought is a drought that refers to the precipitation deficiency, hydrological droughts pertain to the declining surface and groundwater supplies, agricultural droughts refer to soil moisture deficiencies, and socioeconomic droughts refer to physical water shortages affecting people.

In Iowa, the highest occurrence of drought conditions are associated with meteorological and agricultural as a result of either a decline in precipitation or low soil moisture. Droughts can have widespread adverse economic, environmental, and social impacts as rivers, reservoirs, groundwater levels, and soil moisture decrease. Droughts can be spotty or widespread and last from a few weeks to a number of years. During prolonged droughts, communities can notice serious impact on their water supply and economy, and increased demand for water and electricity may result in shortages of resources. If agricultural production is damaged or destroyed by a loss of crops or livestock, food shortages can occur. While droughts are generally associated with extreme heat, droughts can and do happen during cooler months.

The Palmer Drought Severity Index (PDSI) was developed by Wayne Palmer in the 1960s and uses temperature and rainfall information in a formula to determine dryness. The PDSI is most effective in determining long- term drought (several months) and is not as efficient with short-term forecasts. An

advantage of the Palmer Index is that it is set to local climate, so it can be applied to any part of the country to demonstrate relative drought or rainfall conditions. The Palmer Index uses 0 as normal, with drought conditions shown as negative numbers and excess rainfall shown as positive numbers. Figure 3.1 displays the Palmer Drought Severity Index for the State of Iowa from 2013-2018. The Palmer Drought Severity Index has seven categories of wet and dry conditions that are displayed in table 3.11.

Figure 3.1 Palmer Drought Severity Index: 2013-2018

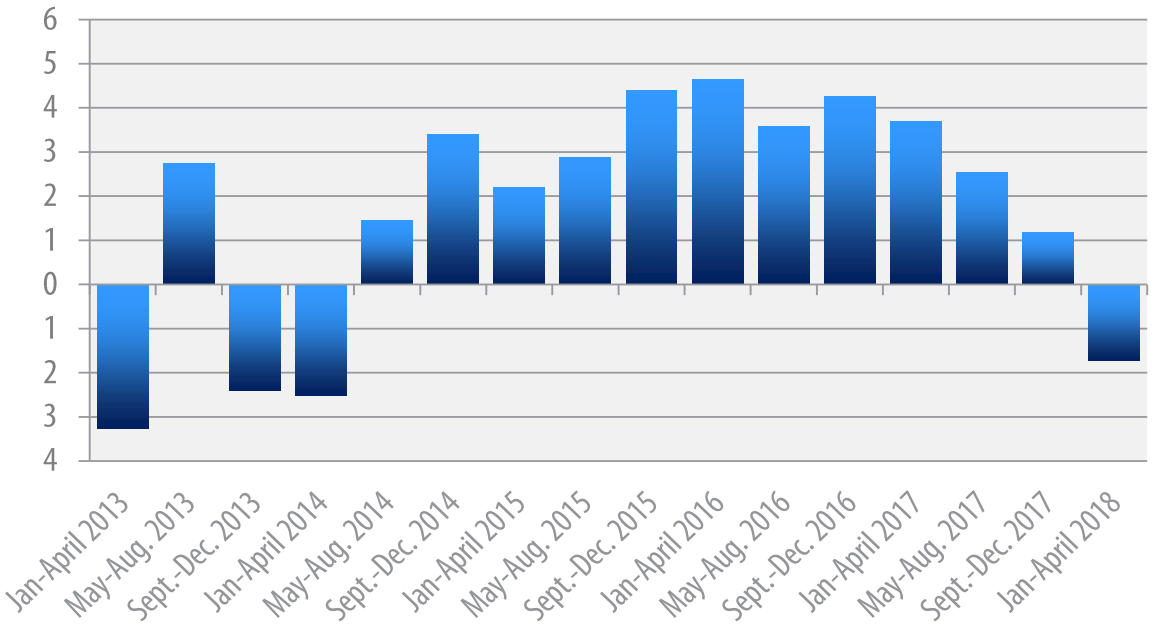


Table 3.11: Palmer Drought Severity Index

Numerical Value	Condition
-4.0 or less	Extreme Drought
-3.0 to -3.9	Severe Drought
-2.0 to -2.9	Moderate Drought
-1.9 to 1.9	Near Normal
2.0 to 2.9	Unusual Wet Spell
3.0 to 3.9	Very Wet Spell
4.0 or more	Extremely Wet

The Palmer Hydrological Drought Index (PDHI) shows hydrological drought and wet conditions, which more accurately reflect groundwater conditions, reservoir levels, etc. The hydrological impacts of a drought take longer to develop and longer to recover, therefore PDHI responds more slowly to changing conditions than PDSI. Figure 3.2 shows the Palmer Hydrological Drought Index for Iowa from 2013-2018.

Figure 3.2 Palmer Hydrological Drought Index: 2013-2018

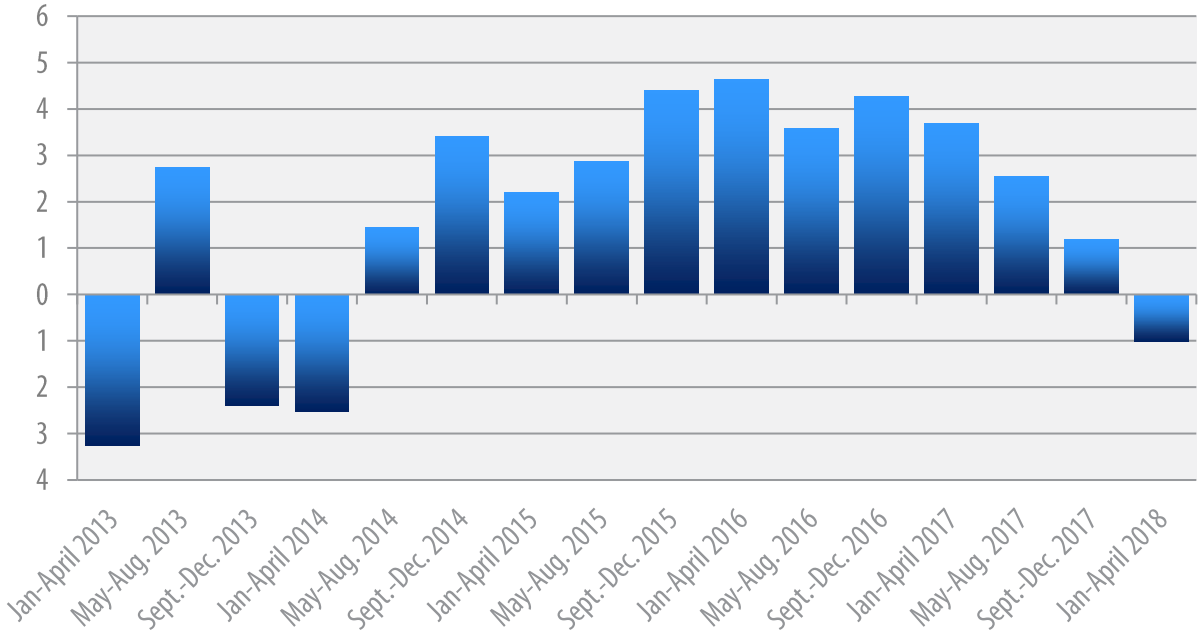


Table 3.12: Drought Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	3	2	1	4	2.50

Since 2014 the City of Auburn has experienced eleven different instances of drought. According to the National Centers for Environmental Information, these droughts happened in 2021 and 2021. Over 280 days were spent in drought conditions over the two year period. These droughts did not do any reported damage to property or crops.

When droughts occur, they tend to affect more than just one city, county or state. As the agriculture sector is reliant on precipitation and when droughts occur it tends to be the most impacted sector. During water shortages, water dependent manufacturers are also affected. Drinking water is drawn from surface and groundwater sources, so prolonged droughts may affect all citizens if there were to be a drop in the stream flow coupled with the drop in the water table.

Over the past century, studies have been conducted that show meteorological droughts are never the result of one single cause. Scientists are not able to predict a drought more than a month or so in advance, as predicting droughts depends on forecasting precipitation and temperature. Anomalies of precipitation and temperature may last weeks, to months, to even decades and is dependent on several unstable weather systems at the global level. Drought prediction improvements differ by region, season, and climate. The U.S. Drought Monitor map provides a weekly summary of drought conditions across the United States and combines a variety of data-based drought indices, indicators and local expert input. This map is the most widely used gauge of drought conditions throughout the Country.

Earthquake

An earthquake is a shaking or vibration of the earth caused by the sudden release of energy that may impose a direct threat on life and property. This shaking can cause bridges and buildings to collapse, landslides, flash floods, floods, and disrupt gas, electric, and phone services. The three general classes of earthquakes are tectonic, volcanic, and artificially produced (Iowa Hazard Mitigation Plan 2018).

Table 3.13: Earthquake Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	No	No	1	1	4	1	1.45

The City of Auburn is located in low risk Seismic Zone 1. Most structures in Iowa are not built to earthquake standards, but because of the relatively low magnitude of a possible quake, property damage would likely be minor foundational damage. The most vulnerable structures are houses built on poorly consolidated substrate, especially floodplain materials.

Iowa as a whole has experienced the effects of only a few earthquakes in the past 175 years. The epicenters of thirteen earthquakes have been located in the state with the majority along the Mississippi River. While more than twenty earthquakes have occurred in or around Iowa over the past 175 years, they have not seriously impacted the state.

Seismologists attempt to forecast earthquake size and frequency based on data from previous events in the New Madrid Fault Zone, but it is difficult because there are few historic moderate to large earthquakes. Based on the recurrence intervals for small earthquakes, scientists estimate a 90% chance of a Richter Scale 6.0 magnitude earthquake in the New Madrid Fault Zone by the year 2040. A magnitude 6.5 in the New Madrid would result in little or no damage in Iowa (Iowa Hazard Mitigation Plan 2018).

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. They usually only last seconds with aftershocks occurring sporadically for weeks or even months.

Expansive Soils

Soils and soft rock that tend to swell or shrink excessively due to changes in moisture content are commonly known as expansive soils. 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 develops gradually and seldom present a threat to life. The hazard occurs in many parts of the southern, central, and western United States. The availability of data on expansive soils varies greatly. For large areas of the United States, little information is reported other than field observations of the physical characteristics of clay.

Table 3.14: Expansive Soils Hazard Score

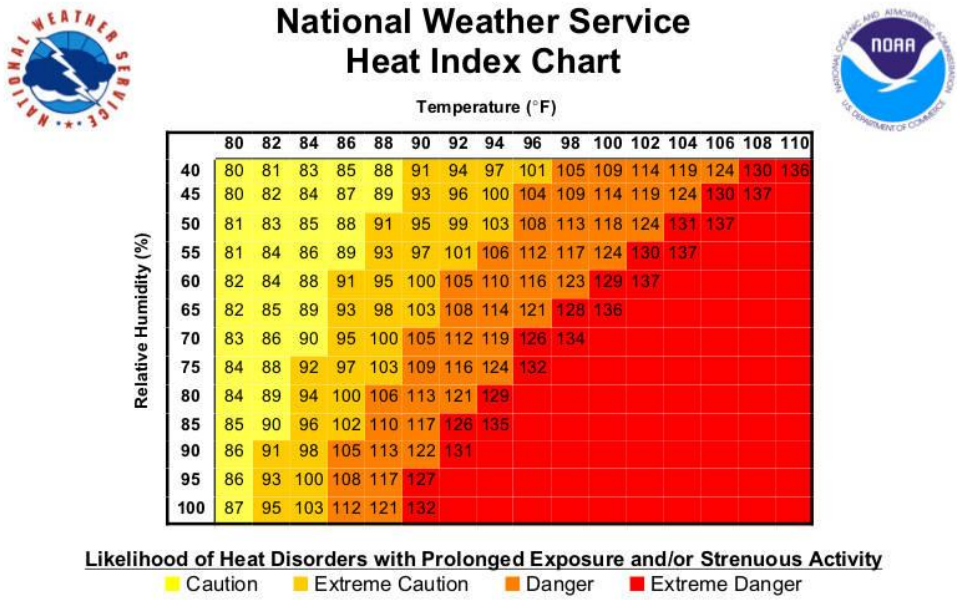
	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	No	No	1	1	1	4	1.30

The most extensive damage from expansive soils happens to highways and streets. Houses and one-story commercial buildings are most apt to be damaged by the expansion of swelling than are multi-story buildings, which usually are heavy enough to counter swelling pressures. The warning time for expansive soils is consistent with other geological hazards that occur slowly over time.

Extreme Heat

Extreme heat is the number one weather-related killer in the United States, and has the highest 30-year average compared to other weather events. The 30-year average for heat-related deaths is 130 per year, 49 more than flooding, which has the second highest average. Extreme heat conditions 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 or at least three consecutive days of 90 plus degree weather. Heat advisories are issued at 105 degrees and warnings are issued at 115 degrees. A heat index is a temperature that tells how hot it really feels when relative humidity is added to the actual air temperature. When exposed to full sunshine, the heat index can be increased by 15 degrees. Figure 3.3 displays heat index and likelihood of experiencing a heat disorder with rising temperatures and humidity.

Figure 3.3: National Weather Service Heat Index Chart



The body's ability to cool itself is affected during extreme heat. When the body heats too rapidly, to cool itself properly or when too much fluid or salt is lost through dehydration or perspiration, the body temperature rises and heat-related illnesses may develop. These illnesses can include heat cramps, sunstroke, heat exhaustion, and heat stroke. As heat stroke can be deadly, immediate medical attention is necessary.

Table 3.15: Extreme Heat Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	3	1	1	3	2.10

Since 2014, the City of Auburn has experienced two extreme heat events. The first occured from July 20 through July 23, 2016. During this time, temperatures were in the 90s with dew points in the upper 70s and 80s. This caused the heat index to at times exceed 110 degrees. The second occurred from July 18 through July

20, 2019. High temperatures coupled with high humidities left heat index values consistently in the 105 to 115 degree range during the daytime periods.

Many factors can determine how extreme heat affects all types of life. Older adults, young children, people with disabilities, and those who work outdoors are more susceptible to illnesses caused by heat. Households that do not have air-conditioning are also more at risk as they cannot escape the heat. Livestock and other animals are also adversely affected by extreme heat and extreme heat at the wrong time can inhibit crop production. Roadways and railroad tracks can also be distorted or even fail during extreme heat.

Extreme heat events can be predicted a few days in advance. When the heat index is expected to exceed 105 degrees for at least two consecutive days, the National Weather Service initiates alert procedures. Since extreme heat events have to have at least three days of 90 plus degree weather, these events are expected to last a minimum of three days, but no more than seven days.

Flash Flood

Flash flooding is one of the most dangerous weather events because there is little to no warning time. Flash floods occur when the water along a stream or low-lying area rises rapidly. These events happen within six hours of a significant rainfall caused by heavy rainfall in a short amount of time from intense storms, slow-moving storms, or storms repeatedly moving over the same area. Other flash floods can be caused by dam or levee failures, or sudden releases of water held by an ice jam. Some flash floods are strong enough to roll boulders, tear out trees, destroy buildings or bridges, and scour out new channels.

Areas with dense populations are at a high risk of flash floods, as the construction of buildings, highways, driveways, and parking lots increase runoff. Streams through cities are sometimes routed underground into storm drains and during heavy rains, the storm drains can be overwhelmed and flood roads and buildings, particularly low spots such as underpasses, underground parking garages, and basements. Areas near rivers are at risk from flash floods. Levees are often built along rivers and used to prevent high water from flooding bordering land.

Nearly half of all flash flood deaths occur as vehicles are swept downstream after the driver drives onto the flooded highway. Six inches of fast-moving water can knock a person off their feet; water only twenty-four inches (two feet) deep can carry away most vehicles. The National Weather Service has the "Turn Around Don't Drown" program to educate the public about the dangers of floods and fast moving waters.

Table 3.16: Flash Flood Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	3	1	4	1	2.35

Since 2014, the City of Auburn has not experienced a flash flood. Land that is located within a floodplain or in low-lying areas are at the most risk of experiencing flash floods. Properties that have aging sewer systems can also be at risks due to the design of the drains. Older systems were designed for what was necessary at the time, and current capacities could be significantly larger. When possible, the National Weather Service forecasts flash flood watches 12-36 hours in advance when conditions look favorable for a flash flood. Although a watch is issued 12-36 hour in advance, warnings, on average, are issued thirty minutes to an hour before the flood occurs. These weather events start and end quickly.

Grass/Wild Land Fires

A grass/wildland fire is an uncontrolled fire that threatens life and property in either rural or wooded areas. When conditions are favorable, such as periods of drought when natural vegetation is drier, fires are more likely to occur.

Wildland fires are a serious threat to life and property in the United States. Fire seasons have become progressively worse over the past fifty years due to the combination of drought, warmer temperatures, high winds, and an excess of dried vegetation in forests and grasslands. As the wildland threat grows, so does the cost of fighting the fires. Although lightning is a common ignition source of wildland fires, nine out of ten fires are started directly or indirectly by people through debris burning, campfires, arson, discarded smoking products, sparks from equipment in operation, arced power lines, or other means.

Weather is the most variable of the factors that affect fire behavior. The combination of wind, temperature, and humidity affects how fast wildland fires can spread. Strong winds can push the flames toward new fuel sources or pick up and transfer burning embers, sparks, and other materials that are capable of starting "spot fires". Temperature effects the spread of wildland fires because the temperature of the fuel affects how quickly or slowly they will reach their ignition point and burn. Humidity dampens the fuel, slowing the spread of flames.

Table 3.17: Grass/Wild Land Fire Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	4	1	4	1	2.80

Grass and Wild Land fires are the most common types of fires that occur in and around the City of Auburn, and all jurisdictions can be affected by this hazard. Most jurisdictions have been affected by a grass or wild land fire in the past, but these types of fires tend to occur in the rural parts of the county most often. Consistent and accurate data is not readily available for the city of Auburn but in total, the fire department responds to multiple incidents per year.

According to the National Interagency Fire Center (NIFC), the United States saw 58,083 fires resulting in 8,767,492 acres burned in 2018. Iowa had 386 wildland fires resulting in 8,014 acres burned in 2018. The ten year total for the State of Iowa (2009-2018) was 4,236 wildfires resulting in 91,378 acres burned. According to the NIFC, no fire in Iowa has been reported as a historically significant wildfire or a large wildfire (more than 100,000 acres). The NIFC puts out a monthly National Significant Wildland Fire Potential Outlook, warning areas where wildland fires have the potential to breakout.

Most grass/wildland fires are contained to highway right-of-way and rail right-of-way ditches; however, high winds can turn a small fire into a multi-acre grass fire within a matter of minutes. The extent is dependent of weather conditions and topography. Grass/wildland fires occur without warning and can spread rapidly. The majority of Iowa wildfires are short in duration.

Human Disease

This hazard includes a medical, health, or sanitation threat to the general public, such as a contamination, epidemics, plagues, insect infestations, and pandemics. Public health action to control infectious disease in the 21st century is based on the 19th century discovery of microorganisms as the cause of many serious diseases (e.g., cholera and Tuberculosis). 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. Scientific findings have contributed to a new understanding of the evolving relationship between humans and microbes (Iowa Hazard Mitigation Plan 2018).

Table 3.18: Human Disease Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	2	2	2	4	2.20

The City of Auburn and nation as a whole have been recovering from the COVID-19 pandemic. This pandemic has caused a disaster declaration (DR-4483). It was declared on March 23, 2020 for the incident period of January 20, 2020 and continuing. Current public assistance dollars obligated, as of October 21, 2022, total $255,873,613.31. This declaration covers all 99 counties in Iowa. It is unknown when this incident period will end, and it is anticipated that the public assistance grant dollar amount will rise the longer this pandemic lasts. Vaccines have been developed for this pandemic disease, but it continues to impact individuals, businesses, and communities. Information is not available on a city-by-city basis, but in Sac County since the onset of the disease, 3,159 residents have tested positive. There have been 2,751 positive cases and 41 deaths. The number of positive cases continues to decline, but have not become zero.

The Iowa Department of Public Health tracks epidemiological statistics in Iowa. Public health agencies work to protect Iowans from infectious diseases and preserve the health and safety of Iowans through disease surveillance, investigation of suspect outbreaks, education, and consultation to county, local, and health agencies. As of January 1, 2010, sixty infectious diseases were designated as notifiable at the national level. A notifiable disease is one for which regular, frequent, and time information regarding individual cases is considered necessary for the prevention and control of the disease.

A pandemic human disease is defined as a disease that has spread around the world to many people. The word "pandemic" means occurring over a wide geographic area and affecting an exceptionally high proportion of the population (Merriam-Webster Dictionary). Some examples of pandemic diseases, past and present, include Tuberculosis, Polio, HIV/AIDS, SARS, and Influenza. Response and recovery to pandemic disease has been recently discovered to be extremely lengthy.

Severe Winter Storms

Every year, winter weather kills hundreds of people in the United States, primarily from automobile accidents, overexertion, or exposure. Severe winter storm events can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold. They are most common from the months of October to April.

The various types of severe winter weather can cause considerable damage. Heavy snow can immobilize transportation systems, down trees and power lines, collapse buildings, and lead to the loss of livestock and wildlife. Loose snow begins to drift when wind speed reaches 9-10 mph under freezing conditions. The potential for drifting is substantially higher in open country than urban areas where buildings, trees, and other features obstruct the wind. Ice storms have resulted in fallen trees, broken tree limbs, downed power lines and utility poles, fallen communications towers, and impassable transportation routes. Severe ice storms have caused total electric power outages over large areas of Iowa and rendered assistance unavailable to those in need due to impassible roads. Extreme cold often accompanies a winter storm or is left in its wake. Prolonged exposure to the cold can cause frostbite or hypothermia and become life threatening. Table 3.20 displays the definitions for severe winter storms.

Table 3.19: Severe Winter Storm Definitions

Blizzard	Sustained or frequent winds of 35 mph or greater; falling and/or blowing snow that frequently reduces visibility to 1/4 of a mile or less; conditions are expected to last for a minimum of three hours
Heavy Snow	4" or more of snow in 12 hours or less, 6" or more of snow in 24 hours or less
Ice Storm	Damaging accumulations of more than 1/4" of ice are expected during freezing rain
Sleet Storm	Pellets of ice composed of frozen or mostly frozen raindrops; these pellets cause slippery surfaces. Heavy sleet is a relatively rare occurrence defined as an accumulation of sleet covering the ground to a depth of 1/2" or more
Extreme Cold	Temperatures at or below 0 degrees Fahrenheit and wind chill temperatures at -25 degrees Fahrenheit for at least three hours is considered extreme cold. Wind chill is not the actual temperature, but rather how wind and cold feel on exposed skin.

Table 3.20: Severe Winter Storm Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	4	2	2	3	3.00

Between 2014 and 2022, Sac County has experienced thirty-seven severe winter storm events: ten blizzards, two heavy snow, one ice storm, six frost/freezes, twelve extreme cold/wind chill events, one ice storm, and seven winter storm events, meaning that more than one significant hazard met or exceeded locally defined warning criteria. Specific data for the City of Auburn cannot be found, so, the committee utilized county-wide data as these events were not localized to one community within the county.

The economic impact of winter weather each year is huge, with costs of snow removal, damage repairs, and loss of business in the millions. The previously mentioned weather events caused $75,000 in property damage.

Bridges and overpasses are particularly dangerous because they freeze before other structures. This, along with heavy snow, can cause hazardous conditions that can slow or stop the flow of supplies as well as disrupt emergency and medical services.

The National Weather Service has developed effective weather advisories that are widely distributed. Accurate information is made available hours in advance if a severe winter storm is threatening an area. A winter storm can range from a heavy snow over a few hours to blizzard conditions that last several days.

Thunderstorm/Lightning/Hail

A thunderstorm is a rain shower during which thunder occurs. Since thunder comes from lightning, all thunderstorms have lightning. Most thunderstorms are 15 miles in diameter and last an average of 30 minutes. A thunderstorm is classified as "severe" when it contains one or more of the following:

- Hail three-quarter inch or greater
- Winds gusting in excess of 57.5 mph
- Tornado

There are about 100,000 thunderstorms each year in the United States and approximately ten percent of those results in severe thunderstorms. Severe thunderstorms are found most often from Texas to Southern

Minnesota. Thunderstorms are common in the spring and summer months, and during the afternoon and evening hours. However, thunderstorms can occur year-round and at all hours.

There are four types of thunderstorms: single cell, multi-cell cluster, multi-cell line, and supercell.

Single Cell

Single cell thunderstorms typically last less than 30 minutes and are not usually severe; however, it is possible for a single cell storm to produce a brief severe weather event with heavy rainfall and occasionally a week tornado.

Multi-Cell Cluster

Multi-cell cluster thunderstorms are the most common type of thunderstorm. The multi-cell cluster consists of multiple cells, moving along as one unit, with each cell in a different phase of the thunderstorm life cycle. It can produce moderate size hail, flash floods, and weak tornadoes. While to multi-cell cluster may last for several hours, each cell in a multi-cell cluster only lasts about 20 minutes.

Multi-Cell Line

Multi-cell line thunderstorms consists of a long line of storms with a continuous well-developed gust front at the leading edge of the line. The line of storms can be solid, or there can be gaps and breaks in the line. These thunderstorms can produce hail up to golf-ball size, heavy rainfall, and weak tornadoes, but they are best known to produce strong downdrafts.

Supercell

Supercell thunderstorms are rare, but highly organized and pose a high threat to life and property. A supercell thunderstorm is similar to a single-cell thunderstorm because they both have one main updraft. The difference is that the updraft of a supercell is extremely strong, reaching speeds of 150-175 mph. It is set apart from the other thunderstorm types due to the presence of rotation. The rotating updraft of a supercell thunderstorm helps it to produce extreme severe weather threats, such as giant hail (more than two inches in diameter), strong downbursts of 80 mph or more, and strong to violent tornadoes. The leading edge of a supercell is usually light rain as heavier rain tends to fall closer to the updraft with severe weather typically forming towards the rear of the storm.

Unlike other weather hazards that often involve sophisticated watches and warnings from the National Weather Service, lightning can occur anywhere there is a thunderstorm. It is one of the most underrated severe weather hazards, yet ranks as one of the top weather killers in the United States. According to the National Weather Service, from 2008-2017, lightening killed an average of thirty-one people each year, with hundreds of documented injuries. It is estimated that lightening causes more than one billion dollars in damage each year.

There are three types of lightening: ground flashes, cloud-to-ground, and cloud flashes

Ground Flashes

Natural ground flashes occur because of normal electrification in the environment while artificially initiated lightning occurs because of strikes to very tall structures, airplanes, and towers. Natural lightning travels from the cloud to the ground; artificially initiated lightning travels from the ground to the cloud.

Cloud-to-Ground

Cloud-to-ground lightning is the result of a step leader, a channel of negative charge, traveling downward through the cloud. As it nears the ground, the negatively charged step leader is attracted to a channel of positive charge, called a streamer, normally through something tall such as a tree, house, or telephone pole. When the leader and streamer connect, a powerful electrical current begins flowing, resulting in a flash of lightning.

Cloud Flashes

Cloud flashes sometimes have visible channels that extend out into the air and around the storm, but they do not strike the ground. A related term for cloud flashes is heat lightning.

The lightning rate peaks in the summer months, specifically July, with rapid increase during May and rapid decrease in September. Most lightning occurs during the afternoon or early evening. Besides causing injury and death, a lightning strike can result in extensive property damage by sparking a fire or surging through the electrical circulatory of a home or business. Damage to the emergency management center may affect warning systems, communications equipment, and computer systems.

Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. There is no clear distinction between storms that do and do not produce hailstorms. Nearly all severe thunderstorms produce hail, though it may melt before reaching the ground. Hailstorms can have layers like an onion if they travel up and down in an updraft, or they can have no layers if they are "balanced" in an updraft. One can tell how many times a hailstone traveled to the top of a storm by counting the layers. Drops of super-cooled water hit the ice and freeze on it, causing it to grow. Hail falls when it becomes heavy enough to overcome the strength of the updraft and is pulled by gravity towards earth.

Hail size is estimated by comparing it to a known object. Most hail storms are made up of a mix of sizes, and only the very largest hail stones pose serious risk to people caught in the open. Hail that is quarter size (one inch) or larger is considered severe. The stronger the thunderstorm updraft, the larger the hailstone can grow. The largest hailstone recovered in the United States fell in Vivian, South Dakota on June 23, 2010, with a diameter of 8 inches and a circumference of 18.62 inches. It weighed one pound and fifteen ounces.

Damage from hail approaches $1 billion in the United States annually and most of the damage is to crops. Crops are particularly vulnerable and even relatively small hail can destroy them in a matter of minutes. Vehicles, roofs, buildings, homes, and landscaping are other things that are most commonly damaged by hail. Hail only rarely results in loss of life directly, although injuries can occur.

Table 3.21: Thunderstorm/Lightning/Hail Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	4	1	3	1	2.65

Data collected from the National Centers for Environmental Information shows that Iowa experiences many thunderstorm and lightning events every year. From 2014 to 2022, the City of Auburn experienced two hail events. Each event had 1.5 inch hail, but reported no damage. The community experiences a large number of thunderstorms and lightning events per year, but most of them are not severe.

Between 1997 and 2012, Iowa experienced, on average, 628,511 cloud-to-ground flashes per year. This ranks Iowa fifteenth nationally in terms of cloud-to-ground flash densities with 11.1 flashes per square mile. From 1959-2011, Iowa experienced 72 fatalities due to lightning (Vaisasla). Iowa experienced two lightning related deaths in 2015, and those are the most recent deaths due to lightning. Lightning injures more people than it kills and leaves some victims with life-long health problems.

Some thunderstorms can been seen approaching, while others hit without warning. The National Weather Service usually issues severe thunderstorm watches a few hours before the storm hits an area, but an area may only have minutes after a warning is issued. Most single-cell thunderstorms are 15 miles in diameter and last an average of 30 minutes. However, multi-cell cluster thunderstorms are the most common type of thunderstorm and can last several hours.

Tornado

Tornadoes are the most violent of all atmospheric storms. A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. The funnel is made visible by dust and debris sucked up and condensation of water droplets in the center of the funnel.

There are two types of tornadoes: those that come from the supercell thunderstorm and those that do not. Tornadoes that form from a supercell thunderstorm are most common, and often are the most dangerous. In a supercell, the tornado is a very small extension of a larger rotation that can be as large as ten miles in diameter and up to 50,000 feet fall. Field studies show that as few as twenty percent of all supercell thunderstorms produce tornadoes. Non-supercell tornadoes are circulations that form without a rotating updraft. One type of non-supercell tornado is the gustnado. A gustnado tornado has a whirl of dust and/or debris at or near the ground with no condensation funnel. Another non-supercell tornado is a landspout. A landspout tornado is a narrow, rope-like condensation funnel that forms when the thunderstorm cloud is still growing and has no rotating updraft, instead the spinning motion originates near the ground. Waterspouts are similar to landspouts, except they occur over water. Damage from non-supercell tornadoes tends to be F2 or less.

The Enhanced Fujita Scale (EF-Scale) replaced the Fujita Scale on February 1, 2007. The EF Scale addresses some of the Fujita Scale limitations identified by meteorologists and engineers. The EF Scale is still a set of wind estimates, not measurements, based on damage. The original Fujita Scale lumped together homes, schools, mobile homes, vehicles, and trees in one short description of damage for each F-Scale category. In the EF-Scale, detailed descriptions are given for examples of damage to twenty-three types of buildings, taking into account types of buildings, construction quality and maintenance, and five additional objects like trees, towers, and poles. Wind speed estimates are then provided for each structure and type of damage (www.weather.com). Table 3.23 shows the estimated wind speed for the Enhanced Fujita Scale, as well as the expected damage associated with the tornado's intensity. Table 3.24 displays the relationship between tornado strength and associated damages.

Approximately 1,000 tornadoes hit the nation yearly, killing an average of 60 people per year—mostly from flying or falling debris. The peak tornado season for the northern plains and upper Midwest is in June or July. Most tornadoes occur between 3 pm and 9 pm; however, it is important to remember that they can happen at all hours of the day and any day of the year.

Tornado Alley is a nickname given to the area of the United States that consistently experiences a high frequency of tornadoes each year. The relatively flat land in the Great Plains allows cold, dry, polar air from Canada to meet warm, moist, tropical air from the Gulf of Mexico. A large number of tornadoes form when these two air masses meet. Figure 3.4 depicts the warm and cold air masses, as well as Tornado Alley.

Table 3.22: Tornado Ratings and Expected Damage

EF Rating	Wind Speeds	Expected Damage		
EF-0	65-85 mph	'Minor' damage: shingles blown off or parts of a roof peeled off, damage to gutters/siding, branches broken off trees, shallow rooted trees toppled.		
EF-1	86-110 mph	'Moderate' damage: more significant roof damage, windows broken, exterior doors damaged or lost, mobile homes overturned or badly damaged.		
EF-2	111-135 mph	'Considerable' damage: roofs torn off well constructed homes, homes shifted off their foundation, mobile homes completely destroyed, large trees snapped or uprooted, cars can be tossed.		
EF-3	136-165 mph	'Severe' damage: entire stories of well constructed homes destroyed, significant damage done to large buildings, homes with weak foundations can be blown away, trees begin to lose their bark.		
EF-4	166-200 mph	'Extreme' damage: Well constructed homes are leveled, cars are thrown significant distances, top story exterior walls of masonry buildings would likely collapse.		
EF-5	> 200 mph	'Massive/incredible' damage: Well constructed homes are swept away, steel-reinforced concrete structures are critically damaged, high-rise buildings sustain severe structural damage, trees are usually completely debarked, stripped of branches and snapped.		

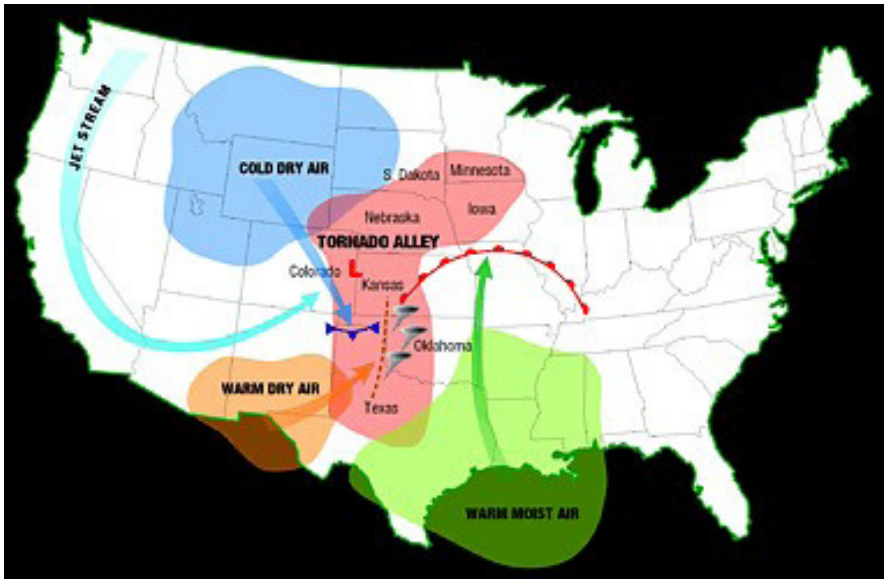
Table 3.23: Tornado Facts

Weak Tornadoes (EF0 and EF1)	Strong Tornadoes (EF2 and EF3)	Violent Tornadoes (EF4 and EF5)
88% of all tornadoes	11% of all tornadoes	1% of all tornadoes
Less than 5% of all tornado deaths	Nearly 30% of all tornado deaths	70% of all tornado deaths
Lasts 1-10+ minutes	May last 20 minutes or longer	Can exceed 1 hour
Light to moderate damage	Considerable to severe damage	Devastating to incredible damage

Table 3.24: Tornado Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	3	2	4	1	2.65

Figure 3.4: Air Masses and Tornado Alley



According to the National Centers for Environment Information, there have been no funnel clouds or tornadoes that have affected the City of Auburn since 2014. Although there haven't been any that have hit the city, there have been six tornadoes and 7 funnel clouds in Sac County. So although there has been no instances of tornadoes or funnel clouds since 2014, the likelihood of one affecting Auburn in the future is high. The six tornadoes caused $240,000 in property damage and $8,000 in crop damage.

Advancement in weather forecasting has allowed tornado watches to be delivered up to hours in advance. However, the best lead-time for a specific severe storm and tornado is about 30 minutes. Tornadoes can develop and change paths rapidly, limiting the warning time. They can last from several seconds to over an hour, though most tornadoes last about five minutes. From 2014 to 2022, tornadoes in Sac County lasted an average of 5 minutes and caused no deaths.

Windstorm

Damaging winds are classified as those exceeding 50-60 mph. Damage from severe thunderstorm winds account for half of all severe reports in the lower forty-eight states and are more common than damage from tornadoes. According to the majority of Storm Prediction Center forecasts, severe wind is the most difficult threat to forecast because they come from a wider range of environments than just supercells, tornadoes, or large hail. Damaging wind events can develop with little advanced warning as they can occur on their own, with severe winter storms, or with severe thunderstorms.

There are several types of damaging winds: straight-line, downdrafts, downbursts, microbursts, gust front, derecho, and bow echo.

Straight-Line

Straight-line winds are any thunderstorm wind that is not associated with rotation and is used mainly to differentiate from tornadic winds. Most thunderstorms produce some straight-line winds as a result of outflow generated by the thunderstorm downdraft.

Downdrafts

Downdrafts are a small-scale column of air that rapidly sinks towards the ground.

Downbursts

Downbursts are strong downdrafts with horizontal dimensions larger than 2.5 miles, resulting in an outward burst of wind on or near the ground. Although usually associated with thunderstorms, downbursts can occur with showers too weak to produce thunder.

Microbursts

Microbursts are small, concentrated downbursts that produce an outward burst of damaging winds at the surface. Microbursts are generally small (less than 2.5 miles) and short-lived, lasting only five to ten minutes.

Gust Front

A gust front wind is the leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. Gust fronts are characterized by a wind shift, temperature drop, and gusty winds out ahead of a thunderstorm.

Derecho

A derecho wind is a widespread thunderstorm wind event caused when new thunderstorms form along the leading edge of an outflow boundary. The thunderstorms feed on this boundary and continue to reproduce themselves. Derechos typically occur in the summer months when complexes of thunderstorms form over the plains and northern plains states. Usually these thunderstorms produce heavy rain and severe wind, as they can last a long time and cover such large areas.

Bow Echo

A bow echo wind is a radar echo which is linear but bent outward in a bow shape. Damaging straight-line winds often occur near the "crest" or center of a bow echo. Bow echo winds can be over 186 miles in length, last for several hours, and produce extensive wind damage at the ground.

Microbursts and downbursts are very dangerous to aviation. They are known for their ability to produce wind shears which can slow airspeed and cause aircrafts to lose altitude at a very critical time for flight near the ground. A plane will encounter strong headwinds followed by strong tailwinds as it enters and flies through a microburst. Great strides have been made in understanding and avoiding the risk from low altitude wind shears. Major airports routinely use Terminal Doppler Weather Radars, developed during the 1990s. These radars pay particular attention to weather conditions occurring within a few miles of the airport, especially conditions that might cause deadly microbursts.

Table 3.25: Windstorm Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	3	1	4	1	2.35

From 2014-2022, Sac County experienced eight high wind events. These events caused $30,000 in property damage. The event which occurred on January 16, 2014 caused $5,000 in property damage and the event just ten days later on January 26, 2014 caused $25,000 in property damage.

Those most at risk during windstorms include people in mobile homes, at campgrounds, or at other dwellings without secure foundations. Windstorms may have a destructive path that is tens of miles wide and the duration could range from hours to days. Damages can include broken tree branches, roof damage, broken windows, or crop damage.

Damaging winds can develop with little advanced warning. The National Weather Service has developed a windstorm warning system similar to other events such as tornadoes, winter storms, and thunderstorms, and watches are issued when conditions are favorable. Advisories are issued when sustained winds of 31 to 39 mph are expected to last for three hours or longer, or when there are wind gusts of 46 to 57 mph. Windstorm warnings are issued when there are sustained winds of 40 mph or greater for one hour or more, or when there are wind gusts of 58 mph or greater for one hour or more. Windstorm watches are generally delivered hours in advance, but the best warning lead-time for a specific storm is about 30 minutes.

Combination Hazards

HAZMAT Incident

A hazardous material is one that may cause damage to persons, property, or the environment when released to soil, water, or air. Hazardous materials are categorized as toxic, corrosive, flammable, irritant, or explosive. They can pose a risk to life, health, or property, possibly requiring evacuation, a hazardous material incident can occur at a fixed location, in pipeline transportation, or while transporting hazardous materials.

A fixed hazardous materials incident is the accidental release of chemical substances or mixtures, which presents a danger to public health or safety during production or handling at a fixed facility. Chemicals are manufactured and used in every-increasing types and quantities- each year over 1,000 new synthetic chemicals are introduced and as many as 500,000 products pose physical or health hazards and can be defined as hazardous chemicals. Hazardous material incidents generally affect a localized area and the use of planning and zoning can minimize the area of impact.

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. An underground 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 the pipelines.

A hazardous materials transportation incident constitutes an accidental release of chemical substances or mixtures that presents a danger to public health or safety during transportation. Large quantities of hazardous materials are transported daily on Iowa's streets, highways, interstates, and railways. The DOT regulates the routes and speed limits used by carriers a monitor the types of hazardous materials crossing state lines. More and more potentially hazardous materials are being used in commercial, agricultural, and domestic uses, and are being transported on roadways and railways (Iowa Hazard Mitigation Plan 2018).

Table 3.26: HAZMAT Incident Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	4	2	4	2	2.30

The State of Iowa requires any person manufacturing, storing, handling, transporting, or disposing of a hazardous substance to notify the department and local law enforcement of the occurrence of a hazardous condition. According to the Iowa Department of Natural Resources Hazardous Substance Database, Auburn reported 3 hazardous spills since 2014. These spills did not pose a threat to the environment, humans, or animals.

A high impact spill is defined as an environmental emergency by the Environmental Protection Agency. An environmental emergency is a sudden threat to the public health or the well-being of the environment, arising from the release or potential release of oil, radioactive materials, or hazardous chemicals into the air, land, or water (Iowa Hazard Mitigation Plan 2018).

A hazardous material spill can occur almost anywhere and with little to no warning. Public address systems, television, radio, and the NOAA Weather Radios are used to disseminate emergency messages about hazardous material incidents.

Infrastructure Failure

This hazard encompasses the following hazards: communications 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.

Communications Failure

Communications 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. 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. Disruptions and failures can range from localized and temporary to widespread and long-term.

Energy Failure

An extended interruption of service either electric, petroleum, or natural gas, which by an actual or impending acute shortage of usable energy could create a potential health problem for the population and possibly mass panic. International events could affect supplies of energy producing products while local conditions could affect distribution of electricity, petroleum, or natural gas. The magnitude and frequency of energy shortages are associated with international markets. Local and state events such as ice storms can disrupt transportation and distribution systems. Stockpiles of energy products eliminate short disruptions but can increase the level of risk to the safety of people and property near the storage site.

Structural Failure

The collapse (all or part) of any public or private 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 cause the 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 (Iowa Hazard Mitigation Plan 2018).

Structural Fire

A structural fire is an uncontrolled fire in a populated area that threatens life, property, is beyond normal day-to-day response capability, and has the potential for large economic loses. 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 material involved.

Table 3.27: Infrastructure Failure Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	4	2	4	2	2.30

No widespread communications failures have occurred in Iowa. Local incidents due to weather conditions, equipment failure, excavation incidents, and traffic accidents have been reported. The energy crisis of the 1970s had significant impacts on consumers in Iowa. High inflation and unemployment were associated with the dependence on foreign oil during that time. An energy shortage of that magnitude has not affected Iowa since. There have been sporadic structural failures across the community. Most have included homes, commercial structures, or communications towers. Structural fires occur occasionally and are quickly extinguished by local fire departments.

Most of the highly necessary communication systems have backup and redundant designs to provide continuity of service. Most communication failures would be limited to localized areas. They can have a negative impact on businesses that are dependent on the internet for servicing and communicating with customers. Communication failures can hamper emergency response efforts when they are not able to communicate as quickly or effectively with injured citizens, and vice versa.

The effects of a petroleum or natural gas shortage would be felt throughout the state. Iowa is almost entirely dependent on out-of-state resources for oil, coal, and natural gas. Electricity failure can result from many hazard events. Severe winter storms, thunderstorms, lightning, extreme heat, tornadoes, high winds, transportation incidents, and others can cause power outages. The loss of electricity could also cause many problems throughout town including the shutdown of water pumps, sump pumps, and communications.

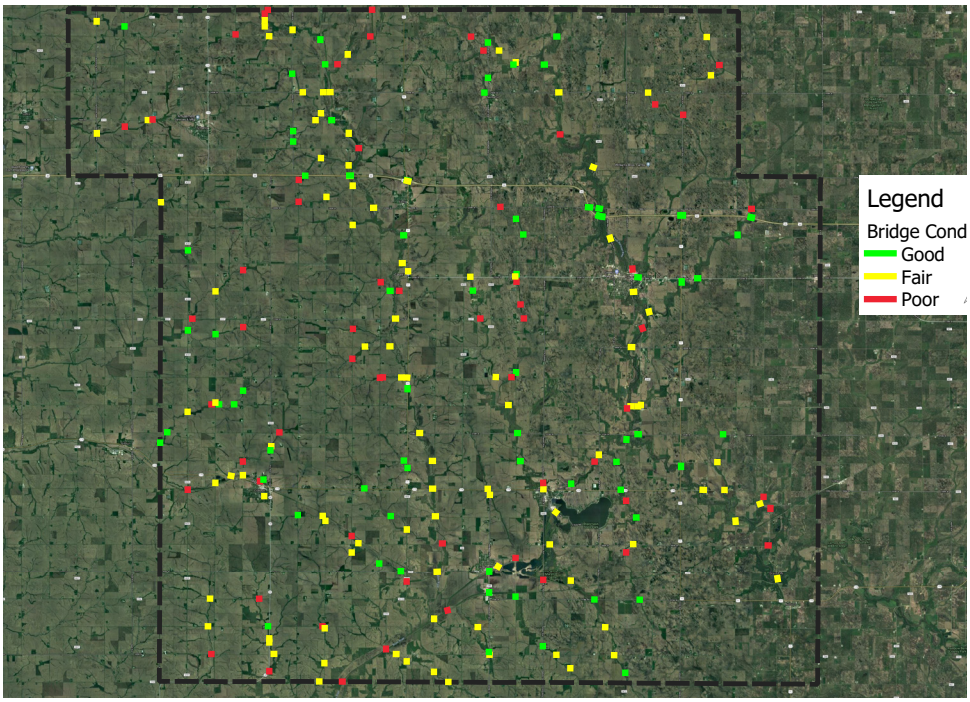
Damages from structural fires can range from minor aesthetic damage to completely destroying the building. Many factors determine the strength of a fire including: wind, fuel sources, and density of buildings. Older structures with outdated electrical systems and fire codes are particularly vulnerable to fires. With modern training, equipment, fire detection devices, and building regulations and inspections, most fires can be quickly contained and limited to the immediate structure involved.

When a structure does fail, the level of damage and severity of the failure is dependent on factors such as the size of the structure, the number of occupants in, on, or near the structure, the time of day, day of week, etc. Structural failure can be caused by the age of the structure, poor maintenance, of by other hazard events such as tornadoes, fires, floods, or severe winter storms.

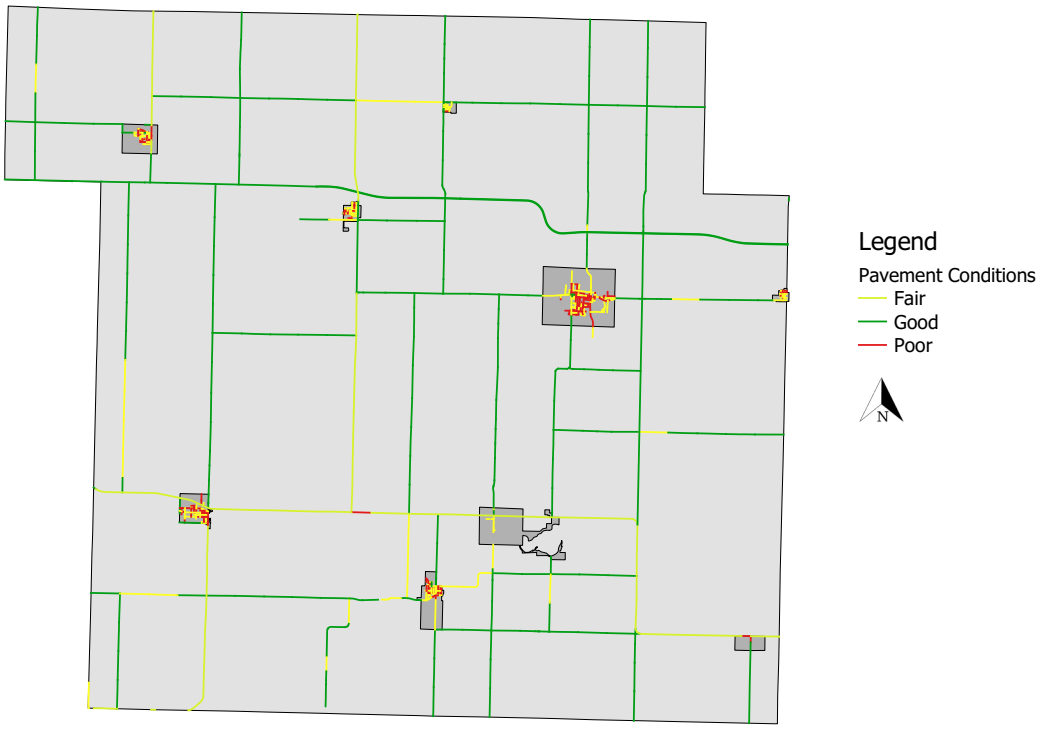
Map 3.1 shows the number of state and county bridges in good, fair, and poor condition for Sac County as of August 24, 2018. 31.62% of the Sac County bridges are in good condition, 41.88% are in fair condition, and 26.06% are in poor condition. Auburn does not have any bridges, but may have traffic patterns impacted if a bridge were to not be usable in other parts of the county.

Map 3.2 show pavement conditions for Sac County. The roads analyzed include major highways and local roads. Secondary roads are not evaluated. Infrastructure failures occur with little or no warning. It is impossible to predict a communication failure, power outage, fires, or structural failure. While a petroleum or natural gas shortage may be predicted in advance, emergencies can rise suddenly and unexpectedly. Communication failures and power outages can last from several minutes to several days, depending on the nature of the outage and the area that the outage covers. Petroleum and natural gas distribution problems can lead to shortages locally for a few days. The duration of structural fires and structural failures is dependent on the size of hazard.

Map 3.1: Sac County Bridge Conditions



Map 3.2: Sac County Pavement Conditions



Radiological Incident

A radiological event is an incident resulting 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 natural hazards even though they may not have been specifically designed for those forces (Iowa Hazard Mitigation Plan 2018).

Table 3.28: Radiological Incident Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	No	No	1	2	4	3	1.95

Emergency Classification is a set of plant conditions which indicate a level of risk to the public. Nuclear power plants use the four emergency classifications listed below in order of increasing severity.

Notification of Unusual Event

Under this category, events are in process or have occurred which indicate potential degradation in the level of safety of the plant. No release of radioactive material requiring off-site response or monitoring is expected unless further degradation occurs.

Alert

If an alert is declared, events are in process or have occurred that involve an actual or potential substantial degradation in the level of safety of the plant. Any releases of radioactive material from the plant are expected to be limited to a small fraction of the Environmental Protection Agency (EPA) protective action guides (PAGs).

Site Area Emergency

A site area emergency involves events in process, or which have occurred, that result in actual or likely major failures of plant functions needed for protection of the public. Any releases of radioactive material are not expected to exceed the EPA PAGs except near the site boundary.

General Emergency

A general emergency involves actual or imminent substantial core damage or melting of reactor fuel with the potential for loss of containment integrity. Radioactive releases during a general emergency can reasonably be expected to exceed the EPA PAGs for more than the immediate site area (US Nuclear Regulatory Commission).

The Nuclear Regulatory Commission (NRC) defines two emergency planning zones around each nuclear power plant. The exact size and configuration of the zones vary from plant to plant due to local emergency response needs and capabilities, population, land characteristics, access routes, and jurisdictional boundaries. Generally, the two types of emergency planning zones are:

Plume Exposure Pathway

The Plume Exposure Pathway extends about ten miles in radius around the plant. The primary concern is exposure of the public to, and the inhalation of, airborne radioactive contamination.

Ingestion Pathway

The Ingestion Pathway extends about fifty miles in radius around the plant. The primary concern is ingestion of food and liquid that is contaminated by radioactivity.

The Fort Calhoun Nuclear Power Plant located nineteen miles north of Omaha is the closest radiological location. Sac County is located outside of the fifty-mile ingestion pathway, but if a large event were to happen, Sac County may be affected.

There have been no general emergency incidents in the United States since the NRC established the classification system in 1980. Iowa has one nuclear power plant located in Linn County. There are three other nuclear power plants near Iowa's borders. In over fifty years of nuclear power production in the United States, no deaths or injuries from radiation have been recorded among the general public. The danger to the residents in the City of Auburn is minimal. Time, distance, and shielding minimize radiation exposure to the body. It is more likely that a radiological incident would occur because of a transportation incident. Radiological incidents occur with little or no warning.

Terrorism

This hazard encompasses the following: 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.

Enemy Attack

An enemy attack incident that would cause massive destruction and extensive casualties. Some areas would experience direct weapons' effects: blast, heat, and nuclear radiation; others would experience indirect weapons' effects, primarily radioactive fallout.

Biological Terrorism

This hazard encompasses the following: 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.

The use of biological agents against persons or property for purposes of intimidation, coercion, or ransom can be described as biological terrorism. Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point of line sources. Biological agents may pose viable threats from hours to years depending upon the agent and the conditions in which it exists. Depending on the agent and the effectiveness in which it was deployed, contamination can be spread by wind or water. Infections can also be spread by human or animal vectors.

Agro-Terrorism

Agro-Terrorism is causing intentional harm to an agricultural product or vandalism of an agricultural/animal related facility. Activities could include the following: intentional release of lab animals, deliberate contamination of bulk milk tanks, poisoning animals, destruction of crops/facilities, and theft of agricultural products, machinery or chemicals, and vandalism of agricultural facilities.

Chemical Terrorism

The use or threat of chemical agents against persons or property for purposes of intimidation, coercion, or ransom. Liquid/aerosol or dry contaminants can be dispersed using sprayers or other aerosol generators. Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists. Contamination can be carried out of the initial target area by people, vehicles, water, and wind.

Conventional Terrorism

The use of conventional weapons and explosives against persons or property for purposes of intimidation, coercion, or ransom. Hazard effects are instantaneous; additional secondary devices may be used, lengthening the duration of the hazard until the attack site is determined to be clear. The extent of damage is determined by the type and quantity of explosive. Effects are generally static other than cascading consequences, incremental structural failures, etc. Conventional terrorism can also include tactical assault of sniping from remote locations.

Cyber Terrorism

Cyber terrorism is an electronic attack using one computer system against another in order to intimidate people or disrupt other systems. Cyber terrorism may last from minutes to days depending upon the type of intrusion, disruption, or infection. Generally, there are no direct effects on the built environment, but secondary effects may be determined depending upon the system being terrorized. Inadequate security can facilitate access to critical computer systems, allowing them to be used to conduct attacks.

Radiological Terrorism

Radiological terrorism is the use of radiological materials against people or property for purposes of intimidation, coercion, or ransom. Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point of line sources such as munitions, covert deposits, moving sprayers, or by the detonation of a nuclear device.

Public Disorder

Public disorder is the assembling of people together in a manner to substantially interfere with pubic peace to constitute a threat, and with use of unlawful force or violence against another person, or causing property damage or attempting to interfere with, disrupting, or destroying the government, political subdivision, or group of people. Examples include mass demonstrations, or direct conflict by large groups of citizens, as in marches, protest rallies, riots, and non-peaceful trikes. Labor strikes and work stoppages are not considered in this hazard unless they escalate into a threat to the community (Iowa Hazard Mitigation Plan 2018).

Table 3.29: Terrorism Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	1	3	4	3	2.25

There are many small military installations in Iowa; most are Iowa National Guard assets spread throughout the state comprised of various military units and functions. The Iowa National Guard headquarters resides at Camp Dodge in Johnston. There have been no enemy attacks on or in Iowa in modern times and it is unlikely that Iowa would be a primary target during an enemy attack. However, an enemy attack is still a possibility due to international conflicts and the large number of weapons in existence throughout the world.

Following September 11, 2001, the country became more aware that terrorism is a very real threat. The Center for Disease Control (CDC) & Health Resources and Services Administration (HRSA) felt public health departments and hospitals would play a large role in preparedness for bioterrorism. In September 2002, the Iowa Department of Public Health (IDPH) received grant funding from the CDC for public health preparedness and funding from HRSA for hospital readiness efforts. All Iowa public health departments and hospitals are responsible for these efforts in their counties. The IDPH has set up six regions across Iowa to work together in these planning and preparedness efforts.

Agro-terrorism incidents have occurred in the State of Iowa, although on a limited scale. Animal rights activists have vandalized or released animals in agricultural facilities; also there has been vandalism to agricultural facilities or incidents of disgruntled employees causing damage to animals and animal products. There are frequent cases of theft of agricultural machinery, products, and chemicals. Chemical terrorism is even more uncommon than agro-terrorism, there have only been two identified chemical terrorism incidents in Iowa. One incident involved mailing rat poison to a number of state and local officials; the other incident involved individuals breaking into a city's water supply and suspected of depositing chemicals in the water supply.

The State of Iowa has experienced many bomb threats. In the spring of 2002, eighteen pipe bombs were found in mailboxes in five states stretching from Illinois to Texas, including Iowa. Five pipe bombs were found in Iowa and six people were injured in the bombings in Iowa and Illinois. In 2005 and 2006, pipe bombs were used in attempted murder cases in Forest City and Altoona.

Cyber-security and critical infrastructure protection are among the most important national security issues facing the United States today, and they will likely only become more challenging in the future. Recent attacks have disrupted electronic commerce and have had a debilitating effect on public confidence in the Internet. Cyber-security attacks can be personal in nature where someone tries to steal money or information from another person for monetary or personal gain. Credit card numbers and social security numbers have become some of the most widely stolen information as they allow the person who stole the number the ability to create a secondary life utilizing other people's money and identities.

Although large-scale destructive civil disturbances are rare, the potential is always there for an incident to occur. Often times, television, radio, and internet coverage helps to spread the incident to other uninvolved or unaffected areas, exacerbating an already difficult situation. Alcohol is often involved in public disorder, especially related to college campuses, sporting events, and concerts (Iowa Hazard Mitigation Plan 2018).

Unfortunately, there will never be a way to totally eliminate all types of terrorism. If a person or persons are inclined to cause death and destruction, they are usually capable of finding a way to carry out their plans. Areas near government buildings, military complexes, and transportation, communication, and fuel facilities, would experience the largest impacts. Because Iowa serves as a food provider to the world, there is an increased risk of agro-terrorist activity. A full-scale attack in the foreseeable future is not likely; however, a limited attack could take place that could potentially threaten target areas. Acts of terrorism can be immediate and often come after little or no warning. The duration of a terrorist attack depends on the type of terrorism. A biological, chemical, or radiological attack could affect people/property for days, weeks, months, even years, depending on the substance used and the size of the area impacted. Due to the small size of the communities in Sac County, if public disorder should occur, it is expected to be resolved within hours. Conventional terrorism usually involves firearms and/or explosives. These events are short-term in nature, and would not be expected to last very long. The committee determined that on average, a terrorism event would last less than one day.

Transportation Incident

The hazard includes all modes of transportation- air, highway, railway, and waterway. This includes any transportation accident that directly threatens life and which results in property damage and/or death(s)/ injury(s) and/or adversely impacts a community's capabilities to provide emergency services.

An air transportation incident may involve a military, commercial, or private aircraft. Air transportation is playing a more prominent role in transportation as a whole. Airplanes, helicopters, and other modes of air transportation are used to transport passengers for business and recreation, as well as thousands of tons of cargo. A variety of circumstances can result in an air transportation incident: mechanical failure, pilot error, enemy attack, terrorism, weather conditions, and on-board fires can all lead to an incident. Statistics from the National Transportation Safety Board and the airline industry show that the majority (over 75%) of airplane crashes and accidents occur during the takeoff or landing phases of the flight.

A highway transportation incident can be single or multi-vehicle requiring responses exceeding normal day-to-day capabilities of response agencies. An extensive surface transportation network exists in Iowa; local residents, travelers, businesses, and industries rely on this network on a daily basis. Hundreds of thousands of trips a day are made on the streets, roads, highways, and interstates in the state; if the designed capacity of the roadway is exceeded, the potential for major highway incident increases. Weather conditions play a major factor in the ability of traffic to flow safely in and through the state.

Railway incidents may include derailments, collisions, and highway/rail crossing accidents. Train incidents can result from a variety of causes: human error, mechanical failure, faulty signals, and/or problems with the track. Results of an incident can range from minor "track hops" to catastrophic hazardous material incidents and even human/animal casualties. With the many miles of track in Iowa, vehicles must cross the railroad tracks at numerous at-gate crossings.

Waterway incidents will primarily involve pleasure crafts on rivers and lakes. In the event of an incident involving a water vessel, the greatest threat would be drowning, fuel spillage, and/or property damage. Waterway incidents may also include events in which a person, persons, or object falls through the ice on partially frozen bodies of water (Iowa Hazard Mitigation Plan 2018).

The predominant transportation network in the planning area, as well as the State of Iowa, is highways and roads. All modes of transportation, including air, rail, trails, and transit systems require the use of highways and roads.

Map 3.14 displays the major highways and AADT in Sac County. From 2014-2016, Sac County had 410 traffic accidents. These accidents resulted in 8 fatalities and 176 injuries.
As the volume of traffic on streets, highways, and interstates increase, the number of traffic accidents will increase too. The combination of traffic volume, weather conditions, mechanical error, and human error creates the potential for a traffic accident.

Railroads are a vital part of Iowa's overall transportation system, helping to move both freight and passengers safely and efficiently. Railroads are critical in moving some of Iowa's commodities including corn, soybeans, chemicals, motor vehicles, wood and paper products, minerals and ores, coal, and biofuels. Maintaining and improving railroad service in Iowa requires a proactive partnership between a number of organizations, including private rail carriers, rail shippers, passengers, the Iowa DOT, other state and federal agencies, and local governments.

Table 3.30: Transportation Incident Hazard Score

	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
City of Auburn	Yes	Yes	3	2	4	2	2.75

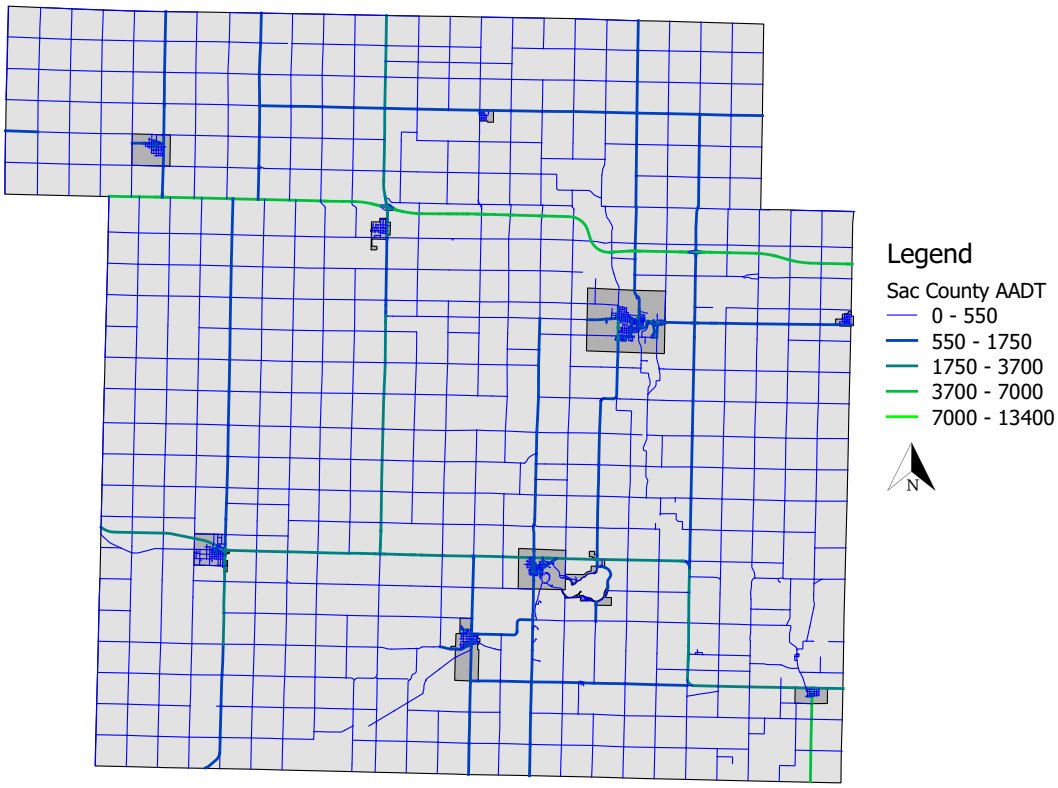
Sac County has a smaller railway presence compared to other counties within the region with the CN Railway running through the southern portion of the county. Sac County had an average of 5 trains per day in 2020. On average, 11,575 vehicles within Sac County cross railroad tracks daily. Map 3.18 shows the railroad carries in Sac County, along with their annual gross tons per mile. The planning committee found it important to look at rail incidences even though there are no tracks which run through Auburn.

Even with rail miles decreasing, Iowa's rail traffic has doubled over the last fifteen years and is expected to keep increasing. Iowa ranks eleventh in the country in terms of total rail miles. Rail cars are getting larger and trains are getting longer. In 1990, the majority of trains were twenty-four cars or less; by 1999, the majority of trains increased to fifty to one hundred cars in length. Derailments have declined, as have rail/highway crossing accidents.

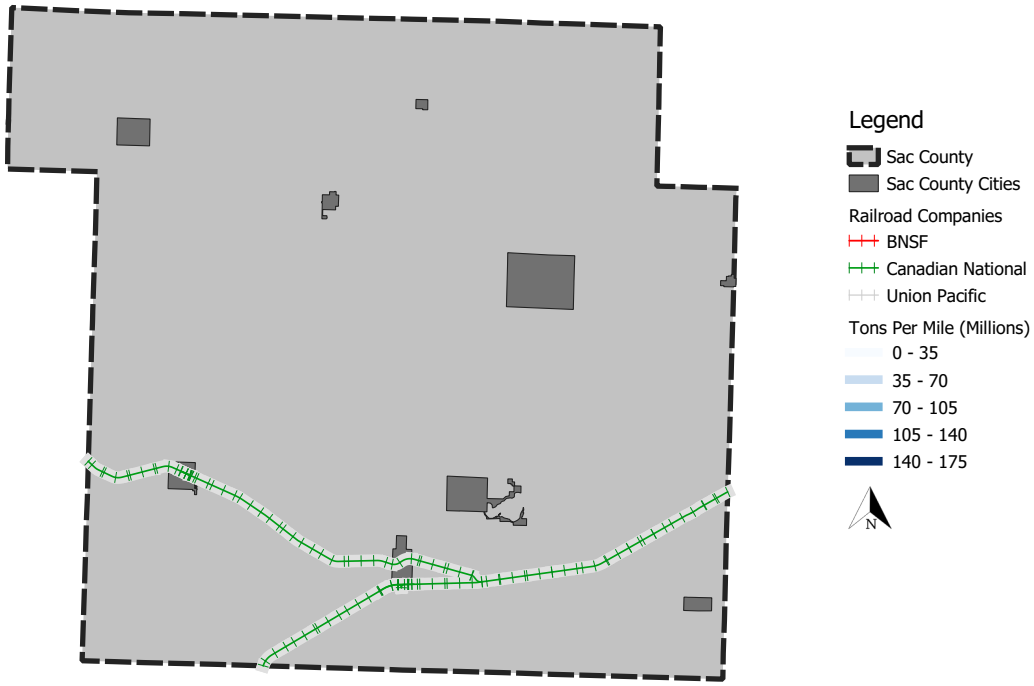
Rail accidents of all kinds, including derailments and track or equipment failures, have decreased over time. More importantly, crossing accidents involving trains and automobiles have also decreased. This comes at a time when rail traffic is increasing, which means that safety is improving substantially.

There have been no disasters causing waterway incidents in Iowa. There have been numerous search and rescue events involving a single person or small boats with only a few people on board. Small-scale incidents on lakes and rivers have resulted in the loss of life form pleasure craft collisions and/or falls from vessels.

Map 3.3: Sac County AADT



Map 3.4: Sac County Railroads



A number of resources were used in gathering the information used in this chapter. They are as follows: Iowa Hazard Mitigation Plan 2018; Association of State Dam Safety Officials; Iowa DNR; National Inventory of Dams; FEMA; National Weather Service; NOAA; National Centers for Environmental Information; National Drought Mitigation Center; National Wildfire Coordinating Group; National Fire Protection Association; National Severe Storms Laboratory; Vaisala Inc.; Storm Prediction Center; The Weather Channel; Iowa Department of Agriculture; Iowa State University Extension; American Association of Equine Practitioners; Iowa Department of Public Health; The Center for Food Security and Public Health; U.S. Nuclear Regulatory Commission; and Guthrie County Home Health, Hospice and Public Health

Chapter 4: Vulnerability Assessment and Loss Estimates

The final step in the risk assessment is to identify the likely level of loss for each type of hazard determined to affect the jurisdiction. The vulnerability assessment and loss estimates assess the City's total exposure to identified hazards. The vulnerability assessment consists of a vulnerability overview for each profiled hazard, an evaluation of potential losses to existing development, a description of the methodology used to estimate losses, and data limitations/corrective actions.

Risk assessment information was gathered from all jurisdictions through worksheets distributed at the hazard analysis and risk assessment meeting. The worksheet identified if the hazard had occurred in the jurisdiction previously, if the hazard was likely to occur in the future, the probability of the hazard occurring in a given year, the magnitude/severity the hazard would have on the jurisdiction, the amount of warning time before a hazard occurred, and the estimated duration that the hazard would last. The final scores of the risk assessment were tallied after further discussion with the Hazard Mitigation Committee, public responses and further detailed research on past hazard occurrences. The risk assessment information, as provided by the City of Auburn, will vary from other jurisdictions due to geographical area and jurisdictional representatives' personal opinions on the identified hazards and their associated risks.

City-wide calculations have been determined for each hazard that could have affect a large portion of the community. The city has ranked these individual hazards based upon history and experience.

Structural Inventory

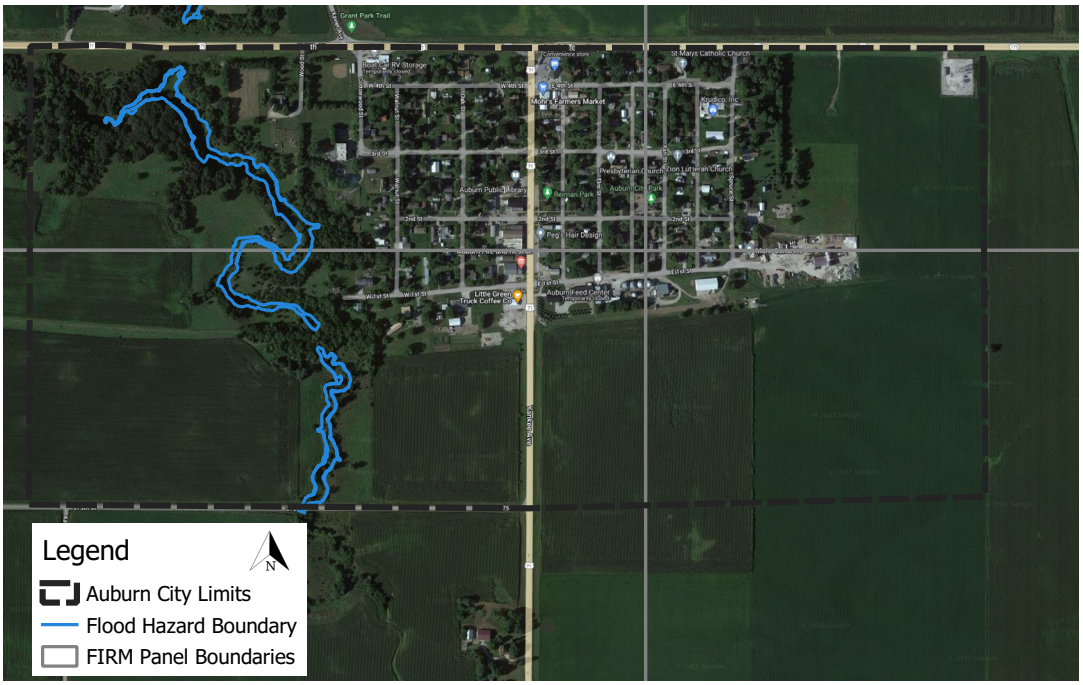
A structural inventory was completed for the corporate limits of the City of Auburn. The structural inventory was completed to determine the type, number and value of structures within the jurisdiction. This information is critical to help determine vulnerability and potential loss in the jurisdiction. Structures were classified into the following categories:

- Residential – structures which are primarily used or intended for human habitation.
- Commercial – structures primarily used or intended as a place business where goods, wares, services, or merchandise is stored or offered for sale. Commercial also includes hotels, motels, rest homes, structures consisting of three or more separate living quarters and any other buildings for human habitation that are used as a commercial venture.
- Industrial – structures used primarily as a manufacturing establishment.
- Agricultural – Structures located on all tracts of land which are used primarily for agricultural purposes, except buildings which are primarily used or intended for human habitation.

Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. The Iowa Department of Natural Resources, along with the Iowa Flood Center, created new, comprehensive, accurate floodplain maps for Iowa cities and counties. The maps show the boundaries of flooded areas for the 1% annual chance (100-year) and 0.2% annual chance (500- year) floods. The National Flood Hazard Layer was analyzed to determine that within the City of Auburn there are no properties with structures located within the 100 or 500 year floodplain. Information from the FEMA Flood Map Service Center that shows Auburn's flood hazard can be found in Map 4.1. According to Iowa Department of Homeland Security and the Iowa Department of Natural Resources, there are no repetitive loss properties within the City of Auburn.

Map 4.1: Auburn Flood Hazard



To determine the extent of an area that is susceptible to damages from each hazard, the committee estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries, fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from chapter 3. Table 4.1 shows the percentages used and other criteria evaluated to determine the overall impact. Each individual hazard was evaluated on their own, and the percentage of loss was determined based on past instances of the hazard and committee input. Magnitude descriptions are utilized to group hazards based on their overall impact to the community, not to figure impact.

The committee determined that the City of Auburn is vulnerable to the following hazards:

- Animal/Plant/Crop Disease
- Drought
- Extreme Heat
- Flash Flood
- Grass or Wild Land Fire
- Hazardous Material
- Human Disease
- Infrastructure Failure
- Severe Winter Storms
- Terrorism
- Thunderstorm/Lightning/Hail
- Tornado/Windstorm
- Transportation Incident

Table 4.1: Loss Estimate Magnitude and Severity Impacts

Description		Percentage Used in Loss Estimates
Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths	51%-100%
Critical	26% to 50% of property severely damaged Shutdown of facilities and services for at least 2 weeks Injuries/illnesses that results in permanent disability	26%-50%
Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability	10%-25%
Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid	0%-9%

Based on the potential impacts of each hazard that is listed above, the vulnerability and loss estimates for the City of Auburn was calculated. All structural data in the tables and figures are based on AY 2020 parcel data provided by the Department of Management and population data came from the 2020 U.S. Census. The number of structures used in the city appendices come from the American Community Survey Data. Table 4.2 shows the maximum amount of damage that could be done to the City of Auburn.

The calculations for "Number of Vulnerable Structures" are based on those structures that are exposed to each hazard. While 100% of the jurisdiction may be vulnerable to a hazard, not 100% of jurisdiction will necessarily experience damages due to the hazard. The "Number of People Vulnerable" for each hazard was based on the total population. The following tables show the potential impact of each hazard on the City of Auburn based of historic data and committee input.

Table 4.2: City of Auburn Maximum Building and Population Exposure

Type of Structure	Value of Structures	Number of People
Agricultural	$230,760	265
Commercial	$1,519,980	
Industrial	$142,370	
Residential	$7,581,840	

Table 4.3: City of Auburn Animal/Plant/Crop Disease & Drought Impact

Type of Structure	Value of Structures	Number of People
Agricultural	$0	0
Commercial	$0	
Industrial	$0	
Residential	$0	

While Animal/Plant/Crop Disease & Drought would not affect any structures or residents of Auburn directly, livestock and fields could be extremely impacted and determining the overall impact is difficult as different diseases and levels of drought would all cause different levels of impact.

Table 4.4: City of Auburn Extreme Heat Impact

Type of Structure	Value of Structures	Number of People
Agricultural	$0	23
Commercial	$0	
Industrial	$0	
Residential	$0	

Extreme Heat would impact the residents of Auburn. While not all residents would be impacted, it is estimated that nearly 8% of the population would be affected. This number is derived from the American Community Survey Estimates number for residents aged 85 or above and a portion of residents aged under 5 as the elderly and small children are more susceptible illness caused by heat exposure.

Table 4.5: City of Auburn Flash Flood Impact

Type of Structure	Value of Structures	Number of People
Agricultural	$11,538	0
Commercial	$75,999	
Industrial	$7,119	
Residential	$379,092	

A Flash Flood could impact a portion of all the structures within the community. It is unlikely that residents would be directly impacted, therefore the committee left the number of people impacted as zero for this hazard. The committee felt that even though past flash floods have not recorded property damage, that some did occur, therefore the committee estimated that 5% of the buildings within the community could experience damage, which is the figure utilized in table 4.5 above.

Table 4.6: City of Auburn Grass or Wild Land Fire Impact

Type of Structure	Value of Structures	Number of People
Agricultural	$34,614	0
Commercial	$0	
Industrial	$0	
Residential	$0	

Grass or Wild Land Fires are more common in the rural parts of the community, this is not to say that the community as a whole could not experience a grass or wild land fire. The estimates utilized above are based on the past instances of grass or wild land fires in and around the City of Auburn. While the largest portion of the damage done by this hazard type would be to property, not structures, agricultural structures are more likely to be involved in this hazard's destruction path as they are normally located near open grassy pasture land or near fields. The committee estimated that if a major grass or wild land fire were to occur, 15% of the agricultural structures within the community could be impacted.

Table 4.7: City of Auburn Hazardous Material/Radiological Incident Impact

Type of Structure	Value of Structures	Number of People
Agricultural	$0	0
Commercial	$0	
Industrial	$0	
Residential	$0	

If a hazardous material incident were to occur within the City of Auburn, it is likely not going to affect any buildings within the community, but instead would affect the soil. Therefore the chart in table 4.7 does not show any impact to structures or residents of the community. Instead, land itself would be impacted.

Table 4.8: City of Auburn Human Disease Impact

Type of Structure	Value of Structures	Number of People
Agricultural	$0	239
Commercial	$0	
Industrial	$0	
Residential	$0	

Human disease would not cause any impact on the structures within the City of Auburn, but would affect the residents of the community to a large degree. Based off of the COVID-19 pandemic numbers and the number of residents who are affected each year by the flu, the committee utilized a 90% impact to determine the number of residents who would be affected by human disease.

Table 4.9: City of Auburn Infrastructure Failure Impact

Type of Structure	Value of Structures	Number of People
Agricultural	$4,615	5
Commercial	$30,399	
Industrial	$2,847	
Residential	$151,636	

Infrastructure failure could impact potentially all residents and structures within the community, but if an event were to happen, the committee estimated that approximately 2% of each building type and residents would be affected. The committee anticipates that one type of structure would be affected per instance, but table 4.9 shows what 2% of each type would look like. The categories should all be looked at individually and not as a whole.

Table 4.10: City of Auburn Severe Winter Storm Impact

Type of Structure	Value of Structures	Number of People
Agricultural	$0	23
Commercial	$0	
Industrial	$0	
Residential	$0	

Severe winter storms most commonly affect the residents of the community and do not cause any impact to the structures within a community, therefore in the chart above, the impact is shown to the population and not structures. While not all residents would be impacted, it is estimated that nearly 8% of the population would be affected. This number is derived from the American Community Survey Estimates number for residents aged 85 or above and a portion of residents aged under 5 as the elderly and small children are more susceptible illness caused by severe winter storms.

Table 4.11: City of Auburn Terrorism Impact

Type of Structure	Value of Structures	Number of People
Agricultural	$57,690	0
Commercial	$0	
Industrial	$0	
Residential	$0	

Terrorism within the City of Auburn is unlikely to be targeted at residents or commercial/industrial/residential structures. Instead, the committee felt that if a terrorism act were to occur, it would affect the agriculture sector of the community, agro-terrorism. The committee felt that estimating 25% damage to agricultural structures was appropriate, therefore that is the number utilized in table 4.11.

Table 4.12: City of Auburn Thunderstorm/Lightning/Hail Impact

Type of Structure	Value of Structures	Number of People
Agricultural	$0	0
Commercial	$0	
Industrial	$0	
Residential	$0	

The City of Auburn experiences a large number of thunderstorm/lightning/hail events annually. On average, these events cause with no damage to the community's structures or to the residents of Auburn. Therefore, the committee felt that not having an impact shown was appropriate.

Table 4.13: City of Auburn Tornado/Windstorm Impact

Type of Structure	Value of Structures	Number of People
Agricultural	$23,076	27
Commercial	$151,998	
Industrial	$14,237	
Residential	$758,184	

While Auburn has not experienced a tornado in the recent past, the city has been affected by a derecho. The community, if it were to experience a tornado would more than likely experience an EF0 or EF1 tornado. Utilizing this information, the committee estimated about 10% of the structures within the community would be impacted. The committee utilized 10% for the number of residents that would be impacted as well. The number represented in table 4.13 above does not mean residents that would be killed, but that may be injured in any way.

Table 4.14: City of Auburn Transportation Incident Impact

Type of Structure	Value of Structures	Number of People
Agricultural	$0	27
Commercial	$0	
Industrial	$0	
Residential	$0	

If a transportation incident were to occur, it is unlikely that any structures would be impacted. The number of people impacted would be the driver and potential passengers of one car, and potentially one or more other cars. Based off of data from the Iowa DOT, it is estimated on average, that 2 people are involved in transportation incidents, and is the number shown in the chart above.

Chapter 5: Mitigation Strategies

Section 201.6 (c)(3)(i): The plan must contain a mitigation strategy that provides the jurisdictions blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section must include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Section 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.

The hazard mitigation goals, objectives and actions are directly connected to the hazard analysis and risk assessment. After the hazard risk analysis was completed for each jurisdiction, broad-based county-wide goals were developed to address hazards and their impact on jurisdictions. The committee used a top-down approach where the overall goals were determined, then worked down to establish more specific objectives and even more specific mitigation actions. As a starting point, each jurisdiction was provided with the goals from their previous hazard mitigation plan. If a jurisdiction did not have a previous hazard mitigation plan, they were given the county's previous goals. This hazard mitigation plan's goals are identified as follows:

- Maintain and protect public infrastructure
- Minimize deaths, injuries, property loss, and vulnerability due to natural hazards
- Improve coordination, public communication, education, and awareness of hazards
- Enhance community protection
- Maintain and support public safety facilities, including equipment and training

Using the plan goals as a platform, each jurisdiction decided upon mitigation objectives and actions to help reduce or eliminate the impacts of hazards. Objectives were defined as strategies or steps to achieve the goals that have been set. They are more specific and narrower in scope than goals. It is important that the objectives be measurable in order to determine if the action was successfully implemented. Actions were defined as specific activities to reduce hazard risks. Actions can be classified into six mitigation categories-prevention, property protection, public education and awareness, natural resource protection, emergency services and structural projects.

Each committee member was supplied with a supplement to provide help in picking mitigation actions. The supplement was titled *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards*. The booklet contained a list of possible hazard mitigation measures for communities compiled from FEMA. The list gives mitigation ideas for natural hazard types, such as flood, tornadoes and drought. A worksheet was also distributed to committee members with examples of mitigation objectives and actions from several approved mitigation plans. In addition, committee members were given copies of their jurisdiction's previous objectives and actions from past hazard mitigation plans. As extensive as the three resources were, they did not prohibit other local ideas for actions to save lives and prevent or reduce damages.

This plans mitigation goals and objectives fall under the state's three main goals to provide complete protection to the citizens of the county. Each of the county's goals falls under the umbrella of the states three main goals which include:

- Protect the health, safety, and quality of life for Iowa citizens while reducing or eliminating property losses, economic costs, and damage to the natural environment caused by a disaster.
- Ensure government operations, response, and recovery are not significantly disrupted by disasters.
- Expand public awareness and encourage intergovernmental cooperation, coordination, and communication to build a more resilient community against all hazards.

Action Plan

The Action Plan is a combination of the hazards addressed by each action, the prioritization of actions, the responsible department for the action, the estimated cost of the action, the potential funding source for the action, the mitigation measure category, and the target completion date of the action. All of these categories are explained in the following sections. The city-wide action plans can be found later in this chapter.

Priority

Priority for each action is determined as High, Moderate, or Low.

- High- Completing this action item is vital to the jurisdiction's efforts towards either mitigating hazards or responding to them. The benefit of completing this project is greater than the cost. These projects tend to need to be completed within a short timeframe.
- Moderate – Completing this action would benefit the city's efforts towards mitigating hazards or responding to them, but if these projects are not completed, the jurisdiction can still further their efforts. The cost of these projects equals the benefit on the jurisdiction. These projects need to be completed in the mid timeframe.
- Low- If this action were to be completed, the jurisdiction would benefit, but if it is not completed, it will not be detrimental to the city's hazard mitigation efforts or response. The cost of these projects equals the benefit on the jurisdiction. These projects tend to be completed long-term.

Estimated Cost

Estimated costs for each action is determined as: minimal, low, moderate or high based on the following:

- Minimal – cost estimate is $9,999 or less
- Low – cost estimate ranges from $10,000 to $99,999
- Moderate – cost estimate ranges from $100,000 to $299,999
- High – cost estimate is $300,000 or greater

Mitigation Measure Categories

Prevention Actions

Prevention actions are intended to address future development. These actions influence the way land and buildings are developed and built. These actions ensure that future development does not increase hazard losses, and guides future development away from hazards. Examples of these actions include:

- Planning and zoning codes that limit development in a floodplain
- Building codes
- Capital improvement programs that prevent extension of public infrastructure into hazard areas
- Open space preservation and development of parks and recreational areas in hazard prone areas
- Storm water management regulations.

Property Protection Actions

Property protection actions modify existing structures or their surroundings to protect them from a hazard. These actions directly protect people and property at risk. Protecting a building does not necessarily affect the building's appearance and is therefore a popular mitigation action for historic and cultural sites. Examples of these actions include:

- Acquisition of lands that are vulnerable to damage
- Elevation
- Relocation of hazard-prone structures to safer areas
- Structural retrofits to reduce damage by future hazards
- Storm shutters
- Flood-proofing

Public Education and Awareness Actions

Actions to inform and educate citizens, elected officials, and property owners about hazards and the actions they can take to avoid potential damage and injury. These actions are directed toward property owners, business owners, and visitors to the community. Examples include:

- Outreach projects that provide hazard information to the public, business and property owners
- Real estate disclosure so that potential property owners are informed of the risk before purchase
- Hazard information centers
- School-age and adult education programs

Natural Resource Protection Actions

Actions that reduce the intensity of hazard effects and preserves or improves the quality of the environment and wildlife habitats. The actions are usually implemented by parks, recreation, or conservation agencies and organizations. These actions can include:

- Sediment and erosion control
- Stream corridor restoration
- Watershed management
- Forest and vegetation management
- Wetland restoration and preservation
- Expanding public open space

Emergency Services Actions

Actions that protect people and property before, during, and immediately after a disaster or hazard event. Examples of these actions are:

- Warning systems
- Emergency response services
- Protection of critical facilities and infrastructure

Structural Project Actions

Actions are called "structural" because they involve the construction of structures or devices to reduce the impact of hazards. Actions in this category directly protect people at risk. These actions can include:

- Dams
- Levees
- Floodwalls
- Retaining walls
- Safe rooms
- Reservoirs to store drinking water
- Diversion of storm water

Target Completion Date

The target completion date is the estimated amount of time that the jurisdiction feels the action can be completed in. It is broken into four categories:

- Short – 0 to 2 years
- Mid – 3 to 6 years
- Long – 7+ years
- Ongoing

City of Auburn Status of Previous Mitigation Actions

Status

The status of the previous actions are broken down into five categories:

- Complete- the project has been implemented since the last Hazard Mitigation Plan
- Underway- the action has been started and progress is being made. The project has a clear end.
- Ongoing- the action is continuing
- Future- the action is planned to have a start date in the future
- Not Implemented- the action has not been implemented due to changes in priority or funding since the last plan update

Table 5.1: City of Auburn Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Educate citizens about summer storms and safety			X		
Continue to remove snow in a timely manner		X			
Educate citizens about winter storms and winter weather safety			X		
Continue to provide quality fire and emergency response service		X			
Work out an effective response plan in case of a highway accident			X		
Continue participation in the NFIP			X		
Purchase new safety equipment as needed		X			

City of Auburn Action Plan

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action identified in paragraph (c)(3)(ii) of this section 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 associated costs.

Section 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.

Table 5.2: City of Auburn Action Plan

Goal 1	**Minimize to the Greatest Possible Extent, the Number of Injuries and/or Loss of Life Associated with all Identified Hazards**
Objective 1	**Reduce effects of severe weather**
Objective 2	**Provide adequate coverage with warning system**
Objective 3	**Protect safety of volunteers and residents from results of hazardous materials incident**
Goal 2	**Ensure city, county, business operations and emergency response are not significantly disrupted by disasters**
Objective 1	**Provide continuity of services and transportation routes**
Objective 2	**Reduce impacts of flooding on critical facilities**
Objective 3	**Protect critical facilities from terrorism activities**
Objective 4	**Maintain equipment**
Goal 3	**Improve Public Communication, Education and Awareness of Hazards and Their Risks in the City of Auburn**
Goal 4	**Improve Coordination and Communication with Other Relevant Organizations and Build Support for Hazard Mitigation**

Table 5.3: City of Auburn Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Action Category	Target Completion Date
Identify potential storm shelters throughout Auburn to serve as designated storm shelters and make upgrades as necessary	Extreme Heat, Tornado, Windstorm, Severe Winter Storms	Medium	County Emergency Management, City Council	Minimal	Local	Structure and Infrastructure Projects	Short
Evaluate and upgrade Auburn's warning siren coverage	Tornado	High	City Council	Low	Local, State, Federal	Structure and Infrastructure Projects	Short
Upgrade siren controls so they can be operated from the communications center	Tornado	High	City Council	Minimal	Local, State, Federal	Structure and Infrastructure Projects	Short
Purchase and install a new storm siren to better protect the community from hazardous weather events.	Tornado, Thunderstorm/ Lightning/Hail	High	City Council	Low	Local, State, Federal	Structure and Infrastructure Projects	Short
Obtain narrowband radios and repeater	Flash Flood, Tornado, Infrastructure Failure	High	City Council	Low	Local, State, Federal	Preparedness and Response Action	Short
Upgrade the snow trucks	Severe Winter Storms	High	City Council	Low	Local, State, Federal	Preparedness and Response Action	Short
Develop flood plan	River Flooding, Flash Flood	Medium	City Council	Minimal	Local	Local Plans and Regulations	Short
Continue participation in NFIP	River Flooding, Flash Flood	High	City Council	Minimal	Local	Local Plans and Regulations	Ongoing
Continue to take advantage of County sponsored hazardous materials training	Hazardous Material, Terrorism	Medium	Fire Department, Sheriff's Department	Minimal	Local	Education and Awareness Programs	Ongoing
Continue to train with air packs	Infrastructure Failure	High	Fire Department	Minimal	Local	Preparedness and Response Action	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Action Category	Target Completion Date
Update and enforce safety regulations on local entities that handle hazardous materials	Hazardous Material	Medium	City Clerk	Minimal	Local	Local Plans and Regulations	Ongoing
Attend training for terrorism when offered, and create opportunities for the public to attend as well	Terrorism	Medium	Emergency Management, Fire Department	Minimal	Local	Education and Awareness Programs	Ongoing
Post signs and increase police surveillance around critical facilities	Terrorism	Medium	County Sheriff Department, City Council	Minimal	Local	Local Plans and Regulations	Ongoing
Purchase new fire trucks and support vehicles as needed	Tornado, Infrastructure Failure, Grass or Wild Land Fire	Medium	Township Trustees, Fire Department	Moderate	Local, State, Federal	Preparedness and Response Action	Ongoing
Purchase new safety equipment as needed	Transportation Incident, Hazardous Material, Tornado, River Flooding, Flash Flood, Infrastructure Failure	Medium	City Council	Low	Local, State, Federal	Preparedness and Response Action	Ongoing
Educate citizens about summer storms and safety	Flash Flood, Tornado, Windstorm, Grass or Wild Land Fire	High	City Council, Fire Department	Minimal	Local	Education and Awareness Programs	Ongoing
Educate citizens about winter storms and winter weather safety	Severe Winter Storms	High	City Council, Fire Department	Minimal	Local	Education and Awareness Programs	Ongoing
Work out an effective response plan in case of a highway accident	Hazardous Material, Transportation Incident	Medium	Emergency Services	Minimal	Local	Preparedness and Response Action	Short

Chapter 6: Plan Maintenance and Adoption

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

Monitoring, Evaluating, and Updating the Plan

With the adoption of this plan, the City of Auburn City Council will be tasked with initiating the review, evaluation, and maintenance of the plan. The Auburn City Council will be in charge of making it a priority to update the City of Auburn Hazard Mitigation Plan. The City of Auburn Hazard Mitigation Plan will be evaluated once a year for potential changes, and to maintain compliance with FEMA rules and regulations. If the City of Auburn decides to update the plan, the city council will be responsible to initiate the update. If there is not an update within four years of the plan being adopted, then the process will begin to update the plan. The City Council will coordinate the meeting times and place and will notify the other members of the committee. If a new committee needs to be formed, it should be compromised of representatives of the city government, businesses, citizens, emergency staff, school board, etc. The members of the City Council agree to:

- Meet annually to monitor and evaluate the implementation of the hazard mitigation plan
- Act as a forum for hazard mitigation issues
- Disseminate hazard mitigation ideas and activities to all members of the committee
- Pursue the implementation of hazard mitigation actions that are included in the plan
- Monitor any sources of possible funding to help the jurisdictions implement the plan's recommended actions
- Monitor and assist in implementation and update of this plan
- Inform and gather input from the public

The primary duty of the Auburn City Council, in relation to maintaining and updating this plan, is to see that the plan is successfully carried out and report to the City, and to make information available to the public regarding the status of the plan and the progress of hazard mitigation actions.

Implementation Policies and Issues

The hazard mitigation planning team was created to develop the mitigation plan and guide the plan preparer. The planning team should not formally end with the approval of the plan. The planning team should become a watchdog to help local officials move the plan's goals forward and should take a key role in implementing projects. Members can help remind public officials and staff of that particular year's mitigation strategy and possible funding options and can volunteer in the implementation process for certain actions. The team and local governments may participate in the process and engage regional organizations, state agencies, colleges, schools, NGOs, and churches via memoranda of agreement.

Throughout the mitigation plan, there are gaps in data that are outlined in the plan. In addition to specific mitigation actions in this chapter, it is important that the City of Auburn reviews this plan periodically as the city prepares for the next five-year update of this Plan. This process would help satisfy FEMA Region VII requirements. Missing data should be found and included by the next major update.

This hazard mitigation plan is a guide for future policy planning for the City of Auburn. The plan considers demographic trends and projections, community background information, current and future political decisions, and overall important goals and objectives for the jurisdiction. The goals and objectives have been developed to reflect the general consensus of the Hazard Mitigation Planning team, the broad range of elected officials, and the citizenry of the community. These recommendations have been developed to look five-plus years into the future with the expectation that periodic updates will occur in order to reflect changes within each county.

The success of this plan will require the support of the emergency management commissions/agencies, elected officials, department heads, and volunteers (including civic groups, academia, and general citizens). Cooperation from the public and private sectors will allow implementation of the recommendations that will provide long-term benefits for each entire county and each jurisdiction. By implementing these recommendations, the jurisdictions will be furthering other civic goals also.

Simply listing a project or discussing an issue does not cause anything to be done about it. It is vital that the jurisdiction makes a sustained effort to implement projects, actions, and policies as outlined in this plan. Reviewing the text intermingled among the tables and lists also provides ideas on how to carry out the plan and meet mitigation goals. This chapter also provides more details about the regular activities involved in carrying out this plan and preparing for future planning efforts.

The following ideas should be kept in mind when considering how the plan should be implemented.

- Funding and resources are very limited due to the small population size, modest land value and tax base, and other funding obligations that make it impossible to save for long-term emergency needs.
- The City of Auburn has a limited number of volunteers and support agencies to handle the mitigation projects or response needs. Funding is also limited to provide proper training and equipment, and volunteers do not have the time to undertake the necessary training. Many volunteers and staff wear multiple "hats" and cannot meet all the demands when hazards occur.
- Many members of the public are apathetic to hazards and particularly to the sustained efforts necessary to mitigate them. Some citizens and public officials do not properly respect the need for mitigation planning, the risks the city faces, and the roles they have in the process. Few members of the general public have attended planning meetings.
- Information and data to bring about detailed hazard analysis and the analysis of possible mitigation actions is often lacking on a local level.
- Local jurisdictions have limited legal authority to implement some possible mitigation actions.
- Because prioritization is needed in order to effectively use limited resources, it is important that the jurisdictions perform studies on community infrastructure and services provided.
- Because of the risk of failure of investments in key hazard areas where the area is defined, the jurisdictions should consider a policy to prohibit or limit public expenditures for capital improvements in such areas.
- Small towns should use mitigation before hazards occur as a means to be prepared for the fact that, in a widespread hazard, resources are not likely to be available to them until larger jurisdictions are served.

Annual Review and Plan Maintenance Process

The DMA of 2000 suggests that each local jurisdiction review the plan annually. Principally, each jurisdiction's government body and key staff should review the actual implementation plan for that jurisdiction. A review of capabilities, goals/objectives, and proposed actions is particularly warranted. It is important that the review notes and suggested changes be made at a public meeting and records are kept. If any of the changes relate to a project that is being submitted to FEMA, such as through a PDM, FMA, or HMGP application, the jurisdiction must adopt the changes at a council meeting to make the changes officially part of the plan and thus eligible for mitigation funding. The local jurisdictional body, city council, is responsible for ensuring reviews are completed.

The public should be invited to all formal meetings where the plan is discussed and possible changes can be made. Local media should be used to alert the public. Each jurisdiction is responsible for review of the parts of the plan relevant to the said jurisdiction.

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions
- Increased vulnerability as a result of failed or ineffective mitigation actions, and/or
- Increased vulnerability as a result of new development (and/or annexation)

The annual reviews and updates to this plan will:

- Consider changes in vulnerability due to action implementation
- Document success stories where mitigation efforts have proven effective
- Document areas where mitigation actions were not effective
- Document any new hazards that may arise or were previously overlooked
- Incorporate new data or studies on hazards and risks
- Incorporate new capabilities or changes in capabilities
- Incorporate growth and development-related changes to inventories, and
- Incorporate new action recommendations or changes in action prioritization

In order to best evaluate the mitigation strategy during plan review and update, the participating jurisdiction will follow the following process:

- A representative from the responsible office identified in each mitigation action will be responsible for tracking and reporting the action status on an annual basis to the jurisdictional HMPC member and providing input on any completion details or whether the action still meets the defined objectives and is likely to be successful in reducing vulnerabilities.
- If the action does not meet identified objectives, the jurisdictional HMPC member will determine what additional measures may be implemented, and an assigned individual will be responsible for defining action scope, implementing the action, monitoring success of the action, and making any required modifications to the plan.
- As part of the annual review process, the Auburn City Council will provide the updated mitigation strategy with current status of each mitigation action to local elected officials of various jurisdictions requesting that the mitigation strategy be incorporated, where appropriate in other planning mechanisms.

Changes will be made to the plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities

will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as the planning team deems appropriate and necessary, and as approved by the Auburn City Council.

Opportunities for Publicity

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

Several times the local media can make comments about the effort and successes that may arise:

- Adoption of the mitigation plan
- Receipt of approval by FEMA
- Initiation and completion of tangible mitigation actions or projects
- Update and evaluation meetings and results

Annually, the jurisdiction is to hold at least one public meeting or hearing so that the public can comment on the status of the mitigation plan's implementation and changes that are needed to the plan.

Incorporation into Other Planning Mechanisms

Section 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 or capital improvements, when appropriate.

The planning team is partly responsible to ensure that the public officials are incorporating mitigation actions into relevant plans and planning mechanisms, such as zoning, annexation plans, and bonding proposals. Communities should also include mitigation initiatives as regular line items in community capital or operational budgets to ensure ongoing funding for hazard mitigation initiatives.

The local jurisdictions did not incorporate any of the mitigation actions into existing plans in any formal sense since the previous plan was adopted. However, mitigation ideas were incorporated informally in budget decisions, such as to fund a mitigation action. The jurisdictions commit to improved formal planning efforts in the next five years. Ways each jurisdiction will incorporate this plan can be found in their respective appendix.

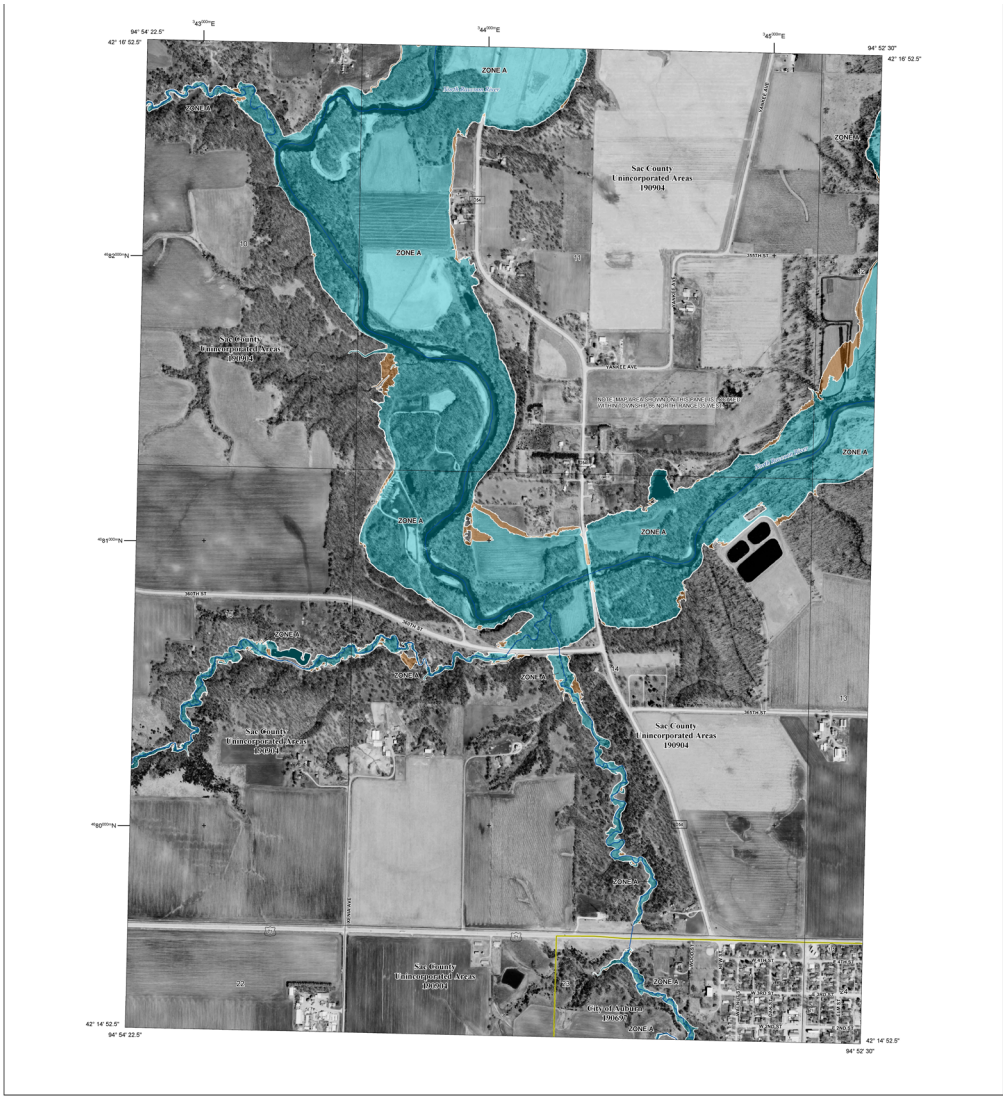
Where possible, the City of Auburn, will consider the findings from this document when updating or creating new planning and operating documents. Examples of planning documents that would benefit from information provided in this plan include, but are not limited to:

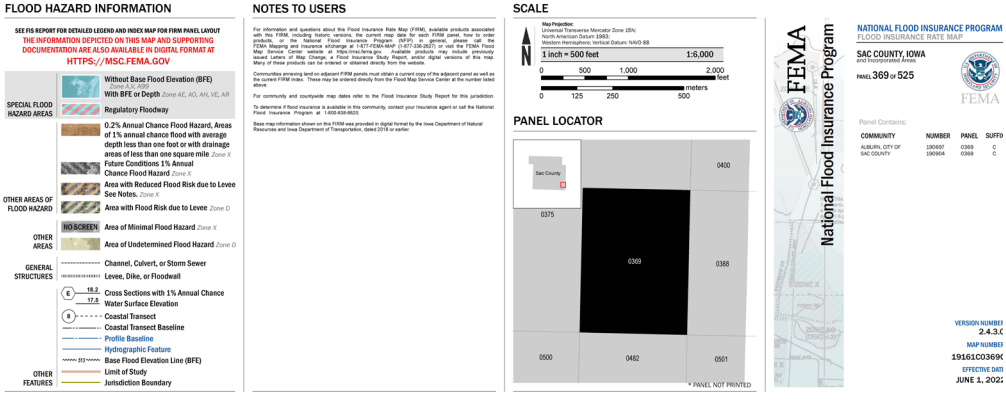
- Auburn City Code Update
- Creation of an Auburn Comprehensive Plan
- Creation of an Auburn Zoning Code
- Capital Improvement Plans
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans

While the City of Auburn does not currently have all of the plans listed above, if the city were to develop the above-mentioned plans, the Hazard Mitigation Plan will be referenced and incorporated where possible.

Appendix A: Additional Maps

Auburn Flood Maps





FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 9 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Iowa Department of Natural Resources and Iowa Department of Transportation, dated 2018 or earlier.

SCALE

Map Projection: Universal Transverse Mercator Zone 15N; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

SAC COUNTY, IOWA
and Incorporated Areas

PANEL 369 OF 525

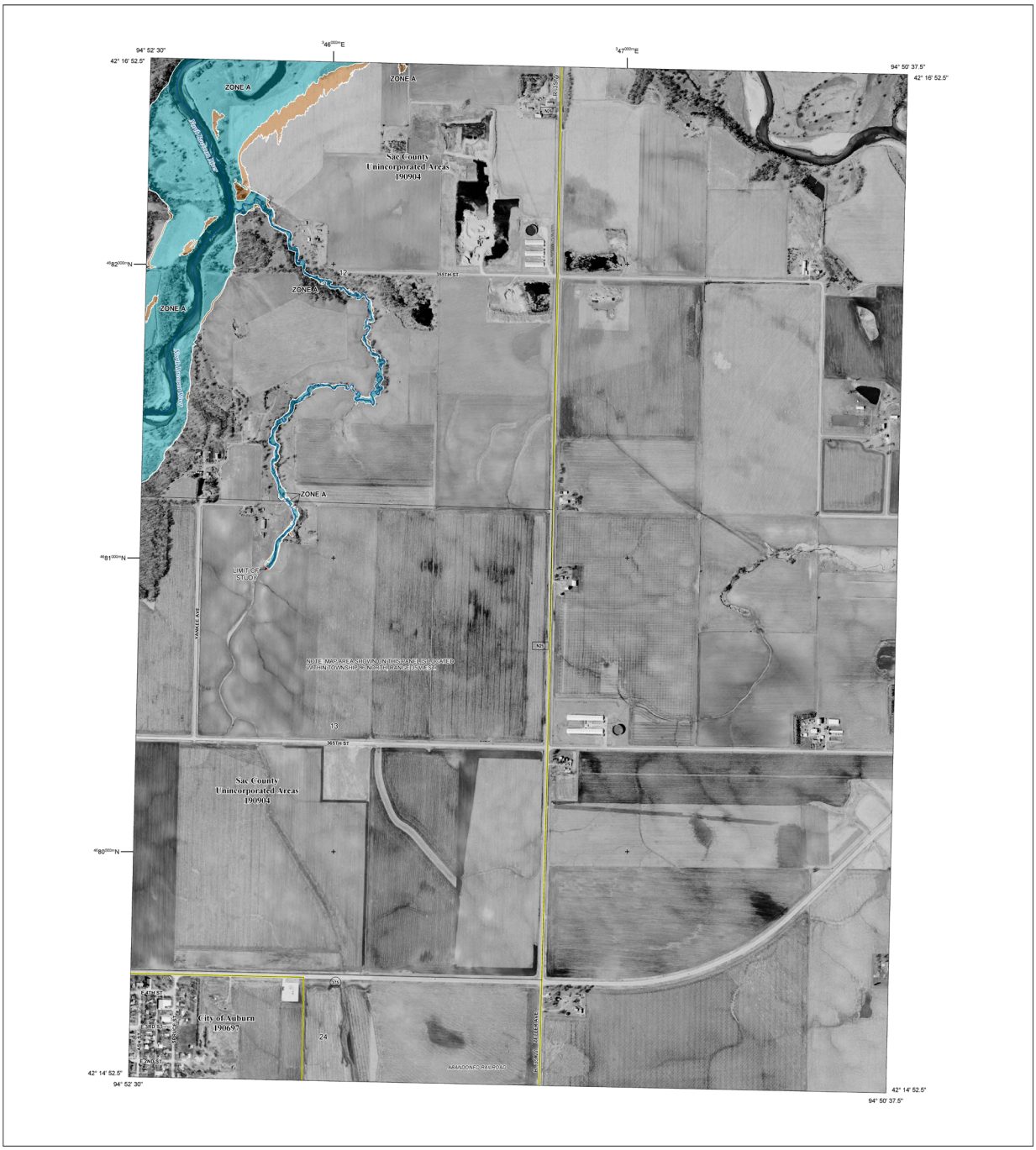
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
AUBURN, CITY OF	190697	0369	C
SAC COUNTY	190904	0369	C

VERSION NUMBER 2.4.3.(

MAP NUMBER 19161C0369(

EFFECTIVE DATE JUNE 1, 202(



FLOOD HAZARD INFORMATION

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THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, A, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN	Area of Minimal Flood Hazard Zone X
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
	18.2 / 17.6	Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
	513	Base Flood Elevation Line (BFE)
OTHER FEATURES		Limit of Study
		Jurisdiction Boundary

NOTES TO USERS

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SCALE

Map Projection:
Universal Transverse Mercator Zone 15N;
North American Datum 1983;
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

SAC COUNTY, IOWA
and Incorporated Areas

PANEL **388** OF **525**

FEMA

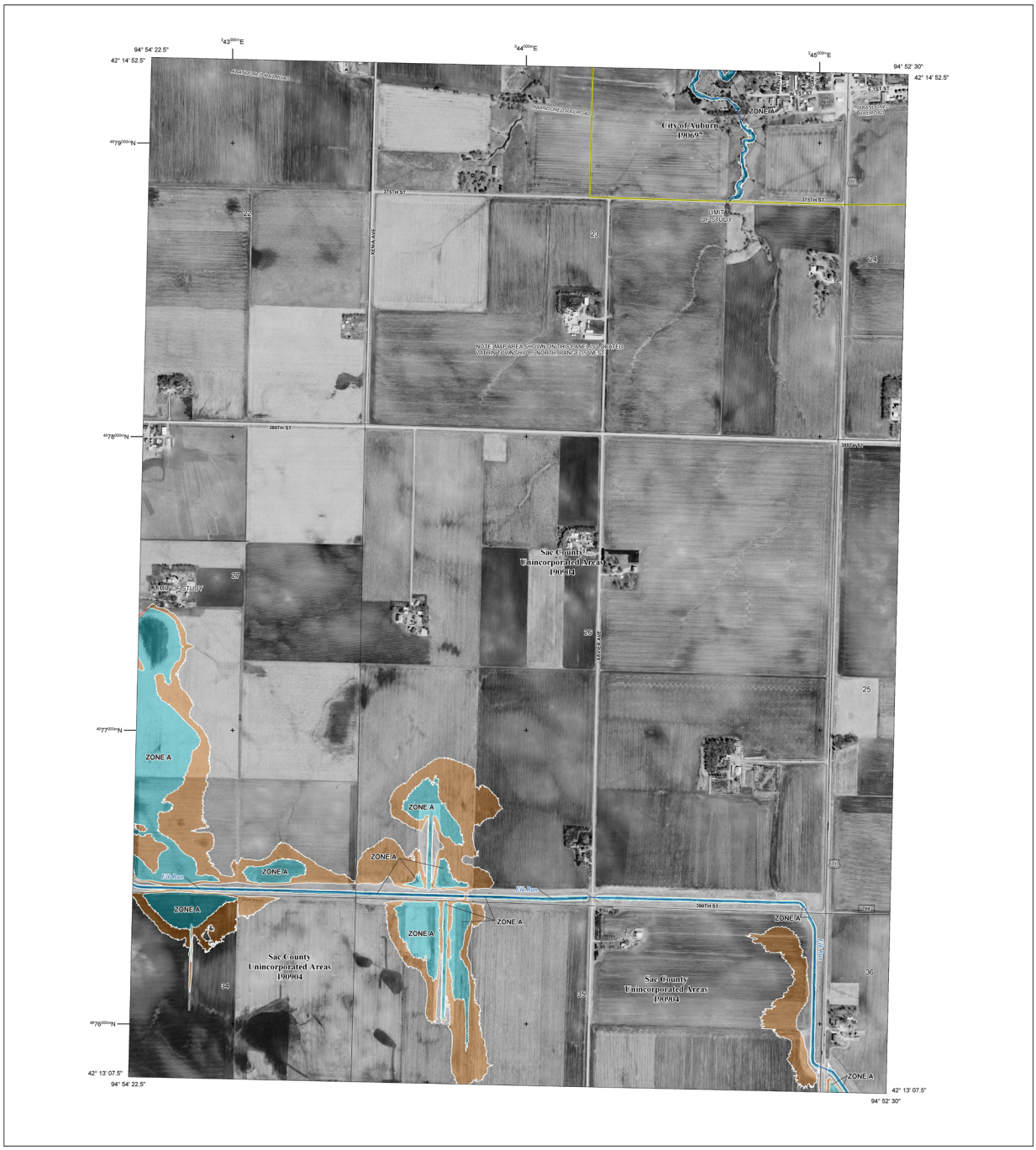
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
AUBURN, CITY OF	190697	0388	C
SAC COUNTY	190904	0388	C

VERSION NUMBER
2.4.3.0

MAP NUMBER
19161C0388C

EFFECTIVE DATE
JUNE 1, 2022



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, A99 With BFE or Depth Zone AE, AO, AH, VE, AR Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee See Notes. Zone X Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Iowa Department of Natural Resources and Iowa Department of Transportation, dated 2018 or earlier.

SCALE

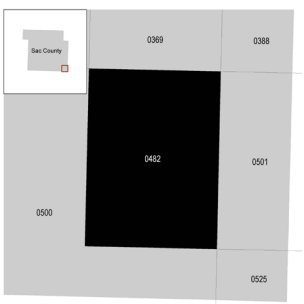
Map Projection:
Universal Transverse Mercator Zone 15N;
North American Datum 1983;
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

SAC COUNTY, IOWA
and Incorporated Areas

PANEL 482 OF 525

FEMA

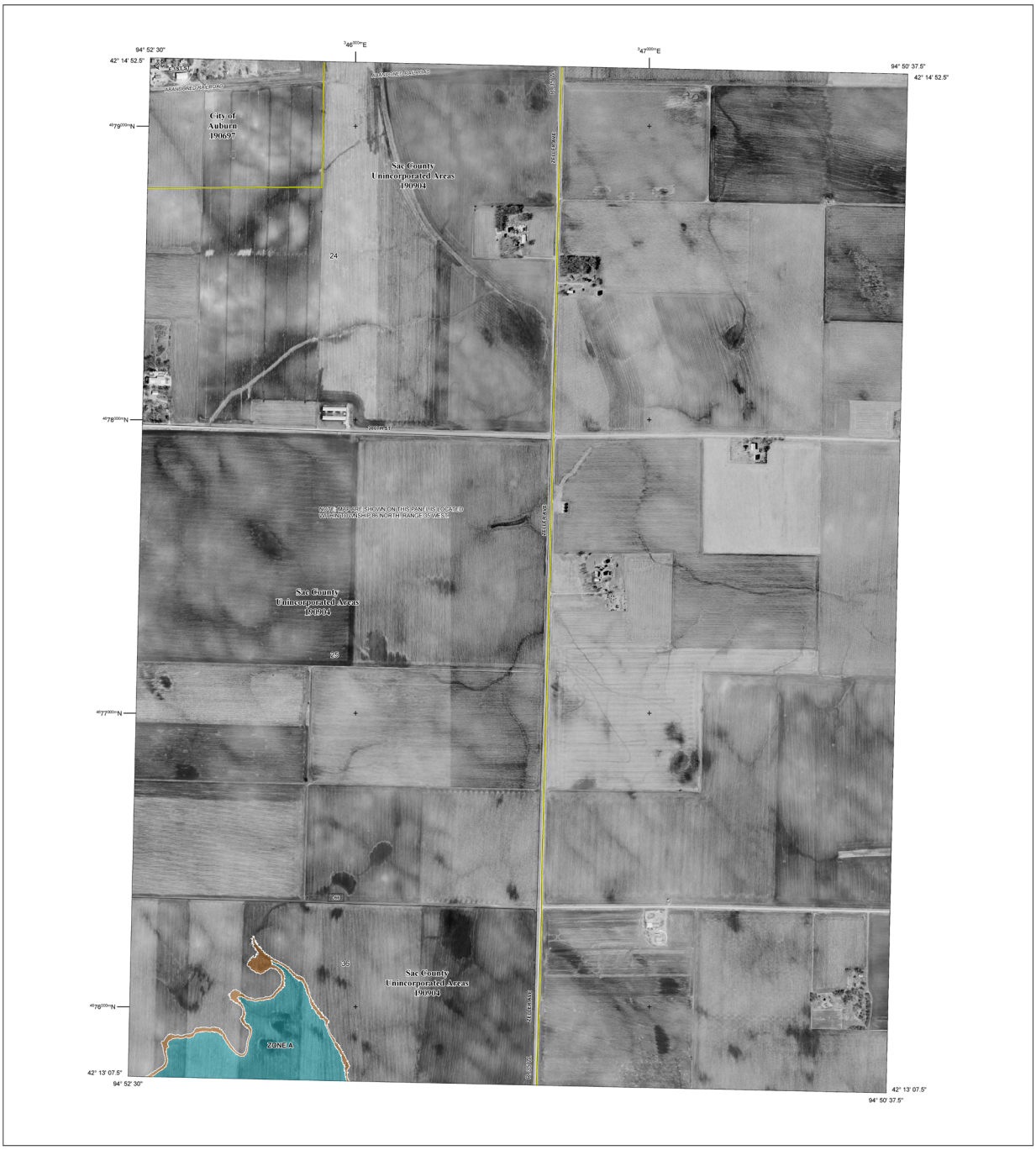
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
AUBURN, CITY OF	190697	0482	C
SAC COUNTY	190904	0482	C

VERSION NUMBER
2.4.3.0

MAP NUMBER
19161C0482C

EFFECTIVE DATE
JUNE 1, 2022



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
	Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X*
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	(E) 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
	(S) Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

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SCALE

Map Projection:
Universal Transverse Mercator Zone 15N;
North American Datum 1983;
Western Hemisphere; Vertical Datum: NAVD 88

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FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

SAC COUNTY, IOWA
and Incorporated Areas

PANEL 501 OF 525

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
AUBURN, CITY OF	190697	0501	C
SAC COUNTY	190904	0501	C

VERSION NUMBER
2.4.3.0

MAP NUMBER
19161C0501C

EFFECTIVE DATE
JUNE 1, 2022

Jurisdiction: **City of Auburn**	Title of Plan: City of Auburn Hazard Mitigation Plan 2022	Date of Plan:
Local Point of Contact: **Lauren Mortensen**	**Address:** **1009 East Anthony Street** **PO Box 768** **Carroll, IA 51401**	
Title: Economic Development Planner		
Agency: Region XII Council of Governments		
Phone Number: 712-792-9914	**E-Mail:** lmortensen@region12cog.org	
Funding Source: Local Funds		
State Reviewer: Jack Stinogel	**Title:** Hazard Mitigation Planner	**Date:** February 20, 2023
FEMA Reviewer: Stephanie Drake Collette Linder	**Title:** Community Planner Community Planner	**Date:** 3/30/2023
Date Received in FEMA Region VII	2/20/2023	
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved	3/30/2023	

Jurisdiction:	NFIP Status*	
	Y	**NP**
City of Auburn (adopted 12/14/2022)		X

*** 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))	Chapter 1 Page: 3	✓	
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))	Chapter 1 Page: 4	✓	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Chapter 1 Page: 3-4	✓	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Chapter 1 Page: 4 Chapter 3 Page: 50	✓	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Chapter 6 Pages: 65-68	✓	
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))	Chapter 6 Pages: 65-68	✓	

ELEMENT A: REQUIRED REVISIONS

None.

Plan Strengths:

- The plan documents multiple opportunities for public and neighboring agencies participation; including through the county EMS and social media.
- The plan highlights residents had conversations with city staff regarding the purpose of the plan, and that "these residents were also informed and encouraged to attend" city council meeting where the plan would be discussed and recommended for adoption.

Opportunities for Improvement:

- New guidance for local hazard mitigation plans becomes effective April 19, 2023, and has new and/or expanded local mitigation planning requirements, particularly regarding planning for impacts of climate change and equitable outcomes, as well as expanded participation or engagement of members from key sectors with mitigation capabilities, for instance economic development, housing, health and social services, land use development, etc. Given the recognition in the community profile, both of aging population and aging housing stock, it is highly recommended to begin identifying partners in these sectors prior to the next update and consider involving them in any annual plan reviews.
- The plan indicates a survey was utilized for public feedback on the draft plan. Though there was no feedback provided through this survey, surveys can be an excellent way to solicit public feedback, and it is highly recommended to continue this practice. Perhaps in the next update, utilize a survey earlier in the planning process to engage the public's input regarding the hazard and risk analysis and mitigation action strategy. Additionally, consider a variety of avenues to publicize the survey including through local print media, local businesses, school district meetings and/or houses of worship.

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))	Chapter 4: 53-56	✓	
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))	Chapter 3: 21	✓	
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))	Chapter 3	✓	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Chapter 4 Page 52	✓	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met

ELEMENT B: REQUIRED REVISIONS

None.

Plan Strengths:

- The community profile is generally thorough and well laid out, great description of Auburn Critical Facilities and housing stock. The plan does a great job of characterizing some of the challenges as well as the pride of small rural communities.
- Variety of maps, tables, and images which are quite informative to help tell the story and provide a better understanding of the community of Auburn.

Opportunities for Improvement:

- Consider the impacts of climate change and the effects it will have on specific natural hazards and vulnerability.
- Consider more detailed analysis of social vulnerability with respect to hazards. While the city profile touches on this with regards to the age distribution of the population, and the housing stock; additional insight for instance regarding access and functional needs, such as oxygen dependence, lack of transportation, or limited English proficiency, could inform planning and mitigation strategy.
- Caution is urged when applying a ranking system to determine the planning significance of a hazard -- especially using the chosen scales and definitions for probability, magnitude, warning time and duration – as ranking systems tend to over-inflate the actual risks for some hazards and underrepresent risk from others. In 2018, the State of Iowa moved away from a ranking system and simply presented the relevant data points for each hazard.
- Several of the maps are difficult to interpret, for example the legends on the flood maps in Appendix A are not legible and distort when zooming in; and the colors of green on Map 2.2: Sac County Watersheds (page 6 of the plan) appear to be the same, thus it is unclear if these are two different watersheds are both Missouri-Little Sioux.
- Regarding the drought profile:
    - On page 25 of the plan in the last paragraph the abbreviation for the Palmer Hydrological Drought Index should be PHDI but is listed as PDHI.
    - On page 26 of the plan, it is stated, “According to the National Centers for Environmental Information, these droughts happened ***in 2021 and 2021***. Over 280 das were spent in drought over the two-year period.” This presumably is a typo.
- Regarding the impact and loss characterization of a transportation accident on page 56 of the plan, it is unclear if the narrative under Table 4.14 is incorrect in indicating on average 2 people are involved in transportation incidents and if the table needs to be corrected; and there is no context for instance to how many accidents occur in a year or some time scale. This narrative in general is confusing. Additionally, while the hazards profile regarding transportation incidents on pages 47-48 of the plan provides extensive details for Sac County, there is little to no information specific to the city of Auburn. This profile and impact characterization could be improved with city level information for the number and any frequent locations of accidents or near accidents, and any repairs made to public property.
- Generally, Natural Hazard profiles should include a problem statement and damage/loss from previous occurrence of the natural hazard since the last update to tie into the mitigation strategy.

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))	Chapter 2: 11	✓	
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))	Chapter 2: 11	✓	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Chapter 5 Page 61	✓	
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))	Chapter 5 Pages: 62-63	✓	
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))	Chapter 5 Pages: 61-63	✓	
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))	Chapter 6: 65-68	✓	

ELEMENT C: REQUIRED REVISIONS

None.

Opportunities for Improvement:

- Regarding NFIP participation, the plan correctly and adequately addresses the city of Auburn's non-participation and provides reason for not participating on page 11 of the plan. However, the plan identifies "Continue participation in the NFIP" regarding previous and current mitigation actions, on pages 60 and 74 of the plan, respectively. This inconsistency should be reconciled in the next update for instance to indicate if the city of Auburn is considering and pursuing NFIP participation. The city of Auburn is encouraged to participate in the NFIP and is reminded that Federal financial assistance for acquisition or construction purposes, including in some cases, Federal disaster assistance, may not be available in Special Flood Hazard Areas.
- Consider documenting all mitigation actions considered. Be as specific as possible and be clearly linked to the vulnerabilities and impacts identified in the risk assessment. This includes actions for alleviating data deficiencies or building up capabilities related to mitigation implementation. Documenting all ideas provides a record of what actions were considered, and why. Additionally, this creates a list of actions that can be reconsidered as conditions change.
- 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 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))	Chapter 1: 11	✓	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Chapter 5: 60	✓	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Chapter 5 Pages: 60-63	✓	
ELEMENT D: REQUIRED REVISIONS None.			
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))	Before Table of Contents	✓	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	N/A	✓	
ELEMENT E: REQUIRED REVISIONS None.			

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.

New planning guidance, Local Mitigation Planning Policy Guide (fema.gov), becomes effective April 19, 2023, and has new and/or expanded local mitigation planning requirements, particularly regarding planning for climate change and equitable outcomes. It is highly recommended that prior to the next plan update the planning committee involve the State of Iowa Hazard Mitigation Planning team and FEMA in a plan update kickoff meeting to review this plan and review tool.

As indicated in Section 1: Regulation Checklist, Element A, it is also recommended to begin identifying community partners in sectors such as economic development, housing, health and social services, early to be engaged in the next plan update and even annual plan reviews.

The city of Auburn is encouraged to reconsider participation in the NFIP and is reminded that Federal financial assistance for acquisition or construction purposes, including, in some cases, Federal disaster assistance, may not be available in identified Special Flood Hazard Areas. If more information or assistance regarding the NFIP participation process is needed please contact the State of Iowa.

B. Resources for Implementing Your Approved Plan

Resources for Implementing Your Approved Plan

A variety of mitigation resources are available to communities. The Iowa Homeland Security & Emergency Management website: Hazard Mitigation | IOWA HSEMD 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: Training Schedule | Iowa Department of Homeland Security Statewide Training.

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 State Hazard Mitigation Plan.

Review of the FEMA Hazard Mitigation Assistance (HMA) guidance (FY15 is the most current) is also encouraged as guidance provides information about application and eligibility requirements. The guidance is available at http://www.fema.gov/mitigation-planning-laws-regulations-guidance or through FEMA's grant applicant resources page at http://www.fema.gov/hazard-mitigation-assistance .

- The FEMA Hazard mitigation planning site Hazard Mitigation Planning | FEMA.gov 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 offers a Mitigation Best Practices Portfolio where 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: Mitigation Best Practices | FEMA.gov

The Department of Homeland Security's Federal Emergency Management Agency (FEMA) recently launched the new FEMA.gov. Please be informed that many popular Hazard Mitigation Assistance web links have changed:

- Where can I get information on Hazard Mitigation Assistance? Hazard Mitigation Assistance Grants | FEMA.gov
- Hazard Mitigation Grant Program: Hazard Mitigation Grant Program (HMGP) | FEMA.gov
- Flood Mitigation Assistance Program: Flood Mitigation Assistance (FMA) Grant | FEMA.gov
- Grant Applicant Resources : https://www.fema.gov/site-page/grant-applicant-resources
- Application Process: https://www.fema.gov/site-page/application-development-and-process
- Information on Joining the National Flood Insurance Program (frcog.org)
  Rehabilitation of High Hazard Potential Dams Grant Program Guidance: Rehabilitation of High Hazard Potential Dams (fema.gov)
- Environmental and Historic Preservation planning resources: Environmental Planning and Historic Preservation | FEMA.gov
- Environmental and Historic Preservation (EHP) At-A-Glance: HMA EHP Resources At-a-Glance Guide (fema.gov) This document provides information on how to incorporate environmental and historic preservation considerations into your Hazard Mitigation Assistance application and project.
- Version 6.0 of the Benefit Cost Analysis Toolkit is now available. The updated toolkit and updated training materials are available on the Benefit Cost Analysis website at Benefit-Cost Analysis | FEMA.gov.

If you need additional information, contact the Hazard Mitigation Assistance Helpline at (866) 222-3580 or email hmagrantshelpline@fema.dhs.gov. Please allow up to 5 business