Linn County

Multi-Jurisdictional Hazard Mitigation Plan

2014 - 2019

Jurisdictions include Linn County cities, school districts and unincorporated areas

This plan maintains Hazard Mitigation Assistance funding eligibility for participating jurisdictions from November 14, 2014 to November 14, 2019

Prepared by the East Central Iowa Council of Governments in partnership with Linn County and Iowa Homeland Security and Emergency Management Division

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Plan Approval

This multi-jurisdictional hazard mitigation plan was submitted for public comment, review, and approval on August 4, 2014. An initial review of the plan was completed by the Iowa Homeland Security and Emergency Management Division. After the state review process, the plan was submitted to the Federal Emergency Management Agency (FEMA) Region 7 office for final review and approval on October 31, 2014. After necessary edits were completed, the plan was approved on November 14, 2014.

The plan has officially been adopted and incorporated into the planning process for each participating jurisdiction. With approval and adoption, each jurisdiction is eligible to apply for Hazard Mitigation Assistance (HMA) funding to complete their mitigation strategy. Hazard Mitigation Assistance includes three programs: Pre-Disaster Mitigation, Flood Mitigation Assistance, and Hazard Mitigation Grant Program. Both Pre-Disaster Mitigation and Flood Mitigation Assistance are annual, nationally competitive funding programs. On the other hand, funds are available in Iowa through the Hazard Mitigation Grant Program when a federally declared disaster occurs anywhere in the state.

In Linn County, participating jurisdictions will be notified of funding opportunities by the East Central Iowa Council of Governments, Linn County Emergency Management Agency, and Iowa Homeland Security. The East Central Iowa Council of Governments will provide ongoing support related to funding inquiries, applications, and maintaining this plan during its five-year term.

Active Plan Period

The Linn County Multi-Jurisdictional Hazard Mitigation Plan for 2014 – 2019 was approved on November 14, 2014. The plan is active for five years following the approval date. A full update must be completed within five years to maintain Hazard Mitigation Assistance funding eligibility.

Plan Background

Purpose of Hazard Mitigation Planning

The primary purpose of hazard mitigation planning is to identify how a community can minimize the negative impacts of natural, technological, and human caused hazards. This type of planning attempts to minimize death, injury, property damage, and community disruption. For Iowa and Linn County, recurring natural disasters such as windstorms, flooding, and ice storms have made local hazard mitigation planning an essential activity.

The secondary purpose of hazard mitigation planning is to maintain a local government's eligibility to apply for Hazard Mitigation Assistance funding, which includes the Pre-Disaster Mitigation, Flood Mitigation Assistance, and Hazard Mitigation Grant Program. Upon approval of this plan, the county, cities, and school districts included in this plan are eligible to apply for Hazard Mitigation Assistance funding to complete their mitigation strategy. It is important to note, when a federal disaster declaration is issued in Iowa, the federal government awards the state Hazard Mitigation Grant Program funding while the other programs are annual and nationally competitive.

At the federal level, the importance of hazard mitigation planning was recognized in the Disaster Mitigation Act of 2000 (DMA 2000). The DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) by repealing the previous mitigation planning provisions and replacing them with requirements that emphasize the need to coordinate mitigation planning and implementation. The legislation established the requirement for local hazard mitigation planning to access Hazard Mitigation Assistance, which funds hazard mitigation projects for state and local governments.

The development of this plan was funded by a Hazard Mitigation Grant Program planning grant awarded to Linn County. This funding was awarded after a federal disaster declaration, DR-1880, was issued in Iowa. To fulfill the requirements of the grant, Linn County contracted with a planning consultant, the East Central Iowa Council of Governments, which is a regional planning agency. Having decades of experience in planning and grant administration, Linn County regularly contracts with the East Central Iowa Council of Governments.

This plan fulfills the requirements of the Stafford Act, DMA 2000, and Title 44 Code of Federal Regulations §201.6, which is federal legislation that outlines the basic process and content requirements for a FEMA approved hazard mitigation plan. Throughout the development of this plan, the planning consultant balanced grant requirements, applicable federal legislation, and local priorities to provide Linn County an approved, value added plan.

Plan development began in November 2011 after Linn County received grant funding and contracted with a planning consultant. Overall, plan development was a multi-year process that involved collaboration among local officials, staff, and residents. The planning consultant facilitated research, public meetings, and a public comment period. The plan was submitted to Iowa Homeland Security and the Federal Emergency Management Agency for review in August 2014. A final version of the plan was approved on November 14, 2014. Upon approval and adoption by participating jurisdictions, this plan is effective for five years and maintains eligibility for Hazard Mitigation Assistance funding.

DISASTER DECLARATION DR – 1880

The development of this plan was funded by a Hazard Mitigation Grant Program planning grant awarded to Linn County after the DR – 1880 disaster declaration was issued in Iowa. The DR- 1880 federal disaster declaration was issued on March 2, 2010 due to damage from severe winter storms in twelve western Iowa counties including Adair, Audubon, Calhoun, Carroll, Cass, Crawford, Guthrie, Harrison, Madison, Pottawattamie, Sac, and Shelby. The storms occurred January 19 – 26. Hazard Mitigation Grant Program funding is available statewide for mitigation projects after every federal disaster declaration is issued in Iowa.

Plan Participants

Definition of a Jurisdiction

Legislation defines a local government or jurisdiction as any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments, regional or interstate government entity, or agency of a local government; any Indian tribe or tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity. For a hazard mitigation plan in Iowa, jurisdictions or local governments typically include the unincorporated areas, cities, and school districts within a county.

The planning area for a multi-jurisdictional hazard mitigation plan includes multiple jurisdictions with common climate and geography. Jurisdictions are either contiguous or located in close proximity. In Iowa, the planning area for a multi-jurisdictional plan typically includes an entire county. The planning area includes the unincorporated areas, cities, and school districts. Not all school districts participated in this plan. See Table 1 for a full list of jurisdictions included in this plan.

Table 1: Participating Jurisdictions

County	Cities	School Districts
Linn County	Alburnett	Center Point - Urbana
	Bertram	College
	Cedar Rapids	
	Center Point	
	Central City	
	Coggon	
	Ely	
	Fairfax	
	Hiawatha	
	Lisbon	
	Marion	
	Mount Vernon	
	Palo	
	Prairieburg	
	Robins	
	Springville	
	Walker	

Plan Development

A hazard mitigation plan is the product of a multi-year planning process that involves collaboration between officials, staff, and residents in participating jurisdictions. In Iowa, the process typically is completed by a coordinator, usually a planner, who works with each jurisdiction, the Iowa Homeland Security and Emergency Management Division, and Federal Emergency Management Agency (FEMA) Region VII. The primary goals of the coordinator are to ensure the planning process and final document focus on the mitigation priorities of participating jurisdictions and fulfill regulatory requirements.

Grant Funding

For this plan, the planning process began in November 2011 when Linn County was awarded Hazard Mitigation Grant Program funding from the state to develop a multi-jurisdictional hazard mitigation plan. Linn County committed to coordinate the plan development process with a regional planning agency and provided a 15% in-kind grant match. The primary point of contact with Linn County was Linn County Planning and Development.

Planning Consultant

In November 2011, Linn County contracted with the East Central Iowa Council of Governments, a regional planning agency, to provide grant administration services and coordinate the development of the plan. Linn County has worked with the agency since its establishment in 1972 as an intergovernmental council. Planning staff at the East Central Iowa Council of Governments have specific knowledge and experience in hazard mitigation planning having prepared plans in Linn County and the other counties in the agency's service area. For more information about the East Central Iowa Council of Governments, visit the agency website at www.ecicog.org.

Starting in November 2011, Hilary Copeland-Marvin, a planner at the agency, was the primary consultant coordinating plan development. Starting in January 2013, Alicia Presto became the primary consultant to complete the plan development process, which ended in November 2014.

Review and Research

Throughout the plan development process, existing documents and data for each jurisdiction were reviewed for relevance and potential inclusion in this plan. Several jurisdictions had existing single jurisdiction or multi-jurisdictional hazard mitigation plans to use as a reference for existing priorities and gauge mitigation strategy progress. See Table 2 for information about existing hazard mitigation plans.

Table 2: Existing Hazard Mitigation Plans in Linn County

Jurisdiction	Plan Type	Plan Approval Date
Linn County	Single Jurisdiction	3/23/2010
Cedar Rapids	Multi-Jurisdictional	6/10/2008
Coggon	Single Jurisdiction	12/17/2009
Ely	Multi-Jurisdictional	6/10/2008
Fairfax	Multi-Jurisdictional	6/10/2008
Hiawatha	Multi-Jurisdictional	6/10/2008
Marion	Multi-Jurisdictional	6/10/2008
Mount Vernon	Multi-Jurisdictional	10/22/2013
Palo	Multi-Jurisdictional	3/19/2009

Other documents incorporated into the content of this plan include local regulatory documents, planning and procedure documents, and maps. Jurisdictions included in this plan are diverse in purpose and size so the types of documents available vary for each jurisdiction. In each jurisdiction's mitigation strategy, the jurisdiction specific documents incorporated into the content of this plan are described.

In addition to existing documents, extensive research was completed to include current information for each jurisdiction in the plan. The bulk of this research consists of database searches for hazard event information relevant to Linn County. The databases used are cited throughout the plan. To incorporate local perspectives, discussion with planning committee members and local media coverage were also used to include current information.

A valuable source of information, referenced often in this plan, is the statewide hazard mitigation plan prepared by the Iowa Homeland Security. At the beginning of the planning process, the current statewide hazard mitigation was the *2010 Iowa Hazard Mitigation Plan*. In October 2013, an updated plan was approved, which is after the majority of plan process, research, and writing occurred for this plan. Where possible, information from the *2013 Iowa Hazard Mitigation Plan* has been incorporated to reflect state wide hazard mitigation priorities in this plan.

To ensure this plan meets regulatory requirements, the October 2011 version of the *Local Mitigation Plan Review Guide* provided by the Federal Emergency Management Agency was referenced regularly throughout the plan development process. This particular plan is the first countywide, multi-jurisdictional plan for Linn County, and the plan incorporates existing single and multi-jurisdictional plans. The planning process was designed to meet the basic requirements presented in the guide for a multi-jurisdictional plan to provide a base for future updates that exceed basic requirements.

Planning Meetings

The planning consultant worked directly with a primary contact in each jurisdiction. Providing assistance to the planning consultant, the primary contact identified and personally invited members of the local planning committee, scheduled meetings, and posted public meeting notices. To maintain an open plan development process, at least one public planning meeting was held in each jurisdiction. For most jurisdictions, two or more public planning meetings were held. Each person who attended the planning meetings, regardless of whether or not they were initially identified, was considered a member of the jurisdiction's planning committee.

Since this plan includes jurisdictions that vary by type and size, the number of meetings needed to discuss all aspects of hazard mitigation planning was flexible. Only one meeting was necessary for school districts while the unincorporated areas and certain cities required several meetings. Regardless of the type and size of the jurisdiction a consistent set of agenda items was used for meetings. For jurisdictions with multiple meetings, agenda items were distributed accordingly with a review of the previous meeting built-in into each agenda.

BASIC PLANNING MEETING AGENDA

1. Consultant and planning committee introductions
2. Hazard mitigation planning overview
3. Hazard Mitigation Assistance funding
4. Hazard risk assessment
5. Vulnerable populations and critical facilities
6. Planning goals
7. Mitigation strategy and action plan
8. Plan monitoring and evaluation
9. Plan adoption and implementation

The planning consultant prepared documentation for each meeting to provide information about the agenda and planning committee members. For review and future updates of this plan, the members of a planning committee can provide valuable context. Documentation for all planning meetings, which includes public notice, agenda and minutes, sign-in sheet, and planning committee members, is included in the appendix for each jurisdiction.

Progress Reports

To provide updates, the planning consultant prepared periodic progress reports that were sent to each participating jurisdictions. The reports included basic plan development process information, completed activities, and a timeline for completing remaining activities. The planning consultant also prepared the required quarterly progress reports for Linn County's planning grant. The completed reports were submitted to both the state and Linn County Planning and Development. Regular updates were given to the Linn County Board of Supervisors by the planning and development department.

Public Comment

The original, 30-day public comment period for this plan began August 4, 2014 and ended September 2, 2014. A draft of the plan was available on the East Central Iowa Council of Government's website, and a news release with information about the public comment period was sent to each participating jurisdiction, local media, and emergency management coordinators in surrounding counties. The surrounding counties include Buchanan, Delaware, Jones, Cedar, Iowa, and Benton County. Specifically inviting surrounding counties to participate in the public comment period allows for potential regional cooperation beyond the planning area because the mitigation strategies and action plans are not yet finalized.

It should be noted, the public comment period was extended because three jurisdictions did not initially participate in plan development. Bertram, Lisbon, and Robins decided to participate after the start of the public comment period. To allow for comments regarding these jurisdictions, the public comment period was extended to September 18, 2014. A news release was sent to each participating jurisdiction, local media, and the emergency management coordinators in the surrounding counties.

During the formal public comment period, comments were received through an online electronic form and the planning consultant's email. The majority of comments were requested corrections from local planning committee members. Comments regarding plan development and content addressed the cohesiveness of the jurisdictions, incorporating a greater land use focus, and addressing waste management. Looking toward future plan updates, the goal of the planning consultant is to facilitate a more collaborative process and encourage planning committees to consider land use and waste management mitigation strategies.

Before the full draft of the plan was released for public comment, the planning consultant gave local planning committees the option to review and verify that information reflects the discussion at planning meetings. The majority of initial planning committee comments were to clarify the jurisdiction's mitigation strategy. Since this plan affects eligibility for mitigation project funding, jurisdictions wanted to ensure the overall mitigation strategy reflected local risk and priorities. Other initial comments clarified a jurisdiction's operations and resources.

Plan Writing

This plan was written by the planning consultant at the East Central Iowa Council of Governments based on the ongoing review of existing documents, research, and discussion at planning meetings with each jurisdiction's planning committee. Plan writing was an ongoing activity throughout the plan development process. In addition to comments received during the public comment period, the planning committee in each jurisdiction provided feedback.

Plan Review and Revision

During the public comment period, the draft version of this plan was concurrently reviewed by Iowa's hazard mitigation planner and FEMA Region 7 plan reviewers. Required plan edits included simple, technical corrections to include hazard information and clarification of progress made in jurisdictions with an existing hazard mitigation plan.

PLAN REVIEW SCHEDULE

Public Comment Period: August 4, 2014 – September 18, 2014

State Review Submission: August 4, 2014

FEMA Final Review Submission: October 31, 2014

Plan Approval and Adoption

This multi-jurisdictional hazard mitigation plan was submitted for public comment, review, and approval on August 4, 2014. An initial review of the plan was completed by Iowa's hazard mitigation planner. After the state review process, the plan was submitted to the Federal Emergency Management Agency (FEMA) Region 7 plan reviewers for final review and approval on October 31, 2014. After necessary edits were completed and Linn County adopted the initial draft of the plan through a resolution, the plan was approved on November 14, 2014.

PLAN APPROVAL AND INITIAL ADOPTION DATE

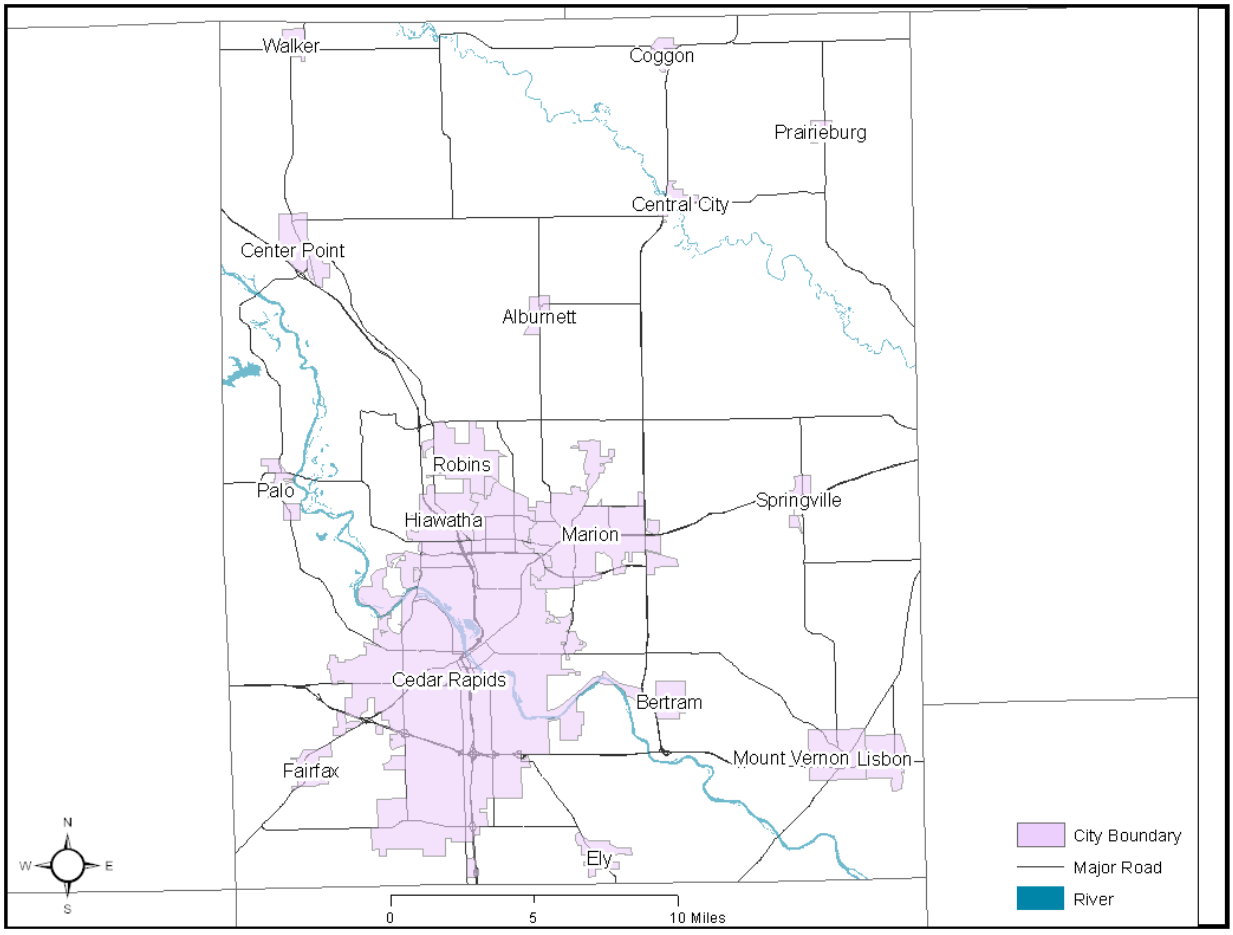
Plan Approval: November 14, 2014

Plan Adoption by Linn County: October 22, 2014

Planning Area

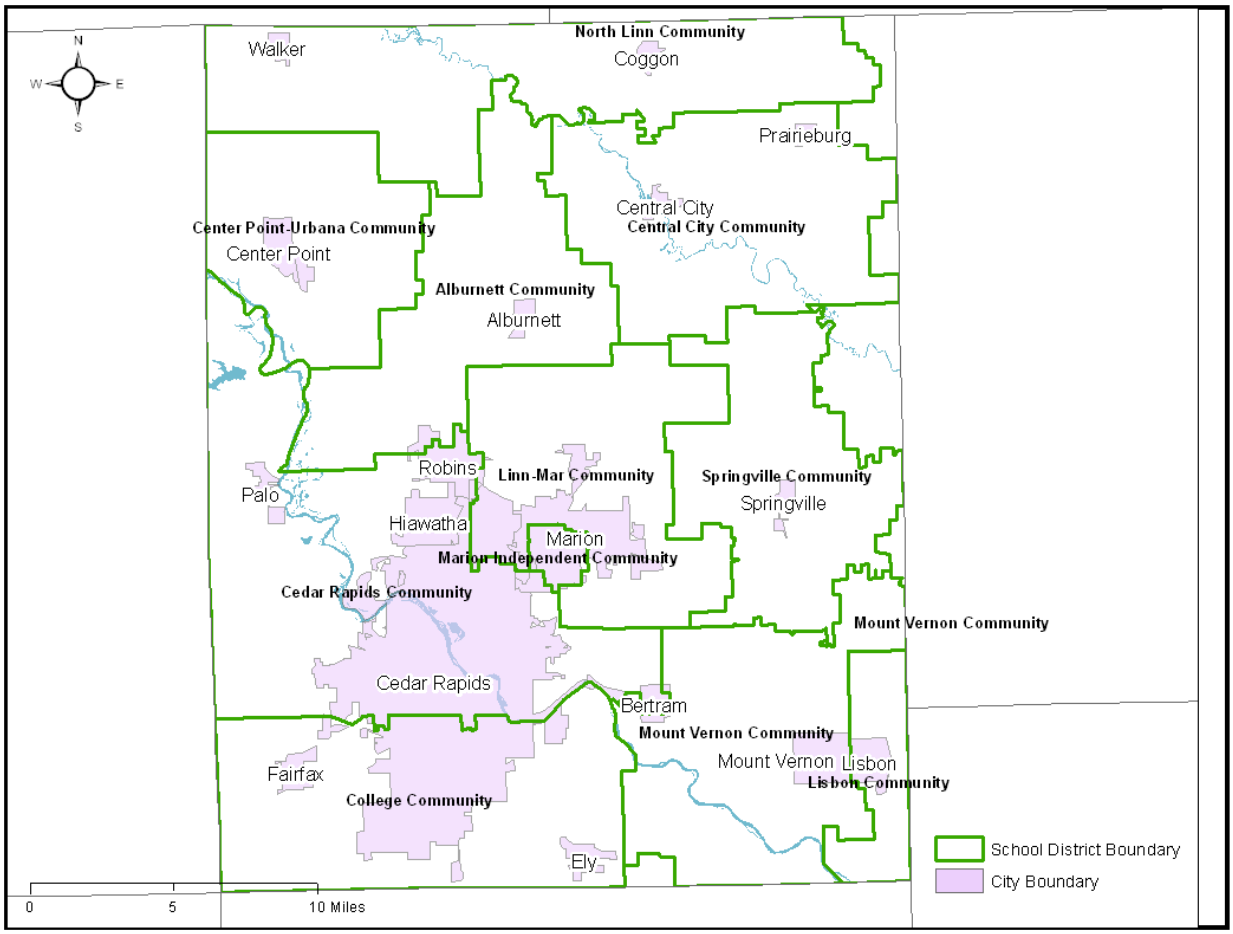
Linn County is located in east central Iowa, which experienced population growth between the 2000 and 2010 U.S. Census. The total population of Linn County, according to the 2010 U.S. Census, is 210,844 with the majority of residents living in the Cedar Rapids Metropolitan Area. The metropolitan area in central and south Linn County includes Cedar Rapids, Marion, Hiawatha, Robins, and Fairfax. Over 20,000 residents live in the unincorporated areas of the county. Refer to Figure 1 for the location of cities within the Linn County planning area.

Figure 1: Linn County Planning Area



Ten school districts provide education services to kindergarten through twelfth grade students throughout Linn County. In many areas, school districts also provide services to the public like library service and recreation. In addition to county and city governments, school districts were included in this plan to maintain Hazard Mitigation Assistance funding eligibility for the participating districts to mitigate or reduce the potential impacts of hazards on their students, staff, and visitors. Refer to Figure 2 for school districts in Linn County.

Figure 2: Linn County Planning Area School Districts



Several private colleges are also located in Linn County. Mount Mercy and Coe College are located in the central and downtown areas of Cedar Rapids. The local community college, Kirkwood Community College, has a main campus in Cedar Rapids on the south side of the city. In addition, Cornell College is located in Mount Vernon, which is east of the Cedar Rapids Metropolitan area along Highway 30.

The largest city in Linn County is Cedar Rapids with a population of 126,326 according to the 2010 U.S. Census. After Cedar Rapids, Marion is the second largest with a population of 34,768 in 2010. Overall, Cedar Rapids is significantly larger, more than three times the population of Marion, than all other cities in Linn County. Several cities have a population near or less than a few thousand. The smallest city in the county is Prairieburg, which has less than 200 residents. Refer to Table 3.

Table 3: Linn County 2010 U.S. Census Population

Jurisdiction	Population
Linn County	20,655
Alburnett	673
Bertram	294
Cedar Rapids	126,326
Center Point	2,421
Central City	1,257
Coggon	658
Ely	1,776
Fairfax	2,123
Hiawatha	7,024
Lisbon	2,152
Marion	34,768
Mount Vernon	4,506
Palo	1,026
Prairieburg	178
Robins	3,142
Springville	1,074
Walker	791
Total	210,844

Source: State Data Center of Iowa, July 2014

The largest school district in Linn County in terms of enrollment is the Cedar Rapids district, which had almost 17,000 students in the 2013 – 2014 school year. Similar to the difference in city population throughout the county, districts serving students outside of Cedar Rapids and the surrounding area are significantly smaller in terms of enrollment. The smallest school district in Linn County is the Springville district with 373 students in the 2013 – 2014 school year.

Table 4: Linn County School District Certified Enrollment 2013 – 2014 School Year

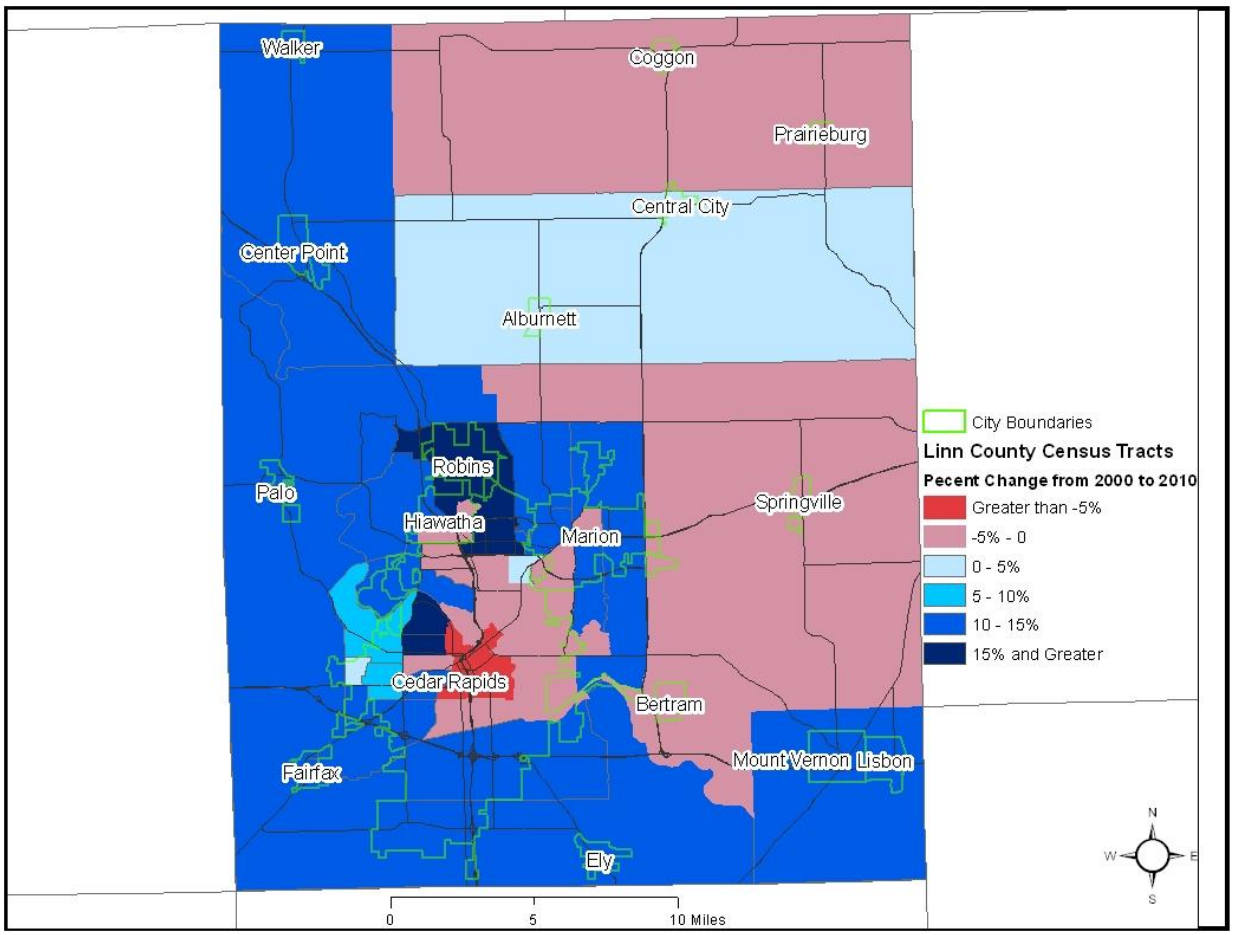
District	Students
Alburnett	544.5
Cedar Rapids	16,864.7
Center Point-Urbana	878.1
Central City	479.3
College	3,746.5
Linn-Mar	6,943
Lisbon	514.4
Marion Independent	1,864
Mount Vernon	1,088.1
North Linn	549.2
Springville	373.1
Total	33,900.6

Source: Iowa Department of Education, July 2014

It should be noted, the total students in Table 4 exceeds the number of students shown for each school district in Linn County. The discrepancy is due to school districts with boundaries that extend into a small area of Linn County, and those students are included in the enrollment for that district primarily located in a neighboring county.

As for population growth in Linn County, the highest percentage of population growth between 2000 and 2010 occurred in the central, west, and south areas of Linn County. A percentage increase of 15% or greater occurred in west Cedar Rapids and the far northern areas of the metropolitan area. The population in central and downtown Cedar Rapids decreased significantly between 2000 and 2010 due to the 2008 flood and continued removal of residential structures in the floodplain. Refer to Figure 3.

Figure 3: Linn County Population Change 2000 – 2010



Data Source: 2010 U.S. Census

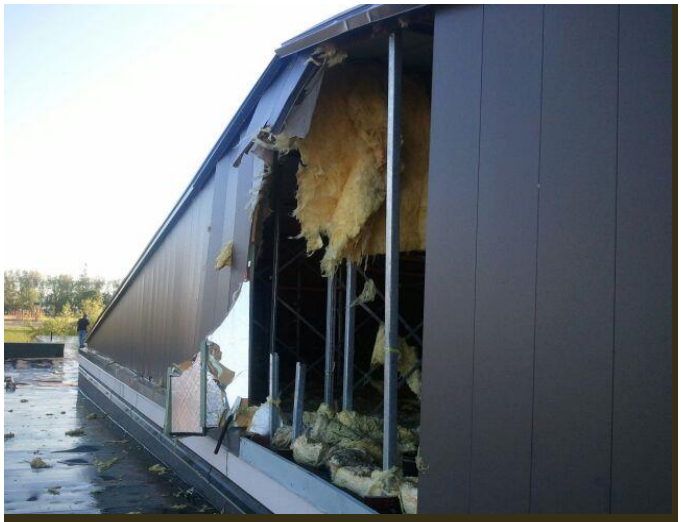
It is important to note where the highest rates of growth are occurring in the county because these areas may not yet have the appropriate capacity to protect a developed or more densely populated area from hazards. It also important to note which areas have a population decrease, because these areas may have limited resources in the future. Overall, the Linn County population is expected to continue to grow.

Operations and Resources

Local governments in Iowa are subject to Iowa Code, which gives the authority to protect the health, safety, and welfare of its residents and levy taxes to provide services. Participating jurisdictions have similar authority, but each jurisdiction varies in terms of size and governmental priorities. When developing a mitigation strategy in a multi-jurisdictional planning area, it is important to distinguish the variation in operations and resources among jurisdictions to ensure the mitigation strategy is feasible. In other words, it is important to consider whether or not each community has the expertise or access to the resources needed to complete a project. In the following pages, the operations and resources for each participating jurisdiction are included.

TYPES OF OPERATIONS AND RESOURCES

- Officials, commissions, and committees
- Staff and departments
- Services provided by jurisdiction
- Contracted or agreement services
- Policies, programs, and plans
- Financial



College Community School District Wind Damage
Photo Source: School District Administration

Snow Drift in North Linn County
Photo Source: North Linn News-Letter

Linn County Operations and Resources

Linn County has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All county operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 5.

Table 5: Linn County Operations and Resources

Officials, Commissions, and Committees	• Board of Supervisors • Planning and Zoning Commission/Board of Adjustment • Conservation Board • Board of Health • Linn County Emergency Management Commission • Cedar Rapids/Linn County Solid Waste Commission • Historic Preservation Commission • Local Emergency Planning Committee
Staff and Departments	• GIS/Mapping • Planning and Development* • Purchasing Division • Community Services • Linn County Conservation • Historic Preservation • Information Technology • Risk Management • Attorney • Assessor • Auditor • Finance and Budget • Recorder • Treasurer • Public Health* • Sheriff's Office* • Engineering and Secondary Roads*
County Services	• Law enforcement and response • Well and septic system permits • Development/building permits • Stormwater system maintenance and improvements • Maintain generators in critical facilities • Road maintenance and improvements and snow removal • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • Mapping services • Purchasing • Recorder and Treasurer Services • County website

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Table 5 (cont.): Linn County Operations and Resources

Contracted and Agreement Services	• Linn County Emergency Management Agency* • LinnAlerts • Police and fire protection mutual aid agreements • Linn County HAZMAT Response Team • Ambulance services • Linn County LIFTS • Linn County Soil Conservation • Corridor MPO and East Central Iowa Council of Governments*
Policies, Programs, and Plans	• Capital Improvement Program* • Linn County Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • Linn County Comprehensive Plan 2013* • Linn County Hazard Mitigation Plan 2010* • Comprehensive Emergency Management Plan* • Community Rating System participation (Current Class 8)* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, Floodplain Ordinance)* • Coordinate with Indian Creek Watershed Management Authority • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• County budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Alburnett Operations and Resources

Alburnett has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 6.

Table 6: Alburnett Operations and Resources

Officials, Commissions, and Committees	• Mayor • City Council* • Planning and Zoning Commission/Board of Adjustment • Linn County Emergency Management Commission
Staff and Departments	• City Clerk* • Public Works* • Fire Department
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Snow removal • Fire protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • City website
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Linn County HAZMAT Response Team • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Alburnett Code of Ordinances includes Building Code, Zoning Ordinance, Subdivision Code, and Disaster Recovery and Reconstruction Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • 2013 Alburnett Comprehensive Plan* • Coordinate with the Indian Creek Watershed Management Authority • Coordinate with the Duane Arnold Energy Center • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • Coordinate with Alburnett Community School District (includes a tornado safe room) • Event permits require emergency plan*
Financial and Other Resources	• City budget* • Bonds* • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Bertram Operations and Resources

Bertram has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 7.

Table 7: Bertram Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Linn County Emergency Management Commission
Staff and Departments	• City Clerk* • Public Works
City Services	• Clean and secure water supply • Street maintenance and improvements • Snow removal • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular test
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • West Bertram and Mount Vernon Fire Departments • Fire protection mutual aid agreements • Linn County Public Health approves septic permits • Linn County HAZMAT Response Team • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Bertram Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial Resources	• City budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Cedar Rapids Operations and Resources

Cedar Rapids has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 8.

Table 8: Cedar Rapids Operations and Resources

Officials and Commissions	• Mayor • City Council • City Planning Commission • Long Term Planning Commission • Airport Zoning Commission • Board of Adjustment (Zoning and Airport) • Municipal Improvement District Commissions • Stormwater Commission • Parks and Recreation Commission • Historic Preservation Commission • Linn County Emergency Management Commission
Staff and Departments	• Animal Care and Control • Building Services • City Assessor's Office • City Attorney's Office • City Clerk's Office • Community Development* • Development Services Department • Eastern Iowa Airport • Finance • Fire Department* • Finance • Human Resources • Information Technology • Library • Parks and Recreation • Police Department • Public Works* • Purchasing Services • Transit • Utilities*
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements* • Snow removal • Fire protection and education • Hazardous materials response • Police protection and education

*The asterisk indicates official or staff that participated in the plan development process or policies and programs that were discussed or reviewed and included in the city's mitigation strategy, if relevant.

Table 8 (cont.): Cedar Rapids Operations and Resources

City Services	• Vegetation and tree management in public areas • Outdoor recreation facilities • Maintain outdoor warning siren system and regular tests* • Maintain generators in critical facilities • Solid waste and recycling removal • Public transit • Maintain city website and "Our CR" publication
Contracted or Agreement Services	• Linn County Emergency Management Agency* • Police and fire protection mutual aid agreements • Linn County Regional HAZMAT Response Team • Corridor Metropolitan Planning Organization* • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency*
Policies, Programs, and Plans	• Cedar Rapids Code of Ordinances includes Building, Zoning and Subdivision Ordinance* • Community Rating System participation (Current Class 6)* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, updated Floodplain Management Ordinance, flood protection system construction, 5 in 1 Dam management)* • Flood Protection Plan* • Envision CR* • 2008 Metro-Area Hazard Mitigation Plan* • Drought Mitigation Plan* • Urban Reforestation Program* • Indian Creek Watershed Management Authority* • NIMS Training for necessary staff and officials* • Coordinate with the Army Corp of Engineers regarding the dam* • Coordinate with the Duane Arnold Energy Center as a standby for evacuation* • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • Coordinate with local school districts
Financial Resources	• City budget* • Local Option Sales Tax* • Stormwater Utility Enterprise Fund* • Grants and federal appropriations* • Bonds* • Grants* • Donations

*The asterisk indicates official or staff that participated in the plan development process or policies and programs that were discussed or reviewed and included in the city's mitigation strategy, if relevant.

Center Point Operations and Resources

Center Point has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 9.

Table 9: Center Point Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Planning and Zoning Commission/Board of Adjustment • Linn County Emergency Management Commission
Staff and Departments	• Administration* • Building Inspector • Public Works • Fire Agency* • Ambulance Service* • Parks and Recreation • Center Point Public Library
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Snow removal • Fire protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular test • City website and Nixle messaging to provide information
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Linn County HAZMAT Response Team • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Center Point Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • 2010 Center Point Comprehensive Plan* • Coordinate with Duane Arnold Energy Center • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • Coordinate with Center Point – Urbana Community School District • National Incident Management System training for necessary staff and officials
Financial Resources	• City budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Central City Operations and Resources

Central City has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 10.

Table 10: Central City Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Planning and Zoning Commission/Board of Adjustment • Linn County Emergency Management Commission
Staff and Departments	• Administration* • Public Works and Building Department* • Fire Department* • J.C. Clegg Public Library • Senior Dining*
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Snow removal • Fire protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • Senior dining service • Falcon Community Center is designated shelter facility • City website
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Linn County Regional HAZMAT Response Team • East Central Iowa Council of Governments*
Policies, Programs, and Plans	• Central City Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • Central City Comprehensive Plan* • Coordinate with Army Corp of Engineers regarding the dam • Coordinate with Duane Arnold Energy Center as a standby for evacuation • Coordinate with Linn County Public Health and offer flu shots • Coordinate with Iowa Department of Natural Resources • Coordinate with Central City Community School District • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds* • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Coggon Operations and Resources

Coggon has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 11.

Table 11: Coggon Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Planning and Zoning Commission/Board of Adjustment • Coggon Area Betterment Association (CABA)* • Linn County Emergency Management Commission
Staff and Departments	• City Clerk* • Public Works • Fire Department* • Library
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Snow removal • Fire protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • Coggon Public Library • City website
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Linn County Regional HAZMAT Response Team • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Coggon Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • 2009 Coggon Hazard Mitigation Plan* • Coordinate with Duane Arnold Energy Center • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds* • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Ely Operations and Resources

Ely has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 12.

Table 12: Ely Operations and Resources

Officials and Commissions	• Mayor • City Council • Planning and Zoning Commission/Board of Adjustment • Parks and Recreation Commission • Participate in Local Emergency Planning Commission
Staff and Departments	• Administration* • Public Works* • Parks and Recreation • Fire Department • Library
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Fire protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • Maintain portable backup power generators • Snow removal • Maintain city website
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Linn County HAZMAT Response Team • Corridor MPO and East Central Iowa Council of Governments* • Solid waste and recycling
Policies, Programs, and Plans	• Ely Code of Ordinances includes Building, Zoning, and Subdivision Code* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • 2003 Ely Comprehensive Plan (update in progress)* • 2008 Metro-Area Hazard Mitigation Plan* • Coordinate with Duane Arnold Energy Center • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Fairfax Operations and Resources

Fairfax has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 13.

Table 13: Fairfax Operations and Resources

Officials and Commissions	• Mayor* • City Council • Planning and Zoning Commission/Board of Adjustment • Parks and Beautification Committee • Library Board of Trustees • Linn County Emergency Management Commission
Staff and Departments	• City Clerk's Office* • Public Works and Parks Department* • Fire and Rescue Department • Library
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Snow removal • Fire protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • Maintain generators in critical facilities • Maintain city website and monthly newsletter
Contracted or Agreement Services	• Linn County Sheriff's Office and Signal 88 Security • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Linn County HAZMAT Response Team • Corridor MPO and East Central Iowa Council of Governments* • Solid waste and recycling
Policies, Programs, and Plan	• Fairfax Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • Fairfax Comprehensive Plan* • 2008 Metro-Area Hazard Mitigation Plan* • Coordinate with the Duane Arnold Energy Center • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Grants* • Bonds* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Hiawatha Operations and Resources

Hiawatha has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 14.

Table 14: Hiawatha Operations and Resources

Officials and Commissions	• Mayor • City Council* • Planning and Zoning/Board of Adjustment • Parks and Recreation • Water Board • Linn County Emergency Management Commission
Staff and Departments	• Community Center • Community Development* • Economic Development • Fire and Ambulance Department* • Library • Parks and Recreation • Police Department* • Policy and Administration* • Public Works* • Water*
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Snow removal • Fire protection and education • Police protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests* • Maintain generators in critical facilities • Solid waste and recycling removal • Maintain city website
Contracted or Agreement Services	• Linn County Emergency Management Agency* • Police and fire protection mutual aid agreements • Linn County Regional HAZMAT Response Team • Corridor MPO and East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency

*The asterisk indicates official or staff that participated in the plan development process or policies and programs that were discussed or reviewed and included in the city's mitigation strategy, if relevant.

Table 14 (cont.): Hiawatha Operations and Resources

Policies, Programs, and Plans	• Hiawatha Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, Floodplain Ordinance)* • Hiawatha Comprehensive Plan* • 2008 Metro-Area Hazard Mitigation Plan* • Participate in Indian Creek Watershed Management Authority* • NIMS Training for necessary staff and officials* • Coordinate with the Duane Arnold Energy Center* • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • Coordinate with local school districts • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants* • Donations

*The asterisk indicates official or staff that participated in the plan development process or policies and programs that were discussed or reviewed and included in the city's mitigation strategy, if relevant.

Lisbon Operations and Resources

Lisbon has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 15.

Table 15: Lisbon Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Planning and Zoning Commission/Board of Adjustment • Linn County Emergency Management Commission
Staff and Departments	• City Clerk's Office* • Public Works* • Fire Department* • Police Department
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Snow removal • Fire protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • City website
Contracted or Agreement Services	• Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Police protection mutual aid agreements • Linn County Regional HAZMAT Response Team • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Lisbon Code of Ordinances includes Building Code, Zoning Ordinance, and Subdivision Code* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map on 4/5/2010, and Floodplain Ordinance)* • Lisbon – Mount Vernon Hazard Mitigation Plan 2013 • Coordinate with the Duane Arnold Energy Center* • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Marion Operations and Resources

Marion has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 16.

Table 16: Marion Operations and Resources

Officials and Commissions	• Mayor • City Council • Planning and Zoning/Board of Adjustment • Construction Code Review Board • Stormwater Advisory Committee • Park Board • Water Board • Local Option Sales Tax Oversight Committee • Traffic Advisory Board • Tree Board • Linn County Emergency Management Commission
Staff and Departments	• City Manager* • Building Services* • City Clerk • Engineering* • Finance • Fire Department* • Parks and Recreation • Planning and Development* • Police Department* • Public Service • Water*
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Snow removal • Fire protection and education • Police protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • Maintain generators in critical facilities • Solid waste and recycling removal • Maintain city website

*The asterisk indicates official or staff that participated in the plan development process or policies and programs that were discussed or reviewed and included in the city's mitigation strategy, if relevant.

Table 16 (cont.): Marion Operations and Resources

Contracted or Agreement Services	• Linn County Emergency Management Agency* • Police and fire protection mutual aid agreements • Linn County Regional HAZMAT Response Team • Corridor MPO and East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency • Fiberight
Policies, Programs, and Plans	• Marion Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, Floodplain Ordinance)* • Requirement for storm shelters in new or expanded manufactured home developments* • 2010 Marion Comprehensive Plan* • 2008 Metro-Area Hazard Mitigation Plan* • Participate in Indian Creek Watershed Management Authority* • NIMS Training for necessary staff and officials • Coordinate with Duane Arnold Energy Center* • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • Coordinate with local school districts • National Incident Management System training for necessary staff and officials
Financial Resources	• City budget* • Bonds • Grants* • Donations

*The asterisk indicates official or staff that participated in the plan development process or policies and programs that were discussed or reviewed and included in the city's mitigation strategy, if relevant.

Mount Vernon Operations and Resources

Mount Vernon has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 17.

Table 17: Mount Vernon Operations and Resources

Officials and Commissions	• Mayor • City Council • Planning and Zoning Commission/Board of Adjustment • Parks and Recreation Commission • Linn County Emergency Management Commission
Staff and Departments	• Administration* • City Engineer • Zoning Administrator • Public Works • Parks and Recreation • Police Department • Fire Department • Emergency Management Coordinator • Library
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Police protection and education • Fire protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • Snow removal • City website
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Police protection mutual aid agreements • Fire protection mutual aid agreements • Linn County HAZMAT Response Team • East Central Iowa Council of Governments* • Solid waste and recycling

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Table 17 (cont.): Mount Vernon Operations and Resources

Policies, Programs, and Plans	• Mount Vernon Code of Ordinances includes Building, Zoning, and Subdivision Code* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • Mount Vernon Comprehensive Plan 2014 (in progress)* • 2013 Lisbon and Mount Vernon Hazard Mitigation Plan* • Coordinate with Duane Arnold Energy Center • Coordinate with Linn County Public Health • Preventative Emerald Ash Borer Treatment Plan • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Palo Operations and Resources

Palo has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 18.

Table 18: Palo Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council • Planning and Zoning Commission/Board of Adjustment • Stormwater Management Committee • Participate in Local Emergency Planning Committee • Parks and Recreation Board
Staff and Departments	• City Clerk's Office* • Public Works • Fire Department*
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Snow removal • Fire protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • City website and newsletter
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Linn County Regional HAZMAT Response Team • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Palo Code of Ordinances includes Building Code, Zoning Ordinance, and Subdivision Code* • National Flood Insurance Program participation • Floodplain Management Program (floodplain manager, current effective map on 4/5/2010, and Floodplain Ordinance)* • 2009 Palo Hazard Mitigation Plan* • Coordinate with the Duane Arnold Energy Center* • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Prairieburg Operations and Resources

Prairieburg has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 19.

Table 19: Prairieburg Community Capabilities

Officials and Commissions	• Mayor* • City Council*
Staff and Departments	• City Clerk* • Public Works* • Fire Department
City Services	• Clean and secure water supply • Wastewater treatment • Street maintenance and improvements • Snow removal • Fire protection and education • Maintain backup power generators in the Fire Station • Vegetation and tree management in public areas • Maintain manual outdoor warning siren and regular tests
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Linn County HAZMAT Response Team • East Central Iowa Council of Governments* • Solid waste and recycling
Policies, Programs, and Plans	• Prairieburg Code of Ordinances* • Coordinate with the Duane Arnold Energy Center • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources
Financial Resources	• City budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Robins Operations and Resources

Robins has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 20.

Table 20: Robins Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council • Planning and Zoning Commission/Board of Adjustment • Linn County Emergency Management Agency Commission
Staff and Departments	• City Clerk's Office* • Public Works* • Fire Department* • Police Department*
City Services	• Street, sanitary, and storm sewer maintenance and improvements • Snow removal • Fire protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • City website
Contracted or Agreement Services	• Water and wastewater services maintained by Cedar Rapids • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Police protection mutual aid agreements • Linn County Regional HAZMAT Response Team • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Robins Code of Ordinances includes Building Code, Zoning Ordinance, and Subdivision Code* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map on 4/5/2010, and Floodplain Ordinance)* • 2013 Robins Comprehensive Plan • Coordinate with the Duane Arnold Energy Center* • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Springville Operations and Resources

Springville has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 21.

Table 21: Springville Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Planning and Zoning Commission/Board of Adjustment • Parks Board • Library Board • Linn County Emergency Management Commission
Staff and Departments	• City Clerk* • Public Works* • Fire Department
City Services	• Clean and secure water supply • Wastewater treatment • Street maintenance and improvements • Snow removal • Fire protection and education • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • Springville Memorial Library • City website
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Linn County HAZMAT Response Team • East Central Iowa Council of Governments* • Solid waste and recycling*
Policies, Programs, and Plans	• Springville Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • 2004 Springville Comprehensive Plan* • Capital Improvement Program* • Coordinate with Duane Arnold Energy Center • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • Coordinate with Springville Community School District • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Walker Operations and Resources

Walker has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All city operations and resources were considered throughout the plan development process to ensure the city's final mitigation strategy is feasible. See Table 22.

Table 22: Walker Community Capabilities

Officials and Commissions	• Mayor* • City Council* • Planning and Zoning Commission/Board of Adjustment • Linn County Emergency Management Commission
Staff and Departments	• City Clerk* • Public Works* • Fire Department/Emergency Medical Service
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Fire protection and education • Emergency medical services • Maintain backup power generators in critical facilities • Vegetation and tree management in public areas • Maintain outdoor warning siren system and regular tests • Snow removal • City website and new resident newsletter
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Linn County HAZMAT Response Team • East Central Iowa Council of Governments* • Solid waste and recycling • Library services in Center Point
Policies, Programs, and Plans	• Walker Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • Coordinate with Duane Arnold Energy Center • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants* • Donations • Walker Betterment Club, Lions Club, Knights of Columbus, American Legion, and Fire Department Mutual Aid Society

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the city's mitigation strategy.

Center Point – Urbana Community School District Operations and Resources

The Center Point – Urbana Community School District has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All district operations and resources were considered throughout the plan development process to ensure the district's final mitigation strategy is feasible. Refer to Table 23.

Table 23: Center Point – Urbana Community School District Operations and Resources

Officials and Commissions	• Board of Education
Staff and Departments	• District Office • Athletic and Transportation Department • Food Service Department • Instructional Services Department
District Services	• Building maintenance and improvements • Grounds maintenance • Snow removal • Transportation
Contracted or Agreement Services	• Linn County Sheriff's Office • Local fire departments • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Solid waste and recycling
Policies, Programs, and Plans	• Emergency plans and drills • Coordinate with Duane Arnold Energy Center • Coordinate with Linn County Public Health
Financial Resources	• District budget* • Bonds • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the district's mitigation strategy.

College Community School District Operations and Resources

The College Community School District has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All district operations and resources were considered throughout the plan development process to ensure the district's final mitigation strategy is feasible. Refer to Table 24.

Table 24: College Community School District Operations and Resources

Officials and Commissions	• Board of Education
Staff and Departments	• District and Business Office* • Operations Department*
District Services	• Building maintenance and improvements • Grounds maintenance • Snow removal • Transportation • Food Service (daily capacity of 6,000 meals)
Contracted or Agreement Services	• Cedar Rapids Police Department • Cedar Rapids Fire Department • Linn County Emergency Management Agency* • Solid waste and recycling
Policies, Programs, and Plans	• Emergency plans and drills • Coordinate with the Duane Arnold Energy Center • Coordinate with Linn County Public Health
Financial Resources	• District budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the district's mitigation strategy.

Plan Goals

Purpose of Hazard Mitigation Planning Goals

Goals broadly define the desired outcomes of a plan. For all types of planning, goals are needed to guide the plan development process. In hazard mitigation planning, goals provide a basis for discussion and evaluation to ensure hazard mitigation strategies accurately reflect the planning area's priorities.

In Linn County, single and multi-jurisdictional hazard mitigation plans were prepared for ten jurisdictions prior to this plan. For these jurisdictions, goals in the existing plans were reviewed by the planning committee for relevance, and a set of example hazard mitigation planning goals were reviewed for reference. The planning committee was given the option of adopting existing goals or setting new goals for the plan. In jurisdictions without an existing plan, the planning committee was given a set of example hazard mitigation planning goals to use as an example for the goal setting process.

The example hazard mitigation planning goals were drafted based on the basic purpose of hazard mitigation planning. Overall, each goal is important, but protecting the health and safety of human is the primary focus. Protecting critical facilities and maintaining services is the secondary focus. Often, public education and cost efficiency are components of a mitigation strategy.

Example Hazard Mitigation Planning Goals

1. Protect the health and safety of residents (or students), visitors, staff, and emergency personnel (paid or volunteer) during and after hazard events.
2. Minimize losses to existing and future structures in hazard areas. Critical facilities are priority structures.
3. Maintain local services and infrastructure in order to reduce community, economic, and environmental disruption during and after hazard events.
4. Educate residents (or students) and visitors about local hazards and the resources available in the community.
5. Apply public funds to hazard mitigation projects in an efficient and fair manner to minimize dependence on state and federal resources.

Jurisdictions with Mutual Goals

Of the twenty jurisdictions participating in this plan, fourteen adopted the hazard mitigation planning goals that were used as an example during the goal setting process. Refer to Table 25 for the full list of jurisdictions. It should be noted that the difference in goals for the school districts is that students rather than residents are the primary focus of the goals.

Table 25: Jurisdictions with Mutual Goals

Jurisdiction
Alburnett
Bertram
Center Point
Central City
Coggon
Hiawatha
Marion
Palo
Prairieburg
Robins
Springville
Walker
Center Point – Urbana
College Community

For all jurisdictions, each goal is important, but protecting the health and safety of residents, visitors, staff, and emergency personnel is each jurisdiction's primary focus in this plan. Protecting critical facilities and maintaining services is each jurisdiction's secondary focus. Often, public education and efficiency are components of a mitigation strategy.

HAZARD MITIGATION PLANNING GOALS

1. Protect the health and safety of residents (or students), visitors, staff, and emergency personnel (paid or volunteer) during and after hazard events.
2. Minimize losses to existing and future structures in hazard areas. Critical facilities are priority structures.
3. Maintain local services and infrastructure in order to reduce community, economic, and environmental disruption during and after hazard events.
4. Educate residents (or students) and visitors about local hazards and the resources available in the community.
5. Apply public funds to hazard mitigation projects in an efficient and fair manner to minimize dependence on state and federal resources.

Jurisdictions with Alternative Goals

In this multi-jurisdictional plan, six of the twenty participating jurisdictions adopted alternative hazard mitigation planning goals. Refer to Table 26 for the full list of jurisdictions. Although the alternative goals are similar, the planning committees in these jurisdictions chose to emphasize certain local priorities or elements of hazard mitigation planning.

Table 26: Jurisdictions with Alternative Goals

Jurisdiction
Linn County
Cedar Rapids
Ely
Fairfax
Lisbon
Mount Vernon

The alternative goals adopted by jurisdictions are included in the following sections in this chapter of the plan. The circumstances of the goal setting process are also included to provide context. In a future plan update, a common set of goals among all participating jurisdictions is ideal in order to create opportunities for collaboration in the county.

Linn County Goals

In the goal setting process, the planning committee reviewed the goals in the county's existing hazard mitigation plan for relevance. In addition, the planning committee reviewed the hazard mitigation related goals in the county's comprehensive plan, *Linn County Comprehensive Plan 2013: A Smarter Course*. Due to similarities and desire to have consistent goals, the planning committee adopted the majority of the goals in the comprehensive plan.

LINN COUNTY HAZARD MITIGATION PLANNING GOALS

1. Reduce the risk of the loss of life, property, and economic activity as a result of the occurrence of hazards.
2. Increase the capacity of local government and residents to respond to the occurrence of hazards.
3. Increase the capacity of local government and residents to recover from the occurrence of hazards.

Each goal is important in Linn County, but reducing the risk of the loss of life is the county's primary focus in this plan. Protecting property and economic activity is the jurisdictions' secondary focus. Often, response and recovery are components of a mitigation strategy.

Cedar Rapids Goals

The planning committee reviewed the goals in the city's existing hazard mitigation plan for relevance and reviewed the example hazard mitigation planning goals for reference. Ultimately, the planning committee decided to adopt the existing hazard mitigation goals for this plan. The planning committee's preference was to incorporate all elements of emergency management, which includes response and recovery. Typically, hazard mitigation planning incorporates the preparedness and prevention elements of emergency management.

CEDAR RAPIDS HAZARD MITIGATION PLANNING GOALS

1. Minimize injuries and loss of life.
2. Reduce or eliminate damages due to hazards.
3. Manage operations with or without county, state, and federal assistance.
4. Return to pre-hazard event conditions in a timely and planned manner.

Overall, each goal is important in Cedar Rapids, but minimizing injuries and loss of life is the city's primary focus in this plan. Reducing or eliminating damage is the city's secondary focus. It should be noted, operations and recovery planning are typically handled in their respective planning processes within the city and region.

Ely Goals

The planning committee reviewed the goals in the city's existing hazard mitigation plan for relevance and reviewed the example hazard mitigation planning goals for reference. All example goals were adopted with the addition of one goal that emphasizes using available mitigation assistance.

ELY HAZARD MITIGATION PLANNING GOALS

1. Protect the health and safety of residents, visitors, staff, and emergency personnel (paid or volunteer) during and after hazard events.
2. Minimize losses to existing and future structures in hazard areas. Critical facilities are priority structures.
3. Maintain local services and infrastructure in order to reduce community, economic, and environmental disruption during and after hazard events.
4. Educate residents and visitors about local hazards and the resources available in the community.
5. Apply public funds to hazard mitigation projects in an efficient and fair manner to minimize dependence on state and federal resources.
6. Effectively use all forms of assistance available for mitigation hazards.

In Ely, each goal is important, but protecting the health and safety of residents, visitors, staff, and emergency personnel is the city's primary focus in this plan. Protecting critical facilities and maintaining services is the city's secondary focus. Often, public education and efficiency are components of a mitigation strategy.

Lisbon Goals

The planning committee reviewed the goals in the city's existing hazard mitigation plan for relevance and reviewed the example hazard mitigation planning goals for reference. Since the existing hazard mitigation plan for Lisbon was approved in 2013, which is only a year before the approval of this plan, the planning committee adopted the existing goals.

LISBON HAZARD MITIGATION PLANNING GOALS

1. Develop mitigation actions that can affect multiple hazards.
2. Develop mitigation actions that improve the quality of life for residents.
3. Develop mitigation actions that take steps to mitigate the consequences of hazards.
4. Identify funding sources for mitigation actions.
5. Protect the health of residents.
6. Ensure a return to pre-disaster conditions as soon as possible
7. Ensure compliance in the National Flood Insurance Program.

Each goal is important in Lisbon, but mitigating the consequences of hazards and protecting the health of residents is the city's primary focus in this plan. The remaining goals are a secondary focus for the city, or the goal is directly addressed in the plan development process, i.e. identify funding sources for mitigation actions.

Fairfax Goals

The planning committee reviewed the goals in the city's existing hazard mitigation plan for relevance and reviewed the example hazard mitigation planning goals for reference. All example goals were adopted with the addition of two goals from the city's existing plan. The planning committee's preference was to incorporate all elements of emergency management, which includes response and recovery. Typically, hazard mitigation planning incorporates the preparedness and prevention elements of emergency management.

FAIRFAX HAZARD MITIGATION PLANNING GOALS

1. Protect the health and safety of residents, visitors, staff, and emergency personnel (paid or volunteer) during and after hazard events.
2. Minimize losses to existing and future structures in hazard areas. Critical facilities are priority structures.
3. Maintain local services and infrastructure in order to reduce community, economic, and environmental disruption during and after hazard events.
4. Educate residents and visitors about local hazards and the resources available in the community.
5. Apply public funds to hazard mitigation projects in an efficient and fair manner to minimize dependence on state and federal resources.
6. Plan response operations with or without county, state, or federal assistance.
7. Return to pre-hazard event conditions in a timely and planned manner.

In Fairfax, each goal is important, but protecting the health and safety of residents, visitors, staff, and emergency personnel is the city's primary focus in this plan. Protecting critical facilities and maintaining services is the city's secondary focus. Often, public education and efficiency are components of a mitigation strategy. It should be noted, operations and recovery planning are typically handled in their respective planning processes within the city and region.

Mount Vernon Goals

The planning committee reviewed the goals in the city's existing hazard mitigation plan for relevance and reviewed the example hazard mitigation planning goals for reference. Since the existing hazard mitigation plan for Mount Vernon was approved in 2013, which is only a year before the approval of this plan, the planning committee adopted the existing goals.

MOUNT VERNON HAZARD MITIGATION PLANNING GOALS

1. Develop mitigation actions that can affect multiple hazards.
2. Develop mitigation actions that improve the quality of life for residents.
3. Develop mitigation actions that take steps to mitigate the consequences of hazards.
4. Identify funding sources for mitigation actions.
5. Protect the health of residents.
6. Ensure a return to pre-disaster conditions as soon as possible
7. Ensure compliance in the National Flood Insurance Program.

Each goal is important in Mount Vernon, but mitigating the consequences of hazards and protecting the health of residents is the city's primary focus in this plan. The remaining goals are a secondary focus for the city, or the goal is directly addressed in the plan development process, i.e. identify funding sources for mitigation actions.

Risk Assessment

Purpose of a Hazard Risk Assessment

In hazard mitigation planning, a risk assessment identifies what hazards can occur in a planning area, how hazards can impact a planning area, and level of priority hazards are given in a mitigation strategy. Overall, a risk assessment provides the necessary foundation for determining effective programs and projects to reduce the potential impacts of hazards.

For Linn County, a risk assessment was completed in a basic three step process. First hazards that can occur in the planning area at some point in the future were identified. Second, possible impacts of each hazard were identified. And finally, based on historical occurrences, potential severity, and local knowledge, a priority level was assigned to each hazard.

For jurisdictions with an existing hazard mitigation plan, the risk assessment from the existing plan was reviewed along with the current countywide risk assessment for the plan. The jurisdictions with an existing plan include Linn County, Cedar Rapids, Coggon, Ely, Fairfax, Hiawatha, Marion, Mount Vernon, and Palo. For each of these jurisdictions, differences in the risk assessment from the existing plan to this plan are identified.

Risk Assessment Process

1. Hazard Identification
2. Hazard Impact Assessment
3. Hazard Prioritization

Dam on the Wapsipinicon River in Central City
Photo Source: Plan Author

Hazard Identification

In the 2013 Iowa Hazard Mitigation Plan, a statewide risk assessment identifies a broad spectrum of hazards that can occur in the state at some point in the future. The spectrum includes natural, technological, and human caused hazards. For Linn County, all hazards in the statewide plan are included in the risk assessment in order to prepare as complete a mitigation strategy as possible. As is the case statewide, variations in where hazards can occur within Linn County exist so detailed profiles for each hazard are prepared to reflect these variations. All hazards included in Linn County's risk assessment are listed below.

Natural Hazards

- Animal, Plant, Crop Disease
- Drought
- Earthquake
- Expansive Soils
- Extreme Heat
- Flash Flood
- Grass and Wildland Fire
- Human Disease
- Landslide
- River Flood
- Severe Winter Storm
- Sinkholes
- Thunderstorm, Lightning, and Hail
- Tornado and Windstorm

Technological Hazards

- Infrastructure Failure
- Transportation Incident
- Hazardous Materials Incident
- Levee and Dam Failure
- Radiological Incident

Human Caused Hazards

- Terrorism

Natural Hazard

A natural hazard is an event occurring due to climate, geology, or hydrology that will negatively impact people or the environment.

Technological Hazard

A technological hazard is an event involving a man-made structure, equipment, or substances that will negatively impact people or the environment.

Human Caused Hazard

A human caused hazard is an event occurring due to intentional human actions that will negatively impact people or the environment.

Hazard Impact Assessment

To understand the potential impact of hazards that can occur in Linn County, profiles were prepared using historical data, existing hazard mitigation plans, local knowledge, and the risk assessment criteria in the 2013 Iowa Hazard Mitigation Plan. Hazard profiles include a hazard description, historical occurrences, probability of future occurrence, potential magnitude and severity, amount of warning time available, and the typical duration. In addition, the hazard profile identifies the potential hazard area. Although Linn County is a geographically small portion of Iowa, there are variations, sometimes large, in where hazards are likely to occur. For this risk assessment, hazards are categorized as countywide hazards or local hazards.

Countywide Hazards

- Drought
- Earthquake
- Extreme Heat
- Hazardous Materials Incident
- Human Disease
- Infrastructure Failure
- Severe Winter Storm
- Thunderstorm, Lightning, and Hail
- Terrorism
- Tornado and Windstorm
- Transportation Incident
- Radiological Incident

Countywide Hazards

A countywide hazard has a relatively equal chance of affecting each jurisdiction. The potential hazard area is identified as the entire county rather than a specific area. An example is a tornado, which can occur in any community in the planning area.

Or, a countywide hazard is a widespread event that affects the entire county when it occurs. The potential hazard area would be identified as the entire county. Drought is an example because the entire county is usually affected by the dry conditions.

Local Hazards

- Animal, Plant, Crop Disease
- Dam and Levee Failure
- Expansive Soils
- Flash Flood
- Grass and Wildland Fire
- Landslide
- River Flood
- Sinkholes

Local Hazards

A local hazard is not applicable to the entire county because environmental factors such as geology, hydrology, or local infrastructure and industries vary. Rather than the entire county, the potential hazard area is identified as specific areas of the county. Flooding is an example because certain communities are located near a body of water or stormwater infrastructure may not have adequate capacity.

Animal, Plant, Crop Disease

DEFINITION OF HAZARD

This natural hazard is an outbreak of disease or infestation that can be transmitted from animal to animal or plant to plant. The outbreak may have an adverse effect on human health, significant economic implications, cause significant crop production losses, and/or significant environmental damage.

Potential Hazard Area

The potential hazard area for the animal, plant, and crop disease hazard is primarily rural or recreation areas throughout the county, although this hazard can affect urban areas.

Historical Occurrences

In Iowa, there are several major reportable animal diseases, and some include the Avian Flu, Bovine Spongiform Encephalopathy (BSE or Mad Cow Disease), Chronic Wasting Disease, Exotic Newcastle Disease, Foot and Mouth Disease, Johne's disease, Pseudorabies, Scrapie, and West Nile Virus. Reports from the Iowa Department of Agriculture and Land Stewardship (IDALS) and the Center for Food Security and Public Health at Iowa State University indicate minimal or no recent cases of most reportable animal diseases in Iowa.

In the past decade, cases of Scrapie, which affects sheep, has significantly decreased. Since 2012, three areas in Iowa have confirmed cases of Chronic Wasting Disease in captive White Tail Deer. Across Iowa, cases of West Nile Virus in horses have increased to 26 confirmed cases in 2012. There were no cases of West Nile Virus reported in Linn County, but there were seven confirmed cases in surrounding counties. In addition, there were 31 confirmed cases of rabies in Iowa in 2012. There were no confirmed cases in Linn County, and there were only two confirmed cases in eastern Iowa counties.

Plant disease and infestations occur throughout Iowa, but most cases are relatively isolated and have not reached an outbreak level. For Iowa's major crops, chemical and non-chemical methods are used to prevent and manage disease and infestations. Reports from Iowa State University Extension and Outreach have confirmed cases of historically uncommon crop diseases like Physoderma, which is a fungus that can cause corn stalks to break, and a bacterium that can destroy a corn plant referred to as Goss's wilt. Disease affecting seedlings in corn and soybean crops were reported in 2013, primarily in southeast Iowa. In addition, pest populations that are resistant to genetic modification and chemical management methods have been confirmed across Iowa.

As for Iowa's landscape, a major concern is the Emerald Ash Borer, which is a beetle that infests ash trees. In early 2014, the presence of the borer was confirmed in eastern Iowa. Cedar County, which borders southeast Linn County, is one of the counties with a confirmed case of the insect. A statewide quarantine is in place to prevent the spread of the insect to other states. Iowans are discouraged from transporting fire wood to other counties in the state to prevent a statewide infestation.

Probability

Minimal historical occurrences indicate that an animal, plant, or crop disease will not likely become a major outbreak in Linn County. According to the *2013 Iowa Hazard Mitigation Plan*, the probability of an outbreak in Iowa is also unlikely. Considering recent reports of Emerald Ash Borer in Iowa, and especially in nearby Cedar County, it is possible an outbreak could occur in Linn County.

Magnitude and Severity

If a major outbreak of an animal, plant, or crop disease were to occur in Linn County, areas beyond the county could potentially be impacted. If animals are affected, a major disease could significantly limit or eliminate the ability to move, slaughter, and export animals and animal products, which could result in a shutdown of facilities. A major disease outbreak could have widespread public health and economic impacts in Iowa, the nation, and potentially the world. If crops and plants are affected there could be similar impacts to public health and industries associated with crops. For some disease and infestations, there could also be major environmental damage.

Warning Time

Animals and plants that are infected with a disease or pests can transmit the disease or pest before the issue is realized. Iowa would only have warning time if an event occurred in another state or region.

Duration

Response and recovery from a major disease or infestation is lengthy, with some producers potentially unable to sustain operation. In addition, diseases and infestations can reoccur, causing repeated losses.

Drought

DEFINITION OF HAZARD

Drought is a prolonged lack of precipitation that produces severe dry conditions. Four types of drought conditions are relevant in Iowa: meteorological drought, hydrological drought, agricultural drought, and socioeconomic drought. A meteorological drought is a lack of precipitation. A hydrological drought is a decline in surface and groundwater. An agricultural drought is a lack of moisture in soil, and a socioeconomic drought is a shortage of water that affects people's daily usage.

Potential Hazard Area

The potential hazard area for drought in Linn County is countywide due to the widespread nature of this hazard. Typically, rural areas Linn County are more severely impacted by this hazard.

Historical Occurrences

Since 2003, Linn County experienced four major periods of drought recorded over several months. In total, the reported crop damage was over $21 million. The majority of crop damage, nearly $15 million, occurred in August 2003, which is a prime month in Iowa's growing season. The remainder of crop damage was reported during the growing season in 2005. Refer to Table 27.

Table 27: Linn County Drought Events 2003 - 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	08/01/2003	0	0	0	$14.88 million
LINN (ZONE)	07/01/2005	0	0	0	$4.56 million
LINN (ZONE)	08/01/2005	0	0	0	$1.97 million
LINN (ZONE)	09/01/2005	0	0	0	0
LINN (ZONE)	10/01/2005	0	0	0	0
LINN (ZONE)	11/01/2005	0	0	0	0
LINN (ZONE)	12/01/2005	0	0	0	0
LINN (ZONE)	01/01/2006	0	0	0	0
LINN (ZONE)	07/10/2012	0	0	0	0
LINN (ZONE)	08/07/2012	0	0	0	0
LINN (ZONE)	11/01/2012	0	0	0	0
LINN (ZONE)	09/10/2013	0	0	0	0
LINN (ZONE)	10/01/2013	0	0	0	0
Total	4 major periods	0	0	0	$ 21.41 million

Source: National Climatic Data Center, January 2014

After August 2005, there is no reported crop damage in Linn County due to drought conditions. Aside from the recorded period of drought in 2012, all drought conditions were recorded in months outside of Iowa's prime growing season. The most recent drought conditions in Linn County were reported in October 2013.

Probability

Based on the major periods of drought, the probability estimate for drought conditions occurring in Linn County is between 20% and 30% in any given year. Multiple short-term drought conditions or long-term drought conditions could occur in Linn County, Iowa, and the Midwest region of the United States. Overall, the probability estimate is based on historical occurrences, the *2013 Iowa Hazard Mitigation Plan*, and local knowledge in Linn County.

Magnitude and Severity

Droughts are typically widespread, affecting a large area. If a drought occurs in Linn County, it is likely most of eastern Iowa or even the entire Midwest United States is experiencing drought conditions. Local conditions, typically intensity, vary during a widespread drought.

People are vulnerable during a drought if water supplies are significantly reduced, but typically there are secondary sources of water that can prevent negative health impacts due to lack of water. Most often, people are affected by higher food prices during and after major periods of drought. Wildlife and livestock are more likely to be vulnerable during a drought when there is a limited supply of water.

The agricultural sector of the economy, especially in Iowa, would be impacted if widespread and long-term drought conditions were to occur. Due to reliance on precipitation and water supply for irrigation, crops are extremely vulnerable. Most often, rural areas experience the majority of negative impacts.

A long-term, severe drought can decrease stream flow and water table levels, which can limit the amount of water available to residents. In certain circumstances, it may be necessary to place restrictions on industries that use large amounts of water.

Fire suppression may be challenging during drought conditions due to dry vegetation and limited water supply. The majority of property losses would likely be livestock and crops. On the other hand, infrastructure can be affected due to drying soils and low water levels around dams.

In Linn County, widespread drought conditions could severely damage 10% of property, primarily crops. Although the potential magnitude and severity of drought conditions would be considered negligible countywide, the direct impacts on rural areas may be critical. If drought conditions were severe enough to significantly reduce water supply, urban areas in Linn County could be directly impacted.

Warning Time

Drought warning is directly related to the ability to predict conditions that produce drought, primarily precipitation and temperature. There are many variables, and it is difficult to predict a drought in advance. An area may already be in a drought before it is recognized. While drought warning may not come until the drought is already occurring, the secondary effects may be predicted weeks in advance.

Duration

Drought conditions are part of normal climate fluctuations in the United States. According to Iowa and Linn County's drought history, most drought events affect the state for a period of a few months. But, climate variability can cause drought conditions for a period of a year and more.

Earthquake

Definition of Hazard

An earthquake is sudden shaking or vibration of the earth that may impose a direct threat to life and property. The shaking or vibration is caused by the breaking and shifting of rock beneath the earth's surface. The three general classes of earthquakes are, tectonic, volcanic, and artificially produced.

There are two common scales for categorizing the magnitude of an earthquake, the Richter Scale and the Modified Mercalli Intensity Scale. The Richter Scale uses a logarithmic scale and the Mercalli Intensity Scale uses a Roman numeral scale.

Richter Scale vs. Mercalli Intensity Scale

Richter Scale	Mercalli Intensity	Description
Less than 2.0	I	Micro
2.0–2.9	I to II	Minor
3.0–3.9	II to IV	
4.0–4.9	IV to VI	Light
5.0–5.9	VI to VIII	Moderate
6.0–6.9	VII to X	Strong
7.0–7.9	VIII or greater	Major
8.0–8.9		Great
9.0 and greater		

Potential Hazard Area

The potential hazard area for an earthquake in Linn County is countywide.

Historical Occurrences

According to the Iowa Geological and Water Survey, twelve earthquakes with epicenters in Iowa have been reported. The first reported earthquake occurred in 1867 near Sidney in southwest Iowa. The most recent earthquake occurred in 1948 near Oxford, which is approximately 20 miles south of Linn County. The most severe earthquake occurred near Davenport in southeast Iowa in 1934, but there was only minor damage reported. None of these events were instrumentally recorded.

Other earthquakes, with an epicenter outside of Iowa, have mildly affected the state. According to the United States Geological Service, the earliest reported earthquakes that were felt in Iowa occurred in 1811 and 1812 and originated in the New Madrid Seismic Zone. Other earthquakes originating in Illinois and Missouri have been felt in Iowa, and each event has resulted in minimal or no damage.

Probability

Iowa is located in low risk earthquake zones, Seismic Zones 0 and 1, which indicates a low probability of a major earthquake affecting the state. Iowa is northwest of the New Madrid Seismic Zone, which has the potential to produce large earthquakes that can impact the state including Linn County. Based on recurrence intervals for small earthquakes, scientists estimate a 90% chance of a Richter magnitude 6.0 earthquake in the New Madrid Seismic Zone by 2040, which may likely be the next earthquake to affect Linn County. It should be noted, a 5.2 magnitude earthquake occurred in April 2008.

Magnitude and Severity

In the past, earthquakes with an epicenter in Iowa have not had a major impact in Linn County. Assuming low magnitude earthquakes will continue to occur in Iowa, impacts will likely be minor in Linn County, if any. Earthquakes that originate outside of Iowa could potentially impact the state and Linn County. Estimated effects of a Richter scale 6.5 magnitude earthquake along the New Madrid Seismic Zone suggest that southern Iowa could experience impacts as severe as trembling buildings, some broken dishes and cracked windows. For most areas, impacts will be vibrations similar to the passing of a heavy truck like rattling of dishes, creaking walls, and swinging of suspended objects. The impacts of an earthquake originating in the New Madrid Seismic Zone would likely be minor in Linn County, if any.

Warning Time

Earthquake forecasting is an inexact science. Even in areas that are well monitored, scientists rarely predict earthquakes. Realistically, there is minimal or no warning before an earthquake in Linn County.

Duration

An earthquake occurs in just a few seconds, but a community can be affected for hours, weeks, and even years after the event. Due to an overall low risk, an earthquake event would likely impact Linn County for just a few hours.

Expansive Soils

DEFINITION OF HAZARD

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.

Potential Hazard Area

The potential hazard areas include areas of the county with high clay content soil. Refer to the risk assessment maps.

Historical Occurrences

There are no documented expansive soil events for the state or Linn County. The availability of data on expansive soils varies across the United States. Clay content information is available but the presence of high clay content does not necessarily indicate expansive soils.

Probability

Based on a lack of historical occurrences in the state and Linn County, the probability of a major expansive soils event is unlikely but is possible based on the presence of high clay content soils throughout the county.

Magnitude and Severity

Expansive soils events have minimal, if any, direct impacts on humans. Impacts commonly involve swelling clays beneath areas covered by buildings, slabs of concrete, and/or asphalt. The most extensive damage from expansive soils occurs to highways and streets.

Houses and one-story commercial buildings are more susceptible to being damaged from expansive soils than multi-story buildings, which are usually heavy enough to counter swelling pressure. Common damage to buildings including sticking doors, uneven floors, and cracked foundations, floors, walls, ceilings, and windows.

Warning Time

The warning time for expansive soils is consistent with other geologic hazards, which occur slowly over time. Often times, expansive soils are realized after damage occurs.

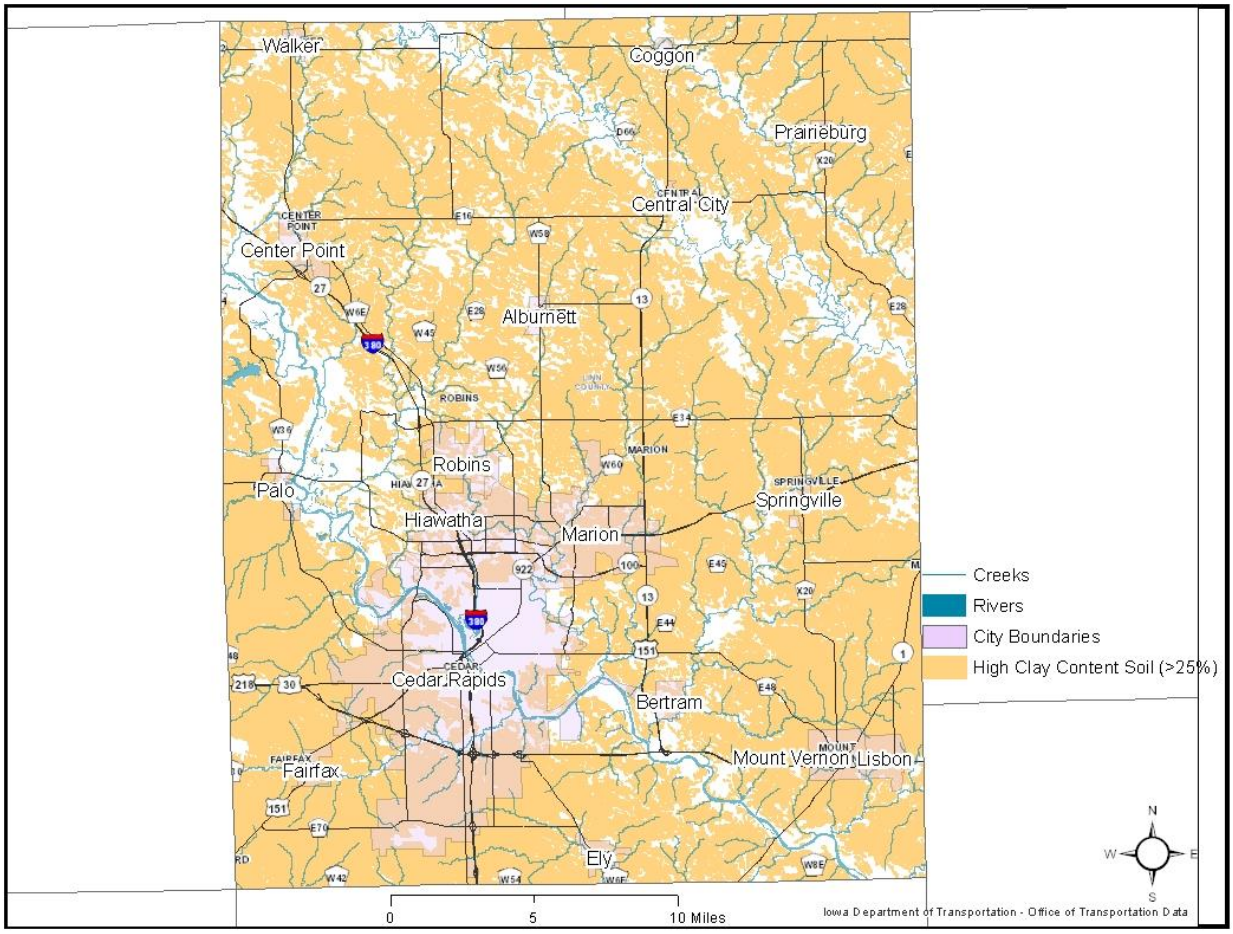
Duration

The response to expansive soils is limited in Iowa with the most severe cases resulting in washed out roads. Response to expansive soils in Iowa is usually coupled with response to river and flash flood events.

Risk Assessment Maps

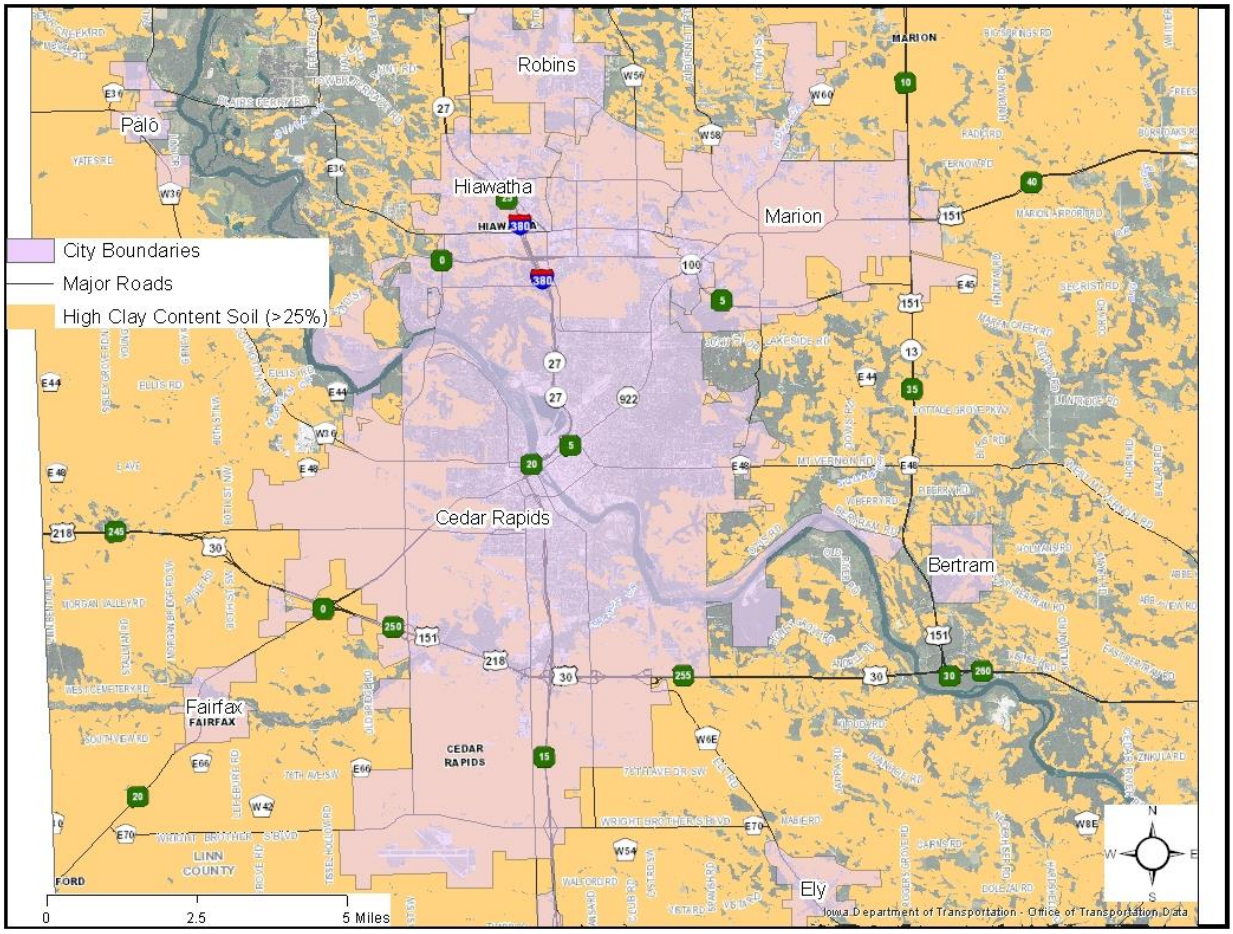
High clay content soils are used as an indicator of potential expansive soils risk. The risk assessment maps for expansive soils show the areas in Linn County with soils composed of 25% or greater clay soil. The maps are based on the most recent information available from the Iowa Department of Natural Resources. Refer to Figures 4 – 8.

Figure 4: Linn County High Clay Content Soil



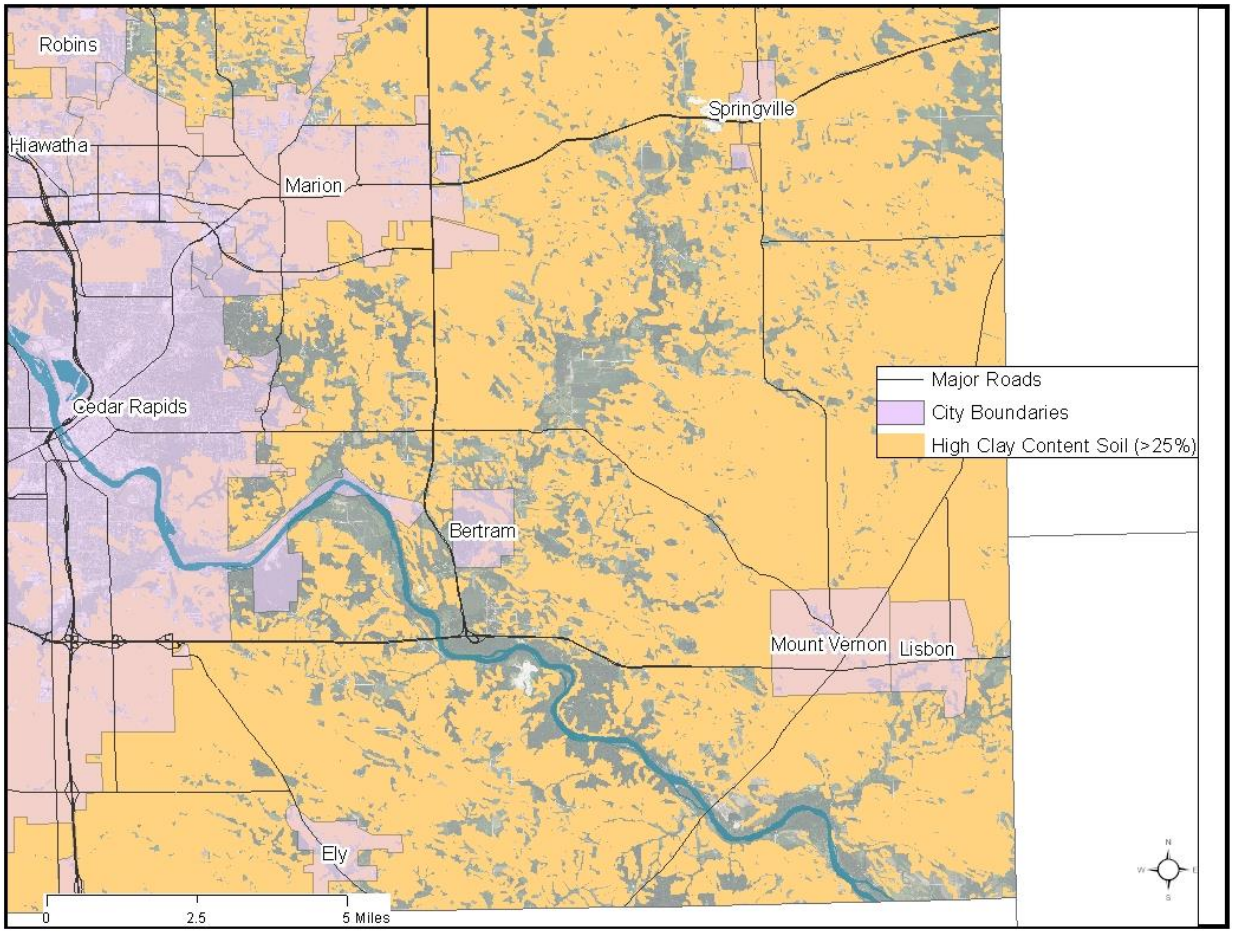
Date Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Figure 5: Cedar Rapids Metropolitan Area High Clay Content Soil



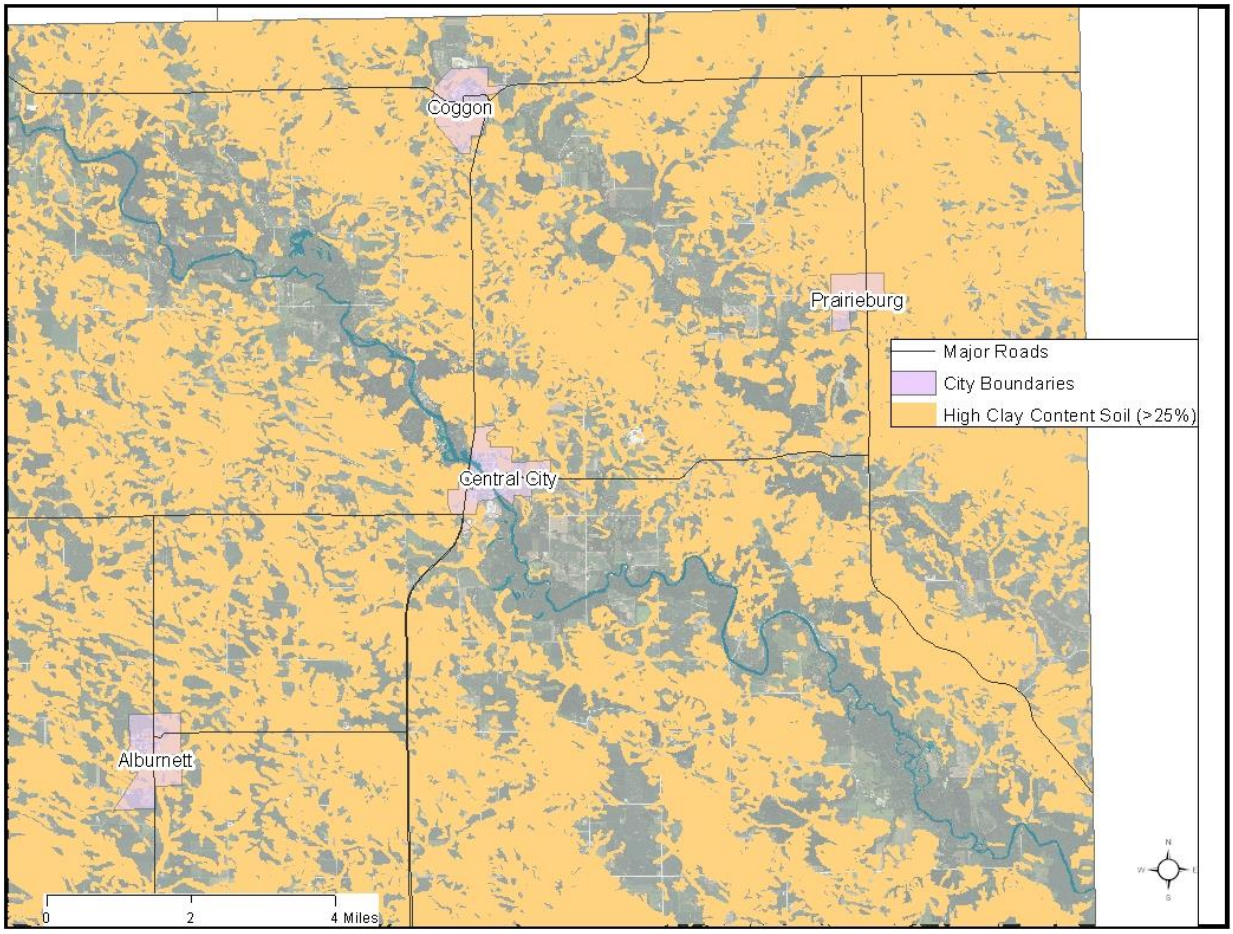
Date Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Figure 6: Southeast Linn County High Clay Content Soil



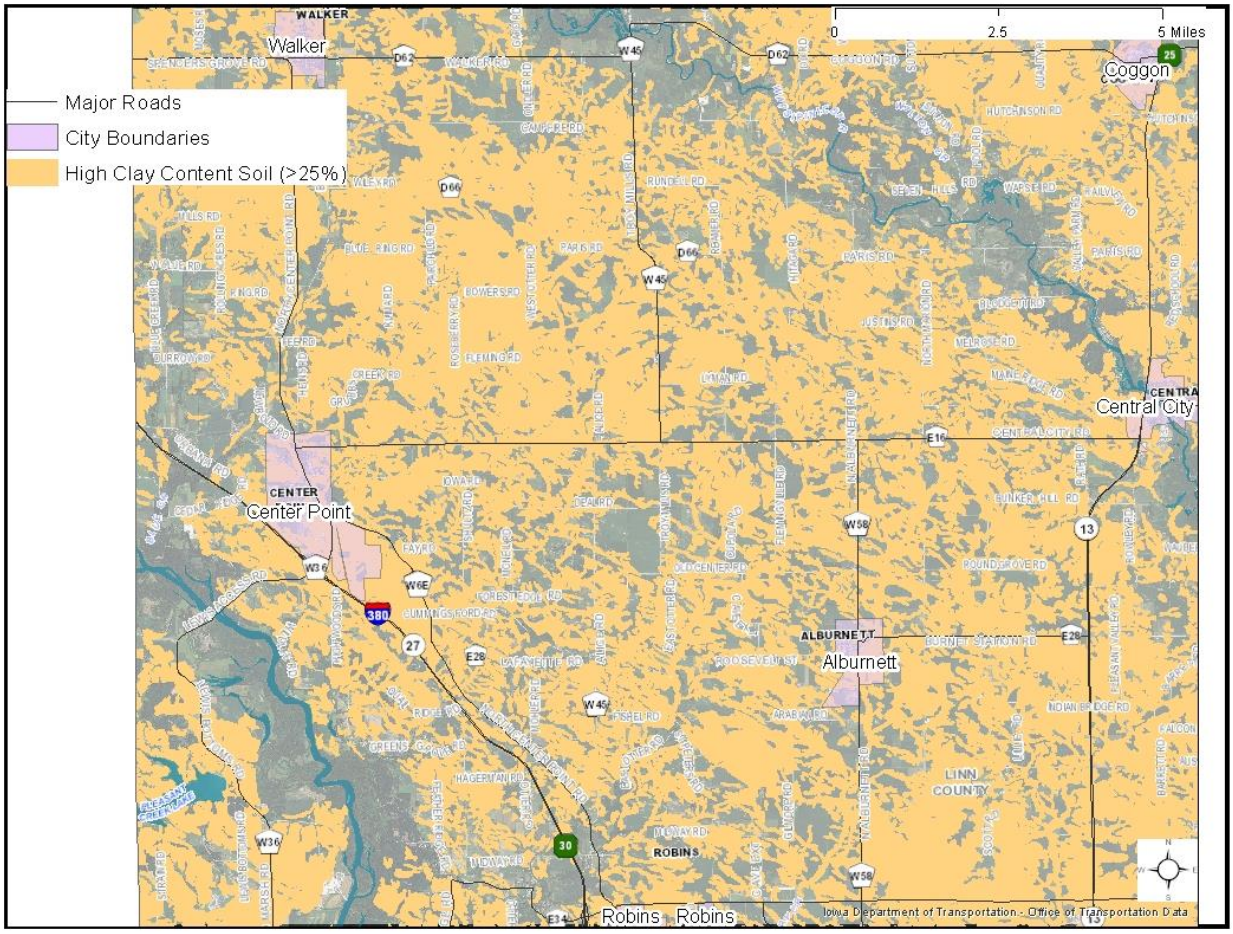
Date Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Figure 7: Northeast Linn County High Clay Content Soil



Date Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Figure 8: Northwest Linn County High Clay Content Soil



Date Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Extreme Heat

DEFINITION OF HAZARD

Extreme heat is a temperature hotter or more humid than average for a location at that time of year. This includes three successive days of 90+ degrees Fahrenheit or one day with a temperature or heat index in excess of 100 degrees Fahrenheit.

Potential Hazard Area

The potential hazard area for an extreme heat event in Linn County is countywide.

Historical Occurrences

Since 1996, Linn County has experienced four heat events. Refer to Table 27.1. As defined by the National Climatic Data Center (NCDC), a heat event is whenever heat index values meet or exceed locally established advisory thresholds. A heat event, as defined by the NCDC, does not fully meet the description of an extreme heat event in Iowa, but data from the NCDC is the most comprehensive data available.

Table 27.1: Linn County Heat and Excessive Heat Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	07/25/1997	0	0	0	0
LINN (ZONE)	07/19/1999	0	0	0	0
LINN (ZONE)	07/04/2012	0	0	0	0
LINN (ZONE)	08/26/2013	0	0	0	0
Total	4 events	0	0	0	0

Source: National Climatic Data Center, January 2014

Among all occurrences, there were no reported deaths, injuries, property damage, or crop damage. Refer to Table 27.1.

Probability

Historical occurrences indicate that extreme heat events are occasional in Linn County. But, local experience and the potential for higher than normal temperatures due to climate change may increase the likelihood of an extreme heat event occurring in the state and Linn County. The probability is likely for an extreme heat event to occur in Linn County.

Magnitude and Severity

An extreme heat event typically affects a large geographic area, sometimes as large as an entire region in the United States. If an extreme heat even were to occur in Linn County, the entire county and beyond would likely be impacted.

Humans, outdoor pets, and livestock are vulnerable during extreme heat events. Heatstroke, sunstroke, cramps, exhaustion, and fatigue can be caused by prolonged heat exposure and/or physical activity. Certain groups of people like the young, elderly, and outdoor workers are especially vulnerable to extreme heat events.

In urban areas, the heat island effect and air stagnation can exacerbate the already dangerous conditions for humans and animals during an extreme heat event. In Linn County, the Cedar Rapids metropolitan area is the most urban and dense area. In rural areas, which is the majority of Linn County, livestock loss and reduced crop yields can occur in extreme heat events. Throughout the county, extreme heat events can damage buildings and infrastructure, which can result in shutdown of facilities for an extended period of time. Based on historical occurrences, the magnitude and severity of an extreme heat event in Linn County would likely be negligible although the impacts could be more severe.

Warning Time

Extreme heat events are predictable within a few degrees approximately three days before the event may occur. Variations in local conditions can affect the actual temperature within a matter of hours or even minutes so warning time may be less. With as much warning time as possible, the National Weather Service will initiate alert procedures when the heat index is expected to exceed 105 degrees for at least two consecutive days.

Duration

By definition an extreme heat event is three consecutive days with a 90+ degree Fahrenheit temperature or one day with a 100+ degree Fahrenheit temperature or heat index. Based on past extreme heat events in the state and Linn County, an event can last a week or longer.

Flood

Definition of Hazard

In a flash flood event, water levels rise at an extremely fast rate with minimal to no warning. Common causes include heavy precipitation over a short period of time, rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces like pavement.

In a river flood event, water levels of a tributary or body of water exceed capacity and cover adjacent land that is not typically covered by water. In this plan, flooding of creeks and other water bodies is included in this hazard.

Potential Hazard Area

The potential hazard areas for a flood is generally the areas designated as a floodplain by the Federal Emergency Management Agency. Refer to the risk assessment maps. It should be noted that flooding is not limited to designated floodplains because uncommon climate conditions and changes in development patterns can affect what areas ultimately experience water inundation.

Flash flooding can occur in any area of Linn County. Certain areas have a greater potential to be affected due to factors such as low elevation, nearby waterways, insufficient storm water management, intense urban or agricultural development, etc. All jurisdictions in the planning area have identified at least minor flash flood issues, but most have persistent issues due to insufficient storm water management.

Historical Occurrences

Since 1996, there have been 30 documented flash flood events throughout Linn County. Refer to Table 28. It should be noted, the National Climatic Data Center (NCDC) identifies the area where a flash flood event began in Linn County and not necessarily the only areas of the county impacted by the event.

Table 28: Linn County Flash Flood Events 1996 - 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
COUNTYWIDE	02/20/1997	0	0	0	0
CEDAR RAPIDS	06/11/1999	0	0	0	0
CEDAR RAPIDS	06/04/2002	0	0	0	0
NORTHEAST PORTION		0	0	0	0
SPRINGVILLE		0	0	0	0
ROBINS		0	0	0	0
CEDAR RAPIDS	05/17/2004	0	0	$10,000	0
MARION	05/21/2004	0	0	$10,000	0
MARION	05/22/2004	0	0	$10,000	0
COGGON	04/02/2007	0	0	0	0

Table 28 (cont.): Linn County Flash Flood Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS	06/22/2007	0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS	07/16/2007	0	0	$1,000	0
CEDAR RAPIDS	04/25/2008	0	0	0	0
COVINGTON	06/05/2008	0	0	0	0
CENTER PT	06/08/2008	0	0	0	0
MIDWAY	06/12/2008	0	0	0	0
ELY	07/02/2008	0	0	$15,000	0
CEDAR RAPIDS AIRPARK	07/24/2009	0	0	0	0
HIAWATHA	08/26/2009	0	0	0	0
COGGON	08/27/2009	0	0	$500,000	0
PALO	06/15/2010	0	0	$5,000	0
CENTER PT		0	0	$10,000	0
PALO	06/18/2010	0	0	0	0
MARION MC BRIDE ARPT	07/12/2010	0	0	0	0
CEDAR RAPIDS	06/10/2011	0	0	0	0
CEDAR RAPIDS	08/04/2012	0	0	0	0
WALKER	04/17/2013	0	0	$250,000	0
WALKER	05/29/2013	0	0	0	0
CENTRAL CITY	06/26/2013	0	0	0	0
Total	30 events	0	0	$811,000	0

Source: National Climatic Data Center, January 2014

For the reported flash flood events, there were no deaths or injuries, but there was over $800,000 in property damage reported. Of all property damage, $500,000 occurred during one flash flood event that began near Coggon in August 2009. Another flash flood event began near Walker in June 2013, which resulted in $250,000 in property damage. Other flash flood events with reported property damage had totals of $15,000 or less.

In Linn County, 22 river flood events have occurred since 1996, but the flood event that began near Center Point on the Cedar River in 2008 caused at least $750 million in property damage. Refer to Table 29. The record crest on the Cedar River in Cedar Rapids occurred on June 13, 2008 at 31.12 feet, and flood stage is 12 feet. Residential, commercial, and industrial areas along the river were severely damaged.

Flooding also forced the closure of major travel routes in eastern Iowa including Interstate 80 and Interstate 380. A section of Interstate 80 between Iowa City and Davenport was closed, and the designated detour added over 100 miles to the regular travel route. Flooding from Coralville Lake, which is south of Linn County, resulted in the closure of I-380 between Interchange 4 and 10. This section of Interstate 380 is between the Cedar Rapids and Iowa City metropolitan area, which is a heavily traveled route.

Table 29: Linn County River Flood Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	05/09/1996	0	0	0	0
CEDAR RAPIDS	06/14/1998	0	0	$2,000	0
COUNTYWIDE	10/14/1998	0	0	0	0
LINN (ZONE)	05/17/1999	0	0	0	0
CEDAR RAPIDS	06/11/1999	0	0	0	0
HIAWATHA		0	0	0	0
CEDAR RAPIDS	06/12/1999	0	0	0	0
LINN (ZONE)	07/23/1999	0	0	0	0
LINN (ZONE)	06/01/2000	0	0	0	0
CEDAR RAPIDS		0	0	0	0
COUNTYWIDE	02/24/2001	0	0	0	0
LINN (ZONE)	04/15/2001	0	0	0	0
CEDAR RAPIDS	05/10/2001	0	0	0	0
CEDAR RAPIDS	10/22/2001	0	0	0	0
CEDAR RAPIDS	07/11/2002	0	0	0	0
COUNTYWIDE	08/12/2002	0	0	0	0
LINN (ZONE)	05/24/2004	0	0	0	0
LINN (ZONE)	06/03/2004	0	0	0	0
CEDAR RAPIDS	04/01/2008	0	0	0	0
CENTER PT	06/01/2008	0	0	$750 million	0
HIAWATHA	05/30/2013	0	0	0	0
COVINGTON	06/01/2013	0	0	0	0
Total	22 events	0	0	$750.002 million	0

Source: National Climatic Data Center, January 2014

Before 1996, the most recent severe flood event in Linn County occurred in 1993. The widespread flooding throughout Iowa and the Midwest United States is commonly called the Great Flood of 1993. The Cedar River crested at 19.83 feet and severely flooded areas of downtown Cedar Rapids. Other notable flood events in Linn County include a flood event in 1851 that set the prior record crest for the Cedar River, which is 20 feet.

Flooding is a persistent natural hazard in Linn County causing millions of dollars in property damage. In certain areas of the county, several properties have been damaged by multiple flood events. These properties are considered repetitive flood loss properties. The technical definition for a repetitive flood loss property, as defined by the National Flood Insurance Program, is a property that has received two or more claim payments of more than $1,000 within a ten year period.

In Linn County, there are 31 repetitive loss properties. Five of the properties are commercial and the remainder is residential property. Refer to Table 30 for a breakdown of the jurisdiction where these properties are general located. Due to privacy restrictions, the exact location is not available.

Table 30: Repetitive Loss Properties by Jurisdiction

Jurisdiction	Properties
Linn County	8 residential
Cedar Rapids	7 residential 4 commercial
Central City	4 residential
Coggon	1 residential
Marion	2 residential
Palo	2 residential
Robins	1 commercial
Walker	2 residential
Total	31 properties

Source: Iowa Homeland Security, January 2014

Repetitive loss properties are a concern, not only because the residents who live in these structures are exposed to the negative impacts of flood multiple times, but because these properties are a significant draw on the funds available in the National Flood Insurance Program.

Probability

Historical occurrences indicate that flash flood events can occur nearly annually in Linn County. Since 2007, multiple flash flood events have occurred each year in Linn County. When considering probability, though, the local planning committees considered the probability of the severe flash flood events that could cause injury, death, or shutdown of facilities. Minor flash floods occur frequently and most jurisdictions have procedures to mitigate injury, death, or damage from these events. Based on local knowledge, the probability is likely that a major flash flood event will occur in Linn County. This is between 20% and 30% in any given year. For river flood events, the estimated probability is highly likely, which is more than 33% in any given year. The probability estimate for flood hazards in Linn County is based on historical occurrences and local knowledge.

Magnitude and Severity

With flood hazard mapping from multiple sources, vulnerability of life and property to river flooding is well identified in Linn County. The Federal Emergency Management Agency (FEMA) has delineated the probable extent of the 100-year flood hazard areas in Linn County. These maps are Flood Insurance Rate Maps (FIRMs), which show properties that have 1% chance in any given year to be affected by floods. For the designated floodplain in Linn County, refer to the risk assessment maps.

In addition to current FIRMs, the Iowa Flood Center, Iowa Department of Natural Resources (IDNR), and FEMA partnered to develop the Iowa Flood Information System (IFIS). The IFIS is a web interface with interactive flood mapping and forecasting features that can be used to understand potential flood risk. To explore the information available for Linn County, visit the Iowa Flood Information System at the following website: http://ifis.iowafloodcenter.org/ifis/en/. In the future, more detailed flood risk information will be provided through the RiskMap program, which is partnership between FEMA and IDNR to provide watershed based information and solutions.

A flash flood event can impact areas far from a tributary or body of water. Streets can become swift moving rivers, and basements can become deathtraps because flash floods can fill them with water in minutes. Nearly half of all flash flood fatalities are auto-related. Motorists often try to traverse water-covered roads and bridges and are swept away by the current. Recreational vehicles and mobile homes located in low-lying areas can also be swept away by the water.

Buildings, infrastructure, and land can be eroded, extensively damaged, or completely destroyed in a flood event. Disruption or complete shutdown of essential facilities and services like major travel routes, water distribution, and wastewater treatment facilities often occurs during severe flood events. Depending on severity, overall disruption may occur just a few hours causing minor inconveniences or up to months causing major environmental and economic impacts in the county and state.

Potential impacts of flooding include injury and loss of life. River flooding does not have as high of risk to human as does flash flooding mostly because of the slow onset of river flooding. People in a flood zone, downstream from a dam or levee, or in low-lying areas are especially vulnerable in any type of flood event. In addition, people located in areas with narrow stream channels, saturated soil, or on land with large amounts of impermeable surfaces are likely to be impacted in the event of a significant rainfall.

Warning Time

Flash floods are somewhat unpredictable, but there are factors that can indicate the likelihood of a flash flood event occurring in an area. Flash floods can occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Weather surveillance radar is being used to improve monitoring capabilities of intense rainfall. Knowledge of the watershed characteristics, modeling, monitoring, and warning systems like the Iowa Flood Information System increases the predictability of flash floods. Depending on the location in the watershed, warning times can be increased. The National Weather Service forecasts the height of flood crests, the data, and time the flow is expected to occur at a particular location.

Gages along streams and rain gages provide information for flood warnings. Advance warning is possible for river flood events because a flood usually develops over the course of several days. The National Weather Service provides flood forecasts for Iowa, and now, the Iowa Flood Information System provides information and forecasts. Flood warnings are issued over mass notification systems and television stations. People in the path of river floods usually have time to take appropriate actions to limit harm to themselves and property.

Duration

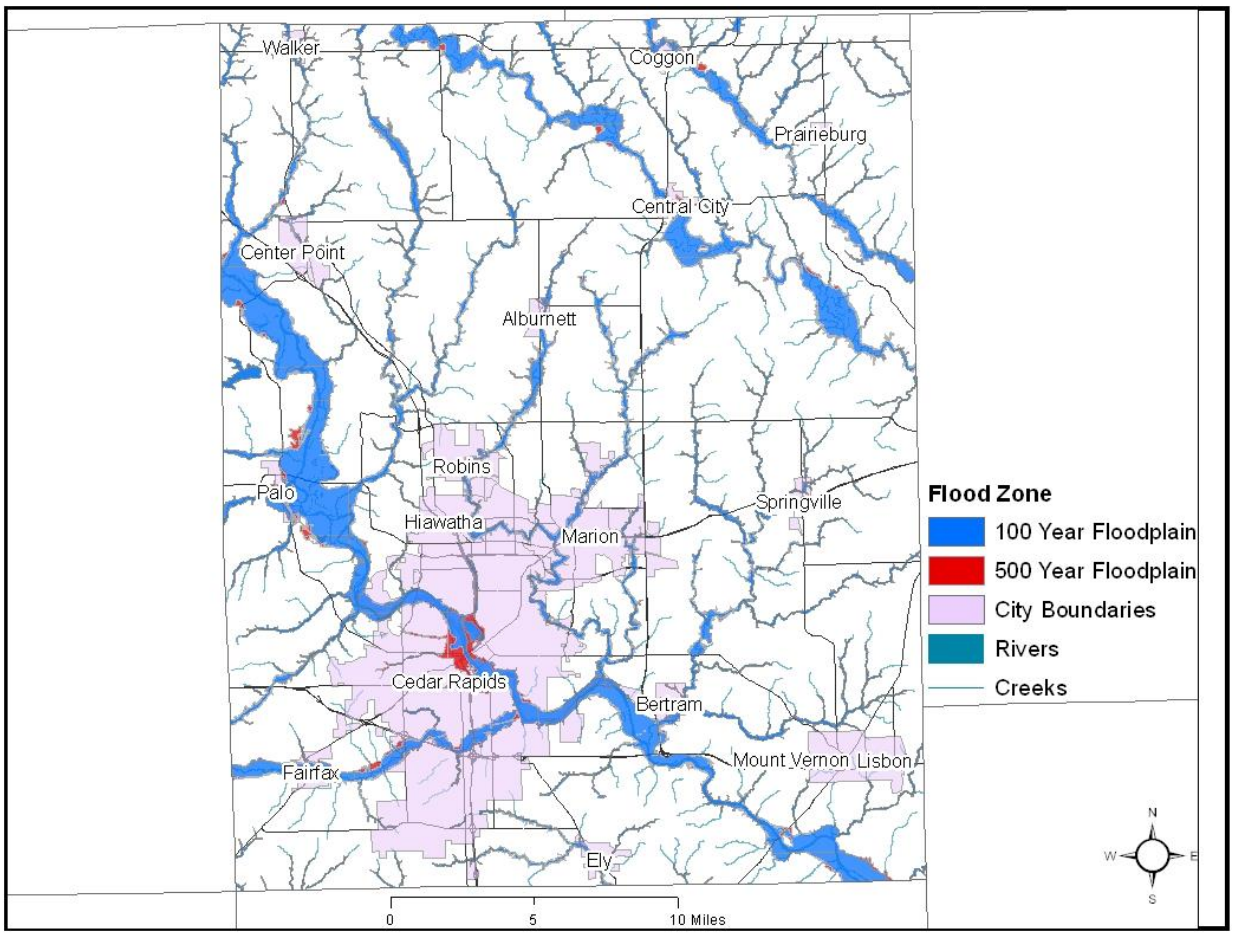
Response to a flash flood event is usually shorter term relative to a river flood event, requiring just days or weeks depending on the severity of the event. Response to a river flood event is usually extensive and requires days and even up to years to adequately recover.

Risk Assessment Maps

In this plan, available floodplain maps are used as an indicator of potential flood risk. Refer to Figures 9 – 13. The risk assessment maps for flood show the areas in Linn County designated as the 100 year or 500 year floodplain. Respectively, the risk at the edge of these areas is approximately 1% and 0.2% in any given year. Property located nearer the potential source of flooding in designated floodplain areas is likely to be impacted by more frequent flooding. In addition, property outside of designated floodplain areas is vulnerable to flooding, especially flash flooding.

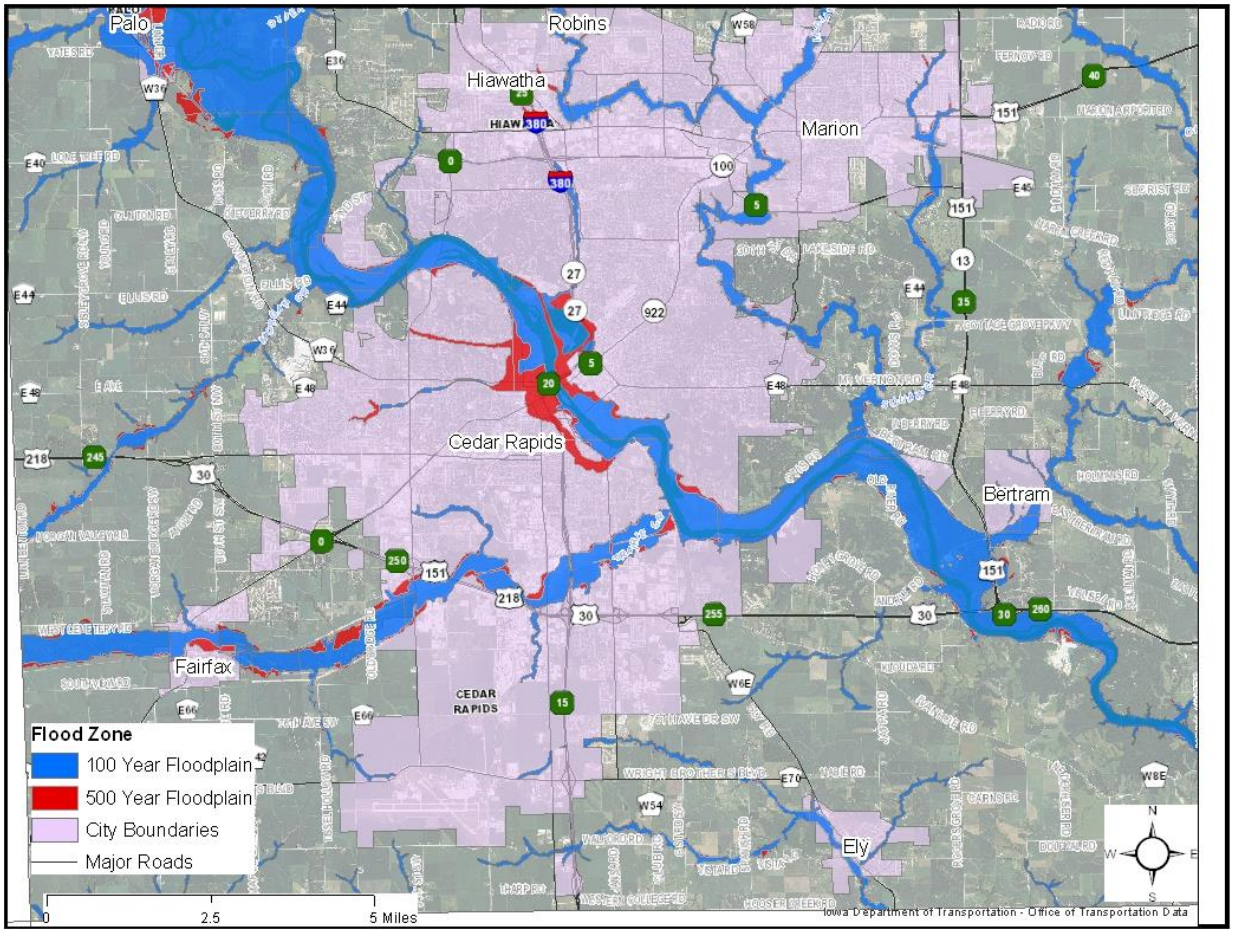
The risk assessment maps are based on the most recent information available from the Federal Emergency Management Agency (FEMA). Current Flood Insurance Rate Maps (FIRMs) in Linn County are effective April 5, 2010. More detailed flood studies and forecasting tools will be available in a future plan update including flood stage mapping from the Iowa Flood Center and RiskMap information that is currently being developed by FEMA and the Iowa Department of Natural Resources.

Figure 9: Linn County Floodplain Map



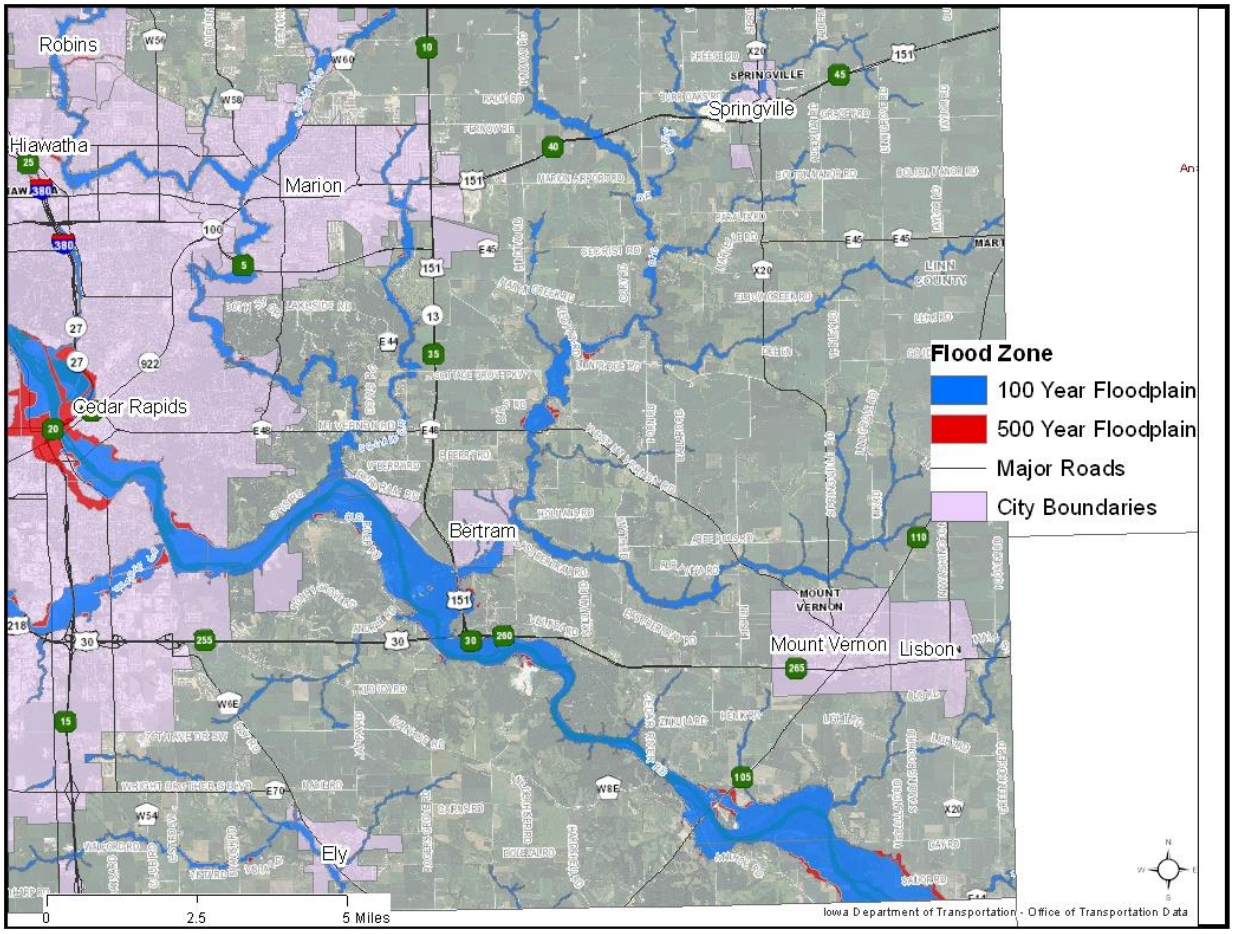
Data Source: Federal Emergency Management Agency and Iowa Department of Transportation, 2013

Figure 10: Cedar Rapids Metropolitan Area Floodplain Map



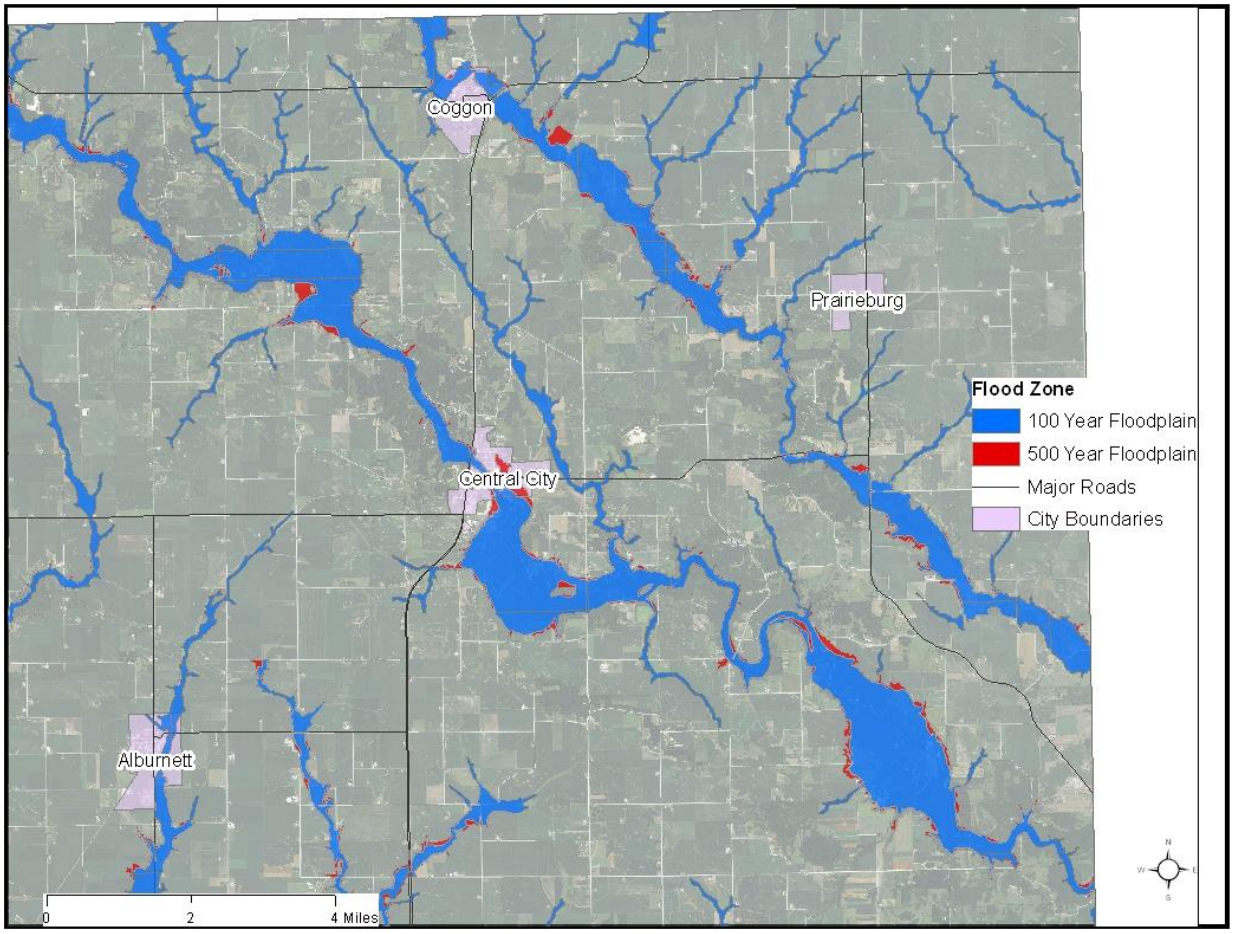
Data Source: Federal Emergency Management Agency and Iowa Department of Transportation, 2013

Figure 11: Southeast Linn County Floodplain Map



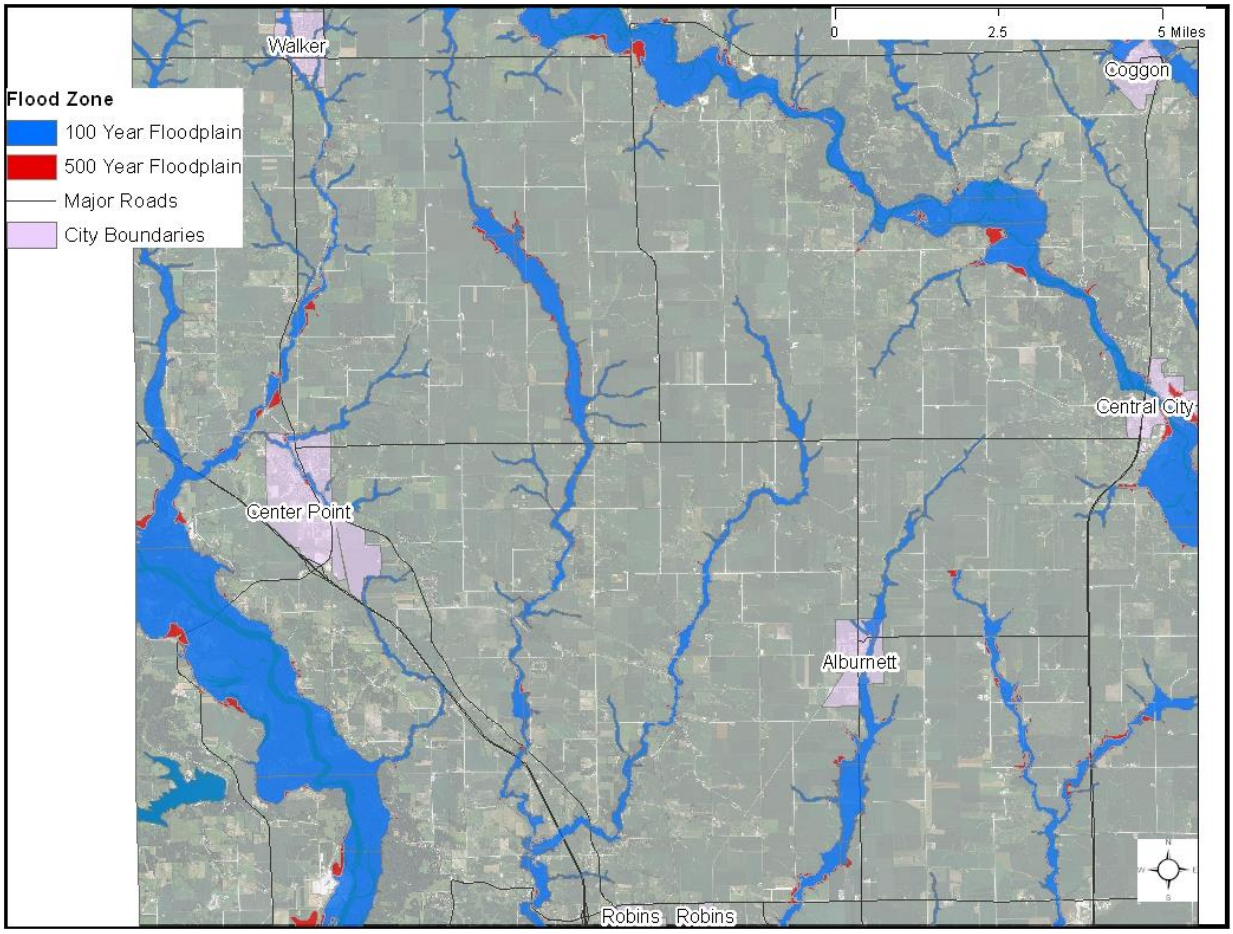
Data Source: Federal Emergency Management Agency and Iowa Department of Transportation, 2013

Figure 12: Northeast Linn County Floodplain Map



Data Source: Federal Emergency Management Agency and Iowa Department of Transportation, 2013

Figure 13: Northwest Linn County Floodplain Map



Data Source: Federal Emergency Management Agency and Iowa Department of Transportation, 2013

Grass and Wildland Fire

DEFINITION OF HAZARD

A grass or wildland fire is an uncontrolled fire that threatens life and property in a rural or wooded area. Grass and wildland fires can occur when conditions are favorable, such as periods of drought when natural vegetation would be drier and subject to combustibility.

Potential Hazard Area

The potential hazard area for major grass and wildland fires in Linn County is primarily rural, wooded, and grassy right-of-way areas. Some recreation areas in Linn County are wooded and/or grassy so they are also potential hazard areas.

Historical Occurrences

In Iowa, there have been no grass or wildland fire events that would be considered historically significant. Grass fires are reported throughout Linn County every year, but none of these fires were substantial enough to be a major threat to life and property. Prescribed burning is used in Linn County to manage vegetation but also the risk of grass and wildland fire events.

Probability

Manageable grass fires will occur in Linn County on an annual basis. The estimated probability of a major grass fire occurring is like likely, which is between 20% and 30% probability in any given year. It should be noted that the probability of occurrence may be relatively high during dry and drought conditions. The probability estimate for grass and wildland fire events occurring in Linn County is based primarily on local knowledge.

Magnitude and Severity

Wildfires are most destructive in the western United States, but this particular hazard has become a frequent and damaging phenomenon nationwide. People choosing to live in rural, grassy, and wooded areas are extremely vulnerable to fires. The emergency response personnel who respond to grass and wild land fire are also extremely vulnerable.

Iowa is most often affected by grass fires, which are usually contained and extinguished before there is a threat to life and property. Most grass fires are contained to highway and rail right-of-way ditches and are less than a few acres in size. Wind can turn a small flame into a multi-acre grassfire within a matter of minutes. Fires often burn large portions of field crops during harvest. A dry field can ignite easily from a spark or overheated equipment. Overall, the potential extent is dependent upon conditions such as moisture, wind, and land cover. Areas throughout Linn County are vulnerable, especially rural, grass, and wooded areas.

Warning Time

Most grass and wildland fires occur without warning and spread quickly. Overall, warning time depends upon conditions such as moisture, wind, and land cover. Methods for forecasting fire potential have become more accurate, and a useful outlook is issued by the National Interagency Fire Center and the National Oceanic and Atmospheric Agency (NOAA) Storm Prediction Center.

Duration

The majority of Iowa wildfires occur within a short duration in grassy areas. Approximately half of the fires are prescribed burns that are supervised by trained experts.

Human Disease

DEFINITION OF HAZARD

A human disease event is a medical, health, or sanitation threat to the general public such as contamination, epidemics, plagues, and insect infestation. A human disease event requires regular, frequent, and timely information regarding individual cases to prevent and control spread of the disease.

Potential Hazard Area

The potential hazard area for human disease events in Linn County is countywide.

Historical Occurrences

In Iowa, there are 51 reportable diseases, and Linn County Public Health maintains reports and investigates these diseases. The most commonly reported diseases in Linn County include HIV, salmonella, Lyme disease, syphilis, cryptosporidium, pertussis, and tuberculosis. Recently, none of these reportable diseases have reached an epidemic level in Iowa. According to *the 2013 Linn County Public Health Annual Report*, the number of cases for the reportable diseases mentioned has decreased since 2010.

According the *2013 Iowa Hazard Mitigation Plan*, there have been three influenza pandemics in Iowa since 1900. The pandemics occurred approximately 30 years apart. In 2009, the H1N1 influenza virus, commonly called the swine flu, caused 41 deaths and 659 hospitalizations in Iowa. When flood or wastewater infrastructure failure events occur in Linn County, the safety of water is monitored and boil advisories have been issued by the Iowa Department of Natural Resources. The most recent public health concern was an outbreak of Cyclospora infections in Iowa, Nebraska, Texas, and Wisconsin. Iowa has the highest number of recorded cases of Cyclospora infection, which totaled 127 cases in July 2013. Several of the cases reported in Iowa were in Linn County, but overall, the outbreak did not reach and epidemic level.

Probability

Historically, pandemics occur approximately every 30 years in Iowa. Influenza occurs every year in nearly every country in the world. The virus spreads through a population for a few months and will disappear or move to another country due to travel. Influenza usually occurs in the fall and winter months in the United States, but this type of human disease event is typically manageable at the local level. Flood and wastewater infrastructure failure events are likely to occur, and in many occurrences, water safety was a concern. Overall, the probability of a major human disease event occurring in Linn County is unlikely but there is a possibility of occurrence.

Magnitude and Severity

If a human disease event were to occur, a widespread area will be affected by the type and severity of the event will determine the extent. A neighborhood, entire city or county, and beyond could be impacted. As such, public health agencies work to reduce the spread of diseases in Iowa. Agencies use community-based prevention, monitor current infectious disease trends, and provide early detection and treatment for infected persons.

Because society is extremely mobile, diseases can move rapidly across the state and nation within months, weeks, and even days. Many diseases on the national notification list result in serious illness and even death. Some diseases are treatable, but for others, only the symptoms are treatable.

Typically the people who are especially vulnerable during a human disease event are the elderly, young, people with chronic medical conditions, and people who engage in high risk behaviors. People who travel internationally and have high exposure to potential vectors of disease are the most susceptible. According the *2013 Iowa Hazard Mitigation Plan*, more than 20% of Iowa's population is considered high risk. With such a high percentage of the population at risk, the magnitude and severity of a human disease event can reach a critical level.

Warning Time

Being the first to diagnose diseases, a healthcare provider is the first line of defense in a human disease event. Linn County Public Health, the Iowa Department of Public Health, and the U.S. Centers for Disease Control monitor reports submitted by healthcare providers, hospitals, and labs to identify patterns. Monitoring agencies are proactive in providing information to the health care community on medical concerns.

The public is reminded to prepare for typical human disease events like influenza before the common time of year this virus spreads throughout Iowa and the United States. For other human disease events, the public is informed of initial outbreaks, which are confirmed cases of a disease, so for most human disease events there is minimal to no warning.

When there is a potential for a human disease event such as contamination of water supplies from infrastructure failure, flooding, or other hazards, there is also minimal to no warning for the public. The Iowa Department of Natural Resources and local governments issue warning as soon as possible, but the contamination is already present in water supplies.

Duration

Response to highly infectious diseases occurs continuously, but the direct effects of a human disease event such as pandemic influenza can occur for months at a time. A major example is the H1N1 influenza in August of 2009.

Landslide

DEFINITION OF HAZARD

A landslide occurs when rock, earth, or debris moves down a slope under the force of gravity and water. Landslides may be small or large, and can move at slow or very high speed. In addition to geological conditions, landslides can occur because of rainstorms, fires, earthquakes, and development that modify slope and drainage.

Potential Hazard Area

The potential hazard area for landslides in Linn County is primarily limited to areas of the county with steep slopes. It should be noted that steep slopes are an estimate of the potential hazard area, because a landslide could occur in other areas of Linn County. Refer to the risk assessment maps.

Historical Occurrences

There are no documented landslide events in Linn County.

Probability

Landslides typically do not occur in Linn County because the specific soil and topographic conditions are not present. For this risk assessment, steep slopes are considered a potential risk for landslide type events. Overall, the probability of a landslide occurring in Linn County is unlikely but possible.

Magnitude and Severity

People occupying structures overlooking steep slopes or located at the bottom of a steep slope are vulnerable. These types of structures are a small percentage of homes and commercially occupied structures in Iowa. Injuries and deaths are unlikely unless a landslide occurred suddenly leaving no time to evacuate. Historic landslide events in Iowa have affected just the immediate surrounding area with no widespread impacts.

Warning Time

Landslides are often involved in or triggered by other natural hazards. Landslides and flooding are often related because precipitation, runoff, and ground saturation combine to destabilize soil and rock. For this reason, landslides can be detected if high potential landslide areas are monitored.

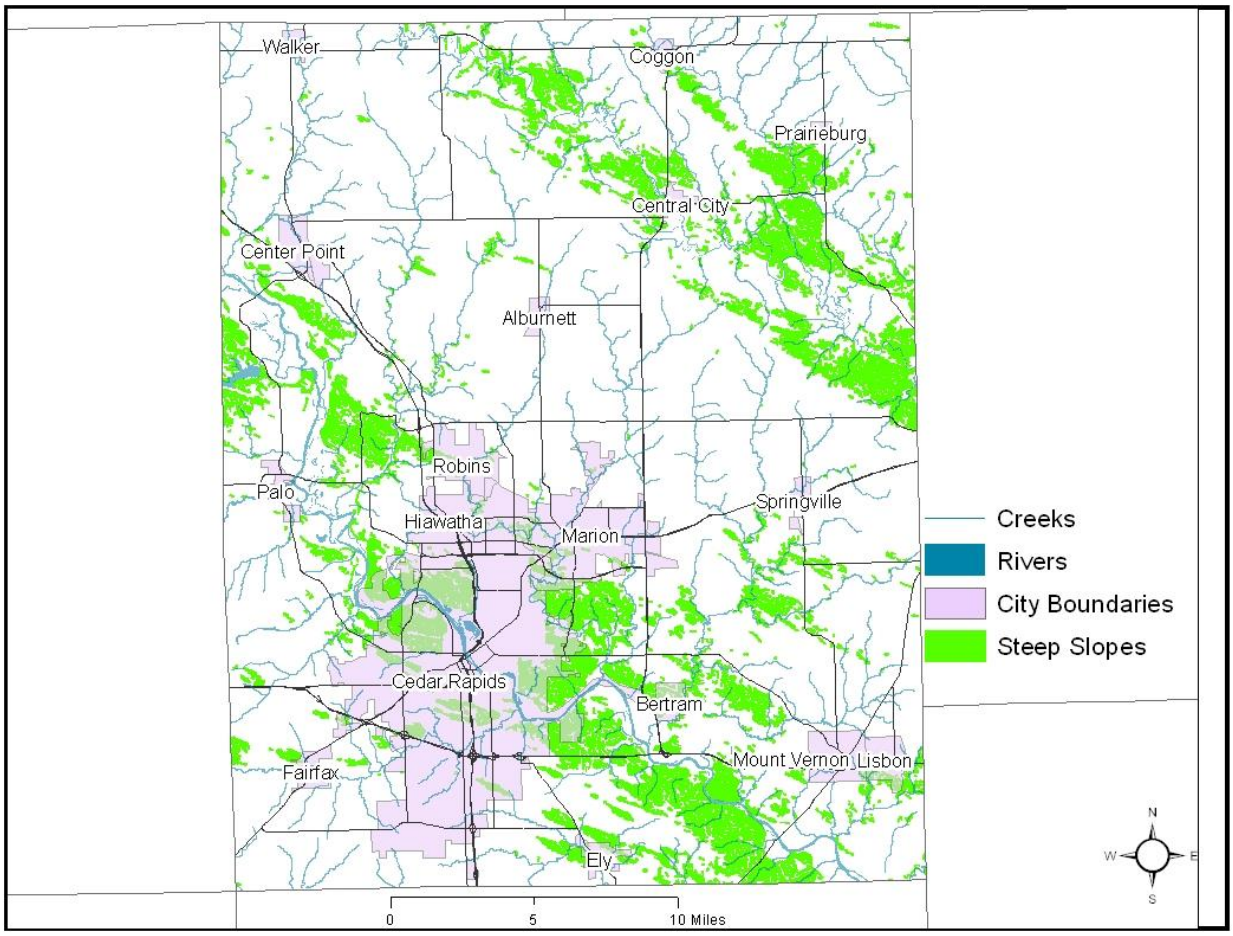
Duration

Response to a landslide is usually limited to the site where the landslide occurred unless a transportation route is involved. Traffic must be redirected and facilities must be restored, which can prolong the amount of time the landslide affects a community. For the fairly minor landslides that can occur in Iowa, the duration is most likely short term.

Risk Assessment Maps

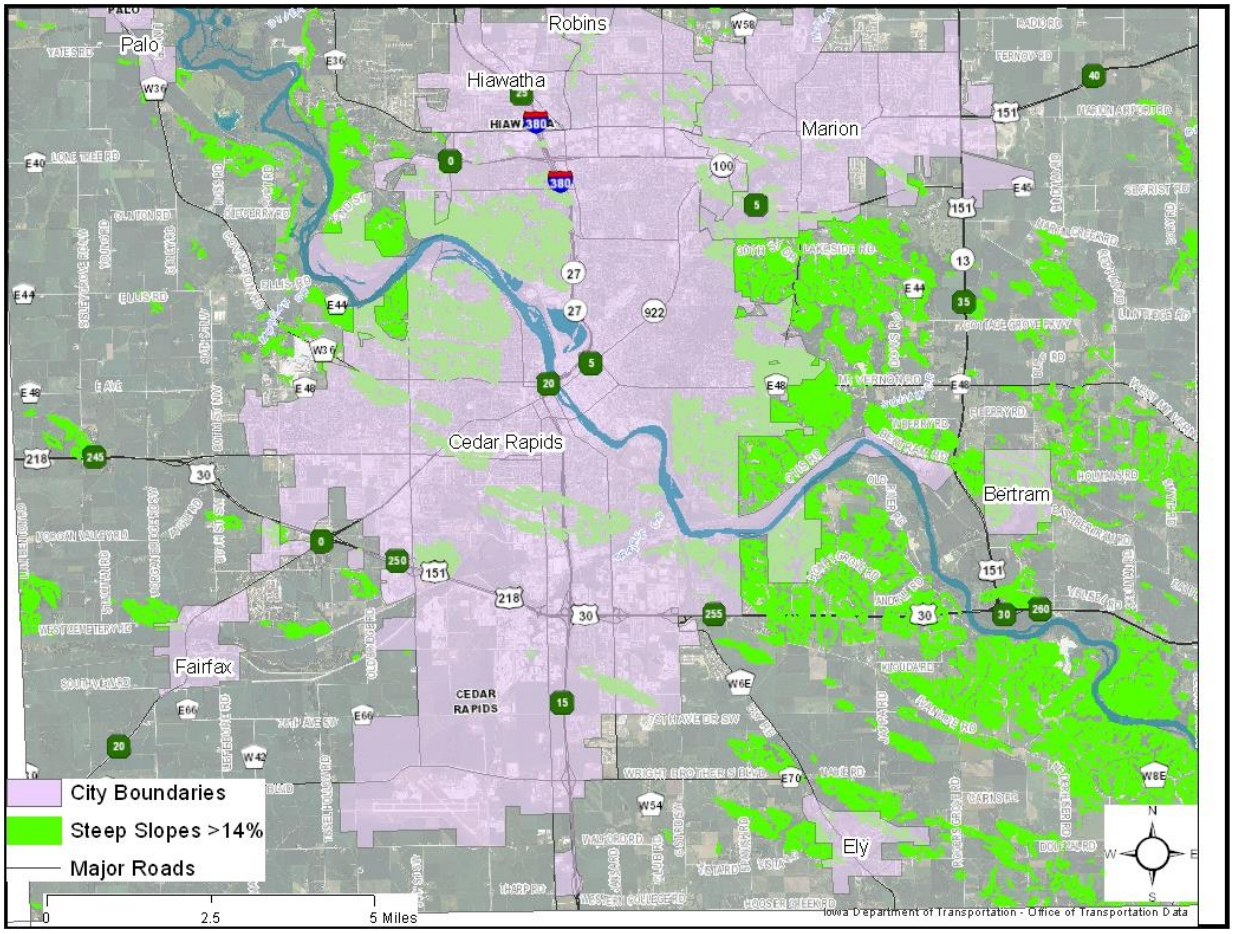
Steep slopes are used as an indicator of potential landslide risk. The risk assessment maps for landslides show the areas in Linn County with 14% or greater slope. It should be noted, the Linn County Code of Ordinances designate slopes of 15% or greater as steel slopes. The maps are based on the most recent information available from the Iowa Department of Natural Resources. Refer to Figures 14 – 18.

Figure 14: Linn County Steep Slopes



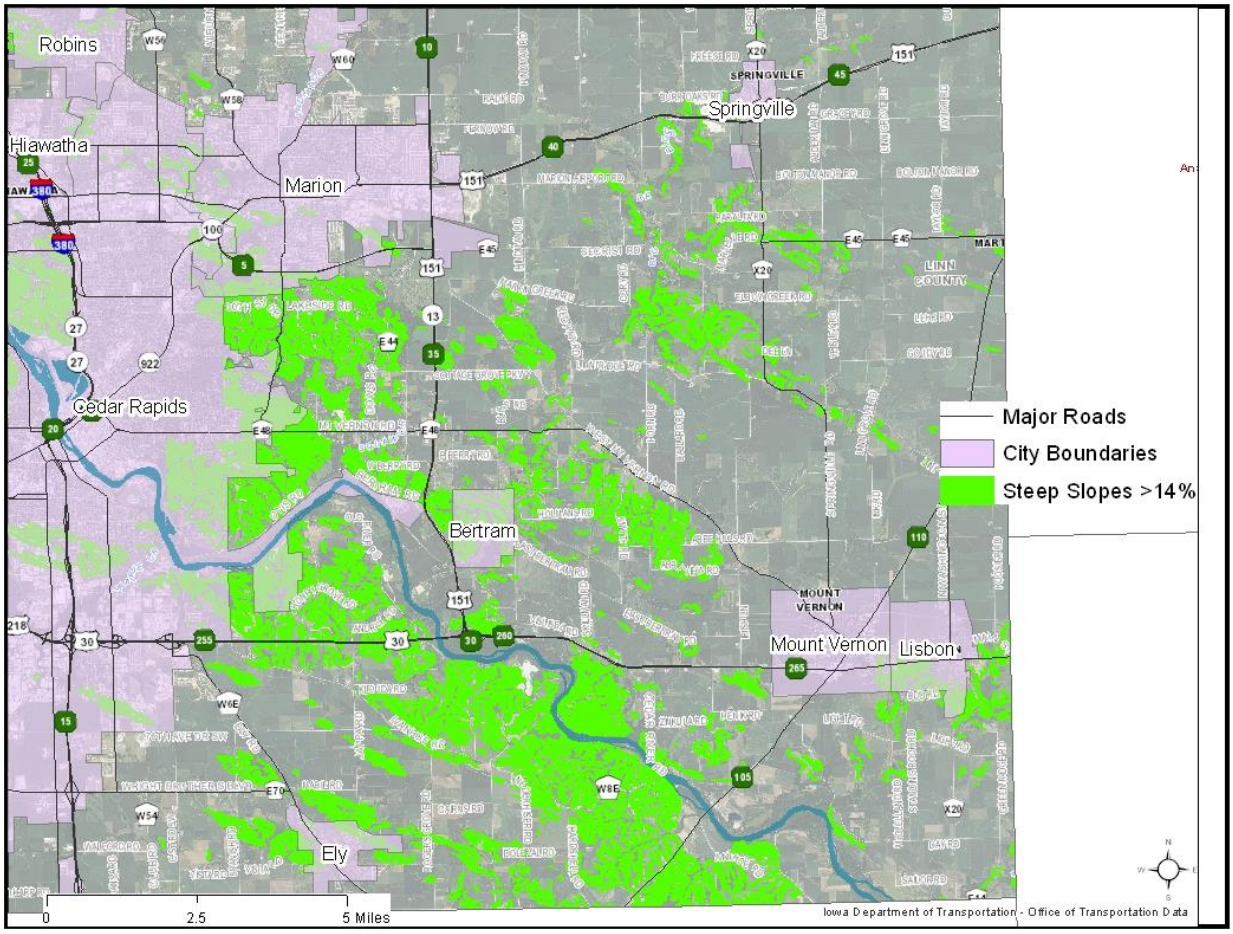
Data Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Figure 15: Cedar Rapids Metropolitan Area Steep Slopes



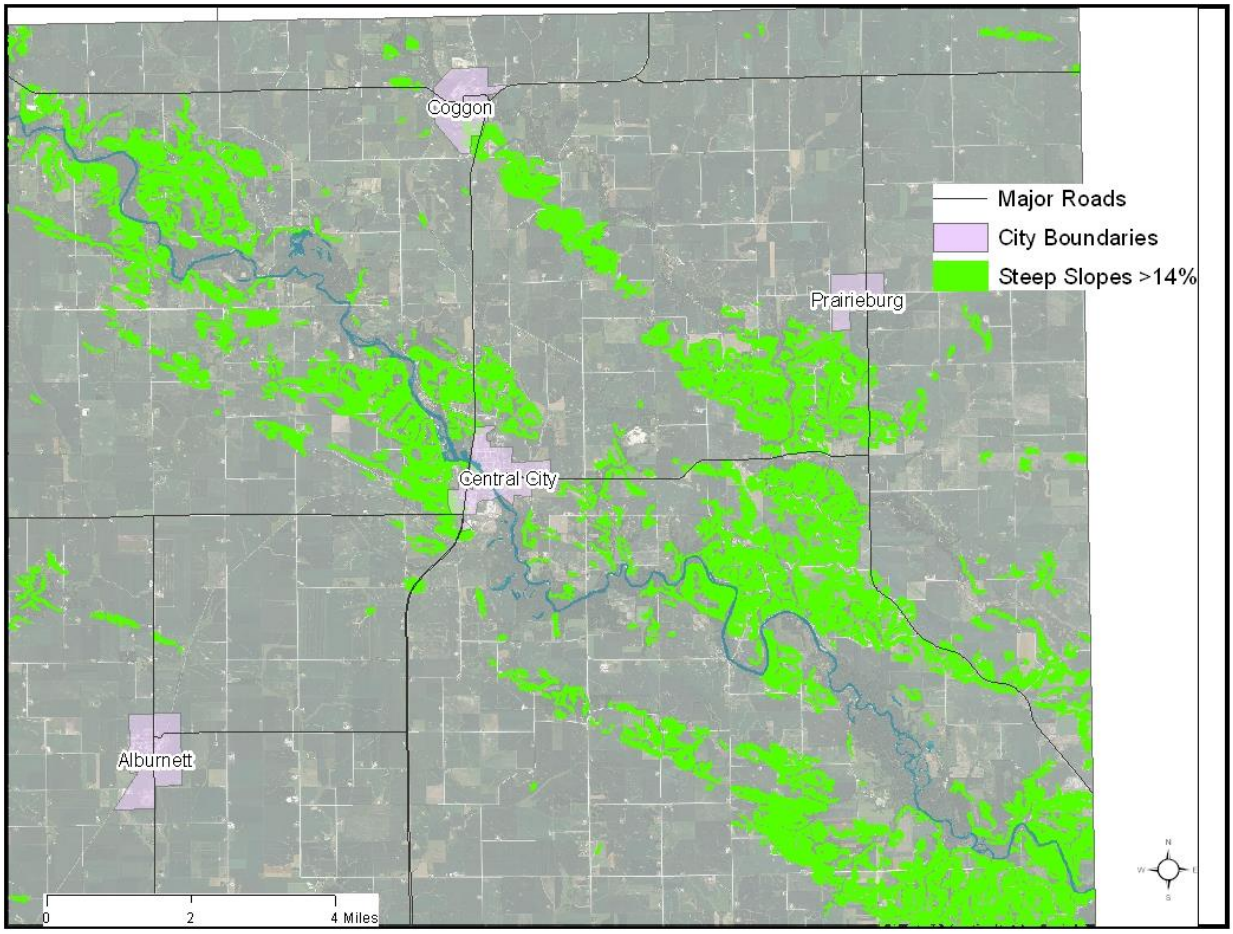
Data Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Figure 16: Southeast Linn County Steep Slopes



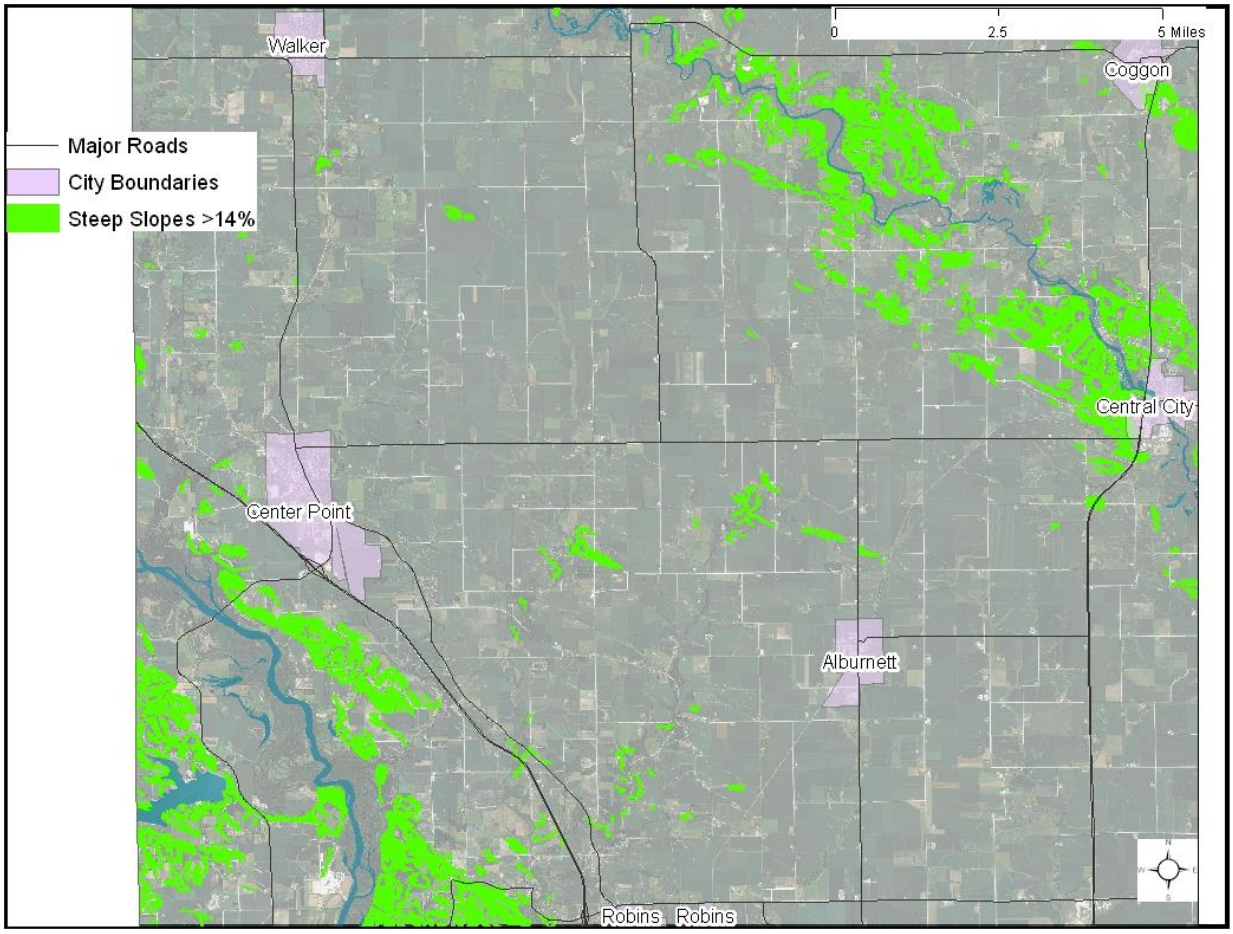
Data Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Figure 17: Northeast Linn County Steep Slopes



Data Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Figure 18: Northwest Linn County Steep Slopes



Data Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Severe Winter Storm

Definition of Hazard

Severe winter storm conditions that affect daily activities can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold.

Blizzard conditions are defined as winter storms lasting at least three hours with sustained winds of 35 mph or more, reduced visibility of 1/4 mile or less, and white out conditions.

Potential Hazard Area

The potential hazard area for a severe winter storm in Linn County is countywide.

Historical Occurrences

Since 1996, there have been 48 recorded winter storm events in Linn County. In most years, there were one or more winter storm events. The only years without a major winter storm event were 2004 – 2006, although a blizzard and heavy snow events occurred in Linn County during that period of time. For all the winter storm events, there were no deaths, injuries, or damage reported. Refer to Table 31.

Table 31: Linn County Winter Storm Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	01/26/1996	0	0	0	0
LINN (ZONE)	11/14/1996	0	0	0	0
LINN (ZONE)	12/25/1996	0	0	0	0
LINN (ZONE)	12/27/1996	0	0	0	0
LINN (ZONE)	01/09/1997	0	0	0	0
LINN (ZONE)	01/15/1997	0	0	0	0
LINN (ZONE)	01/24/1997	0	0	0	0
LINN (ZONE)	02/03/1997	0	0	0	0
LINN (ZONE)	11/14/1997	0	0	0	0
LINN (ZONE)	01/20/1998	0	0	0	0
LINN (ZONE)	02/28/1998	0	0	0	0
LINN (ZONE)	12/06/1998	0	0	0	0
LINN (ZONE)		0	0	0	0
LINN (ZONE)	12/30/1998	0	0	0	0
LINN (ZONE)	01/01/1999	0	0	0	0
LINN (ZONE)	01/18/1999	0	0	0	0
LINN (ZONE)	03/05/1999	0	0	0	0
LINN (ZONE)	03/08/1999	0	0	0	0
LINN (ZONE)	12/16/1999	0	0	0	0
LINN (ZONE)	12/19/1999	0	0	0	0
LINN (ZONE)	12/23/1999	0	0	0	0
LINN (ZONE)	01/03/2000	0	0	0	0

Table 31 (cont.): Linn County Winter Storm Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	01/17/2000	0	0	0	0
LINN (ZONE)	01/19/2000	0	0	0	0
LINN (ZONE)	01/29/2000	0	0	0	0
LINN (ZONE)	02/13/2000	0	0	0	0
LINN (ZONE)	02/17/2000	0	0	0	0
LINN (ZONE)	12/10/2000	0	0	0	0
LINN (ZONE)	02/08/2001	0	0	0	0
LINN (ZONE)	02/23/2001	0	0	0	0
LINN (ZONE)	03/15/2001	0	0	0	0
LINN (ZONE)	03/01/2002	0	0	0	0
LINN (ZONE)	01/28/2003	0	0	0	0
LINN (ZONE)	02/14/2003	0	0	0	0
LINN (ZONE)	03/04/2003	0	0	0	0
LINN (ZONE)	12/01/2007	0	0	0	0
LINN (ZONE)	12/22/2007	0	0	0	0
LINN (ZONE)	02/05/2008	0	0	0	0
LINN (ZONE)	02/16/2008	0	0	0	0
LINN (ZONE)	03/28/2009	0	0	0	0
LINN (ZONE)	12/08/2009	0	0	0	0
LINN (ZONE)	01/06/2010	0	0	0	0
LINN (ZONE)	12/23/2010	0	0	0	0
LINN (ZONE)	01/11/2012	0	0	0	0
LINN (ZONE)	01/30/2013	0	0	0	0
LINN (ZONE)	02/21/2013	0	0	0	0
LINN (ZONE)	02/26/2013	0	0	0	0
LINN (ZONE)	03/04/2013	0	0	0	0
Total	48 events	0	0	0	0

Source: National Climatic Data Center, January 2014

In addition to winter storms, there have been seven blizzard events recorded in Linn County since 1996. There were no deaths or injuries reported, but a small amount of damage was reported in January 2005. The blizzard event in 2005 occurred in year with no other major winter storms. Refer to Table 32.

Table 32: Linn County Blizzard Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	01/26/1996	0	0	0	0
LINN (ZONE)	03/09/2002	0	0	0	0
LINN (ZONE)	01/22/2005	0	0	$5,000	0
LINN (ZONE)	12/20/2008	0	0	0	0
LINN (ZONE)	12/09/2009	0	0	0	0
LINN (ZONE)	02/01/2011	0	0	0	0
LINN (ZONE)	12/19/2012	0	0	0	0
Total	7 events	0	0	$5,000	0

Source: National Climatic Data Center, January 2014

Another type of severe winter weather is heavy snow events, and since 1996, there have been eighteen events in Linn County. There were no directly attributable deaths or injuries reported. Two of the events had a total of $25,000 in damage reported, which is relatively low. Refer to Table 33.

Table 33: Linn County Heavy Snow Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	01/18/1996	0	0	0	0
LINN (ZONE)	10/26/1997	0	0	0	0
LINN (ZONE)	12/24/1997	0	0	0	0
LINN (ZONE)	03/08/1998	0	0	0	0
LINN (ZONE)	04/07/2000	0	0	0	0
LINN (ZONE)	12/01/2000	0	0	0	0
LINN (ZONE)		0	0	0	0
LINN (ZONE)	12/18/2000	0	0	0	0
LINN (ZONE)	12/20/2000	0	0	0	0
LINN (ZONE)	12/23/2000	0	0	0	0
LINN (ZONE)	12/28/2000	0	0	0	0
LINN (ZONE)	01/01/2001	0	0	0	0
LINN (ZONE)	01/26/2001	0	0	0	0
LINN (ZONE)	02/05/2004	0	0	$5,000	0
LINN (ZONE)	01/05/2005	0	0	$20,000	0
LINN (ZONE)	12/18/2008	0	0	0	0
LINN (ZONE)	01/09/2009	0	0	0	0
LINN (ZONE)	01/13/2009	0	0	0	0
Total	18 events	0	0	$25,000	0

Source: National Climatic Data Center, January 2014

In Iowa, ice storm events typically cause the human loss and property associated with severe winter weather, if any. Since 1996, there were seven ice storm events in Linn County. Refer to Table 34. In December 2007, one death occurred due to an icy branch from a tree falling and hitting a man's head in Cedar Rapids. In terms of reported property damage, the most severe ice storm event was in February 2007 with nearly $1 million in property damage. In some areas, there was up to seven inches of accumulated ice. This storm occurred over widespread area in combination with blizzard conditions. Thousands of people lost power and travel was dangerous for several days.

Table 34: Linn County Ice Storm Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	12/15/2000	0	0	0	0
LINN (ZONE)	01/28/2001	0	0	0	0
LINN (ZONE)	02/07/2001	0	0	0	0
LINN (ZONE)	02/24/2007	0	0	$989,000	0
LINN (ZONE)	12/11/2007	1	0	0	0
LINN (ZONE)	12/08/2008	0	0	0	0
LINN (ZONE)	12/23/2009	0	0	0	0
Total	7 events	1	0	$989,000	0

Source: National Climatic Data Center, January 2014

Considering the severe winter storm hazard, extreme cold and wind chill is included the definition because it a dangerous component of Iowa's winter season. There have been eight extreme cold or wind chill events reported in Linn County since 2000. There were extreme cold or wind chill events recorded for Linn County from 1996 – 1999. Refer to Table 35.

Table 35: Linn County Extreme Cold/Wind Chill Events 1996 – 2013

Location	Date
LINN (ZONE)	12/16/2000
LINN (ZONE)	12/21/2000
LINN (ZONE)	12/23/2000
LINN (ZONE)	02/02/2007
LINN (ZONE)	01/24/2008
LINN (ZONE)	01/29/2008
LINN (ZONE)	02/10/2008
LINN (ZONE)	01/14/2009
Total	8 events

Source: National Climatic Data Center, January 2014

Often, extreme cold occurs several times during a severe winter like the three events recorded both in 2000 and 2008. In several years, there were no extreme cold or wind chill events recorded in Linn County indicating a milder winter.

Probability

According to the *2010 Iowa Hazard Mitigation Plan*, most counties will likely experience two or three winter storms during winter months with a severe winter storm occurring every 3 to 5 years. A snowfall of six inches or more from one storm occurs in approximately half of Iowa winters, while a large winter storm event of 10 inches or more occurs once every 3 years.

Historical occurrences indicate that several winter storm events can occur annually in Linn County. When considering probability, though, the local planning committees considered the probability of the severe winter storm events that could cause injury, death, or shutdown of facilities. In Linn County, winter storm events occur frequently but most jurisdictions have procedures to reduce the risk of injury, death, or damage from these events. Based on local knowledge, a severe winter storm is likely with a probability of 20% to 30% in any given year. The frequency of severe winter storm events depends on the overall severity of a particular winter season. As historical data indicates, Linn County can be affected by several severe winter storm events in one year, but there can also be a year with few or no severe winter storm events.

Magnitude and Severity

Winter storms usually impact several counties during a single event. Due to size and environmental changes as a storm travels across a region, there will be local variation in storm intensity and quantity of precipitation. The presence of snow or ice, high winds, and low temperatures can make a significant difference in how a severe winter storm event will impact a community.

According to the *2010 Iowa Hazard Mitigation Plan*, the leading cause of death during winter storm events is transportation accidents. About 70% of winter-related deaths occur in automobiles, and about 25% are due to people caught in a severe storm. Emergency services such as police, fire, and ambulance are sometimes unable to respond due to poor road conditions.

During a winter storm event, people, pets, and livestock are susceptible to frostbite and hypothermia. The people primarily at risk are engaged in outdoor activity such as shoveling snow, digging out vehicles, or assisting stranded motorists. The elderly or very young are also vulnerable during a winter storm event. Businesses and schools often close during extreme cold or heavy snow conditions to protect the safety of patrons, workers, students, and bus drivers.

Heavy snows, blizzards, and ice storms can immobilize transportation systems, damage trees and power lines, and collapse buildings and communications towers. The potential for drifting snow is substantially higher in open country than in urban areas where buildings, trees, and other features obstruct the wind. Severe ice storms have caused total electric power outages over large areas of Iowa and rendered assistance unavailable to those in need due to impassable roads.

Regarding the transportation system, the Iowa Department of Transportation, county road departments, and local governments are responsible for snow removal of snow and treatment of snow streets and highways. Severe winter storm conditions can slow or stop the flow of vital supplies and disrupt emergency services. In addition, the emergency needs of remote or isolated residents for food or fuel, as well as for feed, water and shelter for livestock may be difficult to fulfill.

In Linn County, a severe winter storm can reach a critical level primarily due to the potential risk of human injury and death. It is possible a shutdown of services and facilities could last more than one week if the storm causes major power outages. This severity estimate is based on historical occurrences, the *2010 Iowa Hazard Mitigation Plan*, and local knowledge.

Warning Time

The National Weather Service has developed effective weather notifications that are promptly and widely distributed to the public. Notifications made by the National Weather Service include winter storm watch, winter storm warning, blizzard warning, winter weather advisory, and freeze advisory.

Radio, television, weather alert radios, and even smart phone applications provide current weather information. For winter storm events accurate information is available up to a few days in advance.

Duration

Although a severe winter storm typically occurs over several hours, the event can have lasting impacts on a community beyond a week. Dangerous road conditions and/or electrical power outage can affect a community, especially rural areas, for an extended period of time. It is also possible that a severe winter storm event can last several days due to multiple storms events occurring in short period of time.

Sinkholes

DEFINITION OF HAZARD

A sinkhole is the loss of surface elevation due to the removal of subsurface support. Sinkholes range from broad, regional lowering of the land surface to localized collapse. The primary causes of most subsidence are human activities such as underground mining, groundwater or petroleum withdraw, and drainage of organic soils. Sinkholes are also caused by erosion of limestone in subsurface areas.

Potential Hazard Area

The potential hazard area for sinkholes is relatively limited in Linn County. There are multiple documented sinkholes in the county, and there are areas with potential karst topography that can develop sinkholes. Refer to the risk assessment maps. This potential hazard area is an estimate, because sinkholes could potentially occur anywhere in Linn County.

Historical Occurrences

Currently, there are multiple sinkholes documented in the Robins and Hiawatha area, and there are five other sinkholes documented in unincorporated areas of the county. These historical occurrences are based on a geographic information system database from the Iowa Department of Natural Resources.

Probability

Currently, there are multiple sinkholes documented throughout Linn County. Potential karst topography indicates the potential for sinkholes to develop, because karst topography is characterized by the dissolution of layers of soluble bedrock. Areas of Linn County have potential karst topography so there is a potential but unlikely probability of sinkholes to develop. The probability of sinkholes occurring in Linn County is estimated as occasional, which is between 10% and 19% in any given year.

Magnitude and Severity

Sinkholes can aggravate flooding potential, and collapses due to the sudden formation of sinkholes or the collapse of an abandoned mine may destroy buildings, roads and utilities. Damage consists primarily of direct structural damage, property loss, and depreciation of land values. Generally, land subsidence poses a greater risk to property than to life. Damage to property, facilities, and infrastructure would only occur if the event undermined foundations.

In Linn County, areas that could potentially be affected by sinkholes are likely limited to areas with documented sinkholes and potential karst topography. Overall, the documented sinkholes have not caused major problems. Any sinkholes or potential for sinkholes are typically mitigated in the design and/or construction process for infrastructure and structures. Refer to the risk assessment maps.

Warning Time

Regional lowering occurs gradually over time, while the collapse of infrastructure such as streets can occur suddenly. It is possible for a sinkhole to form over time but not be detected until sudden or major collapse so warning time can be quite minimal.

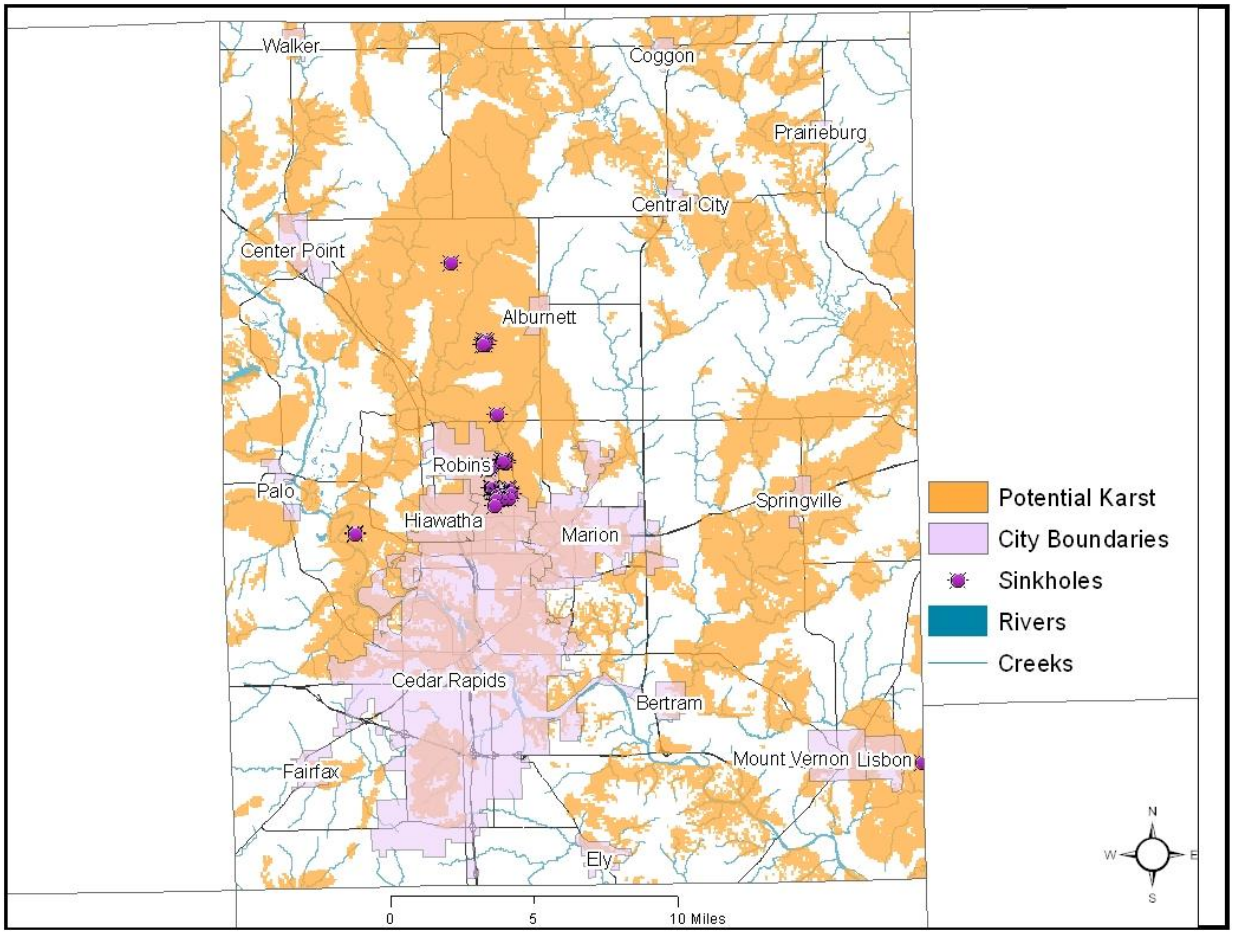
Duration

The response tied to sinkholes is related to securing the immediate threat to life and property including immediate reroute of traffic from the affected infrastructure and search and rescue in the case of structural collapse.

Risk Assessment Maps

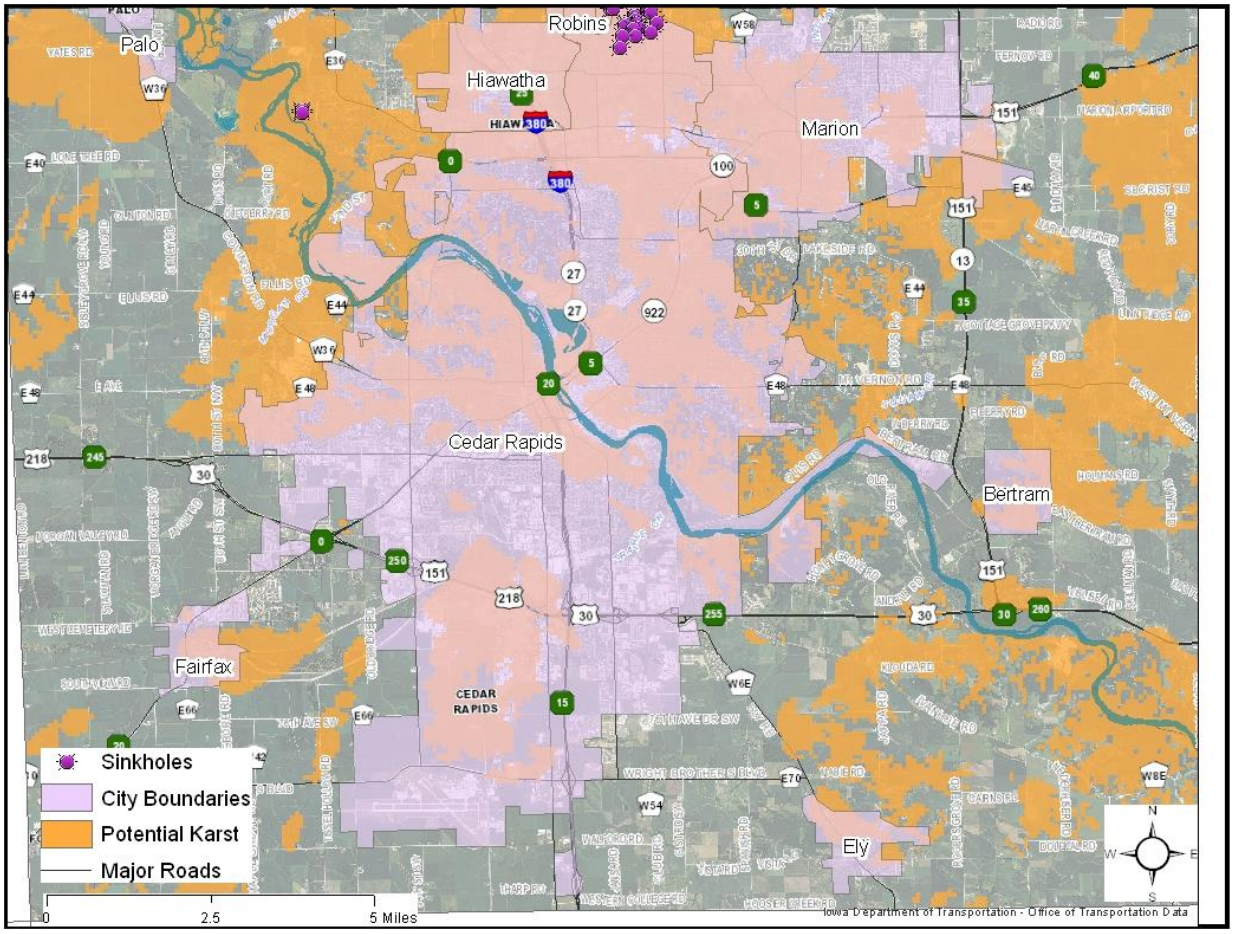
Documented sinkholes and potential karst soils are used as an indicator of potential sinkholes risk. The risk assessment maps for landslide show the areas in Linn County with potential karst soils. The maps are based on the most recent information available from the Iowa Department of Natural Resources. Refer to Figures 19 – 23.

Figure 19: Linn County Documented Sinkholes and Potential Karst Soils



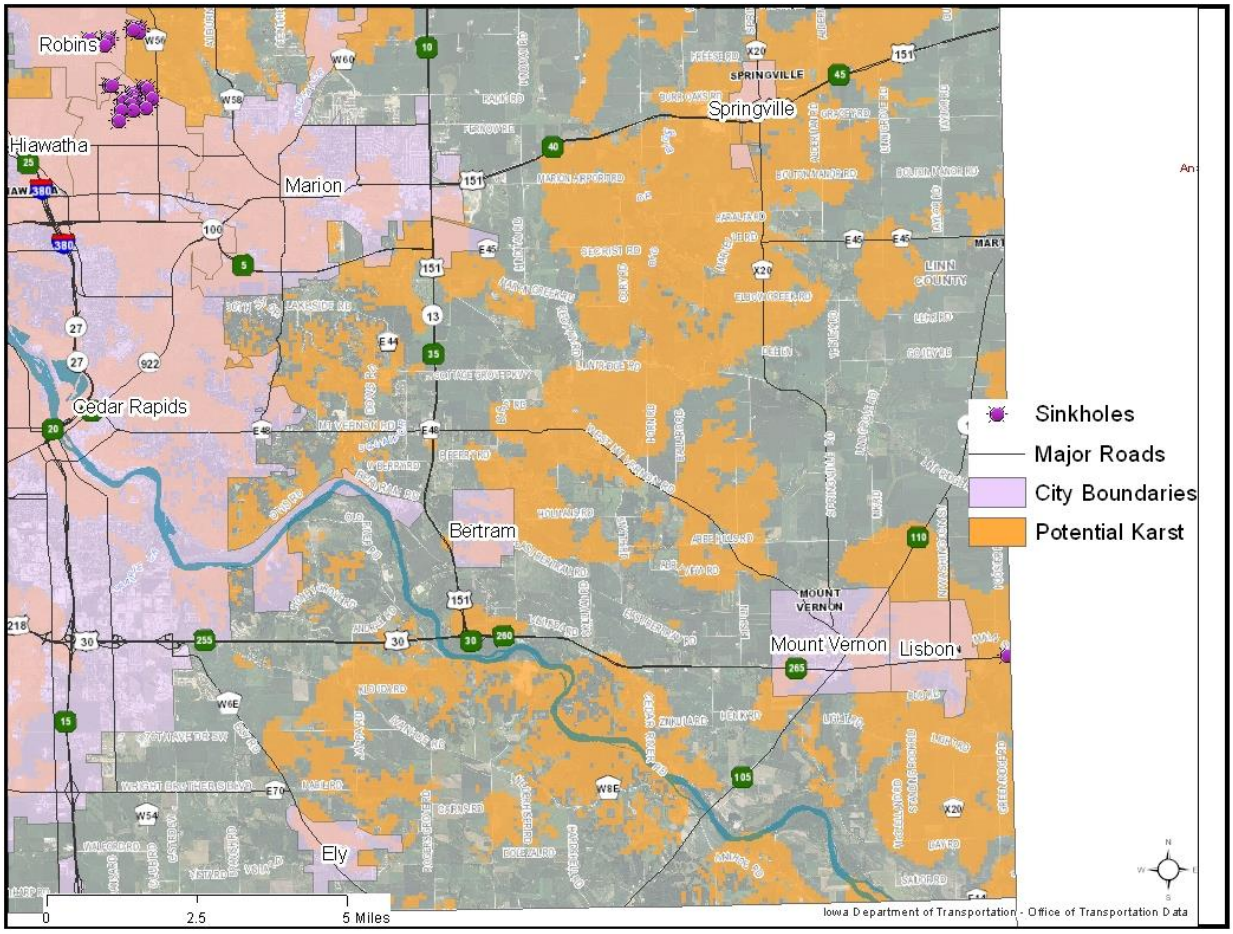
Data Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Figure 20: Cedar Rapids Metropolitan Area Documented Sinkholes and Potential Karst Soils



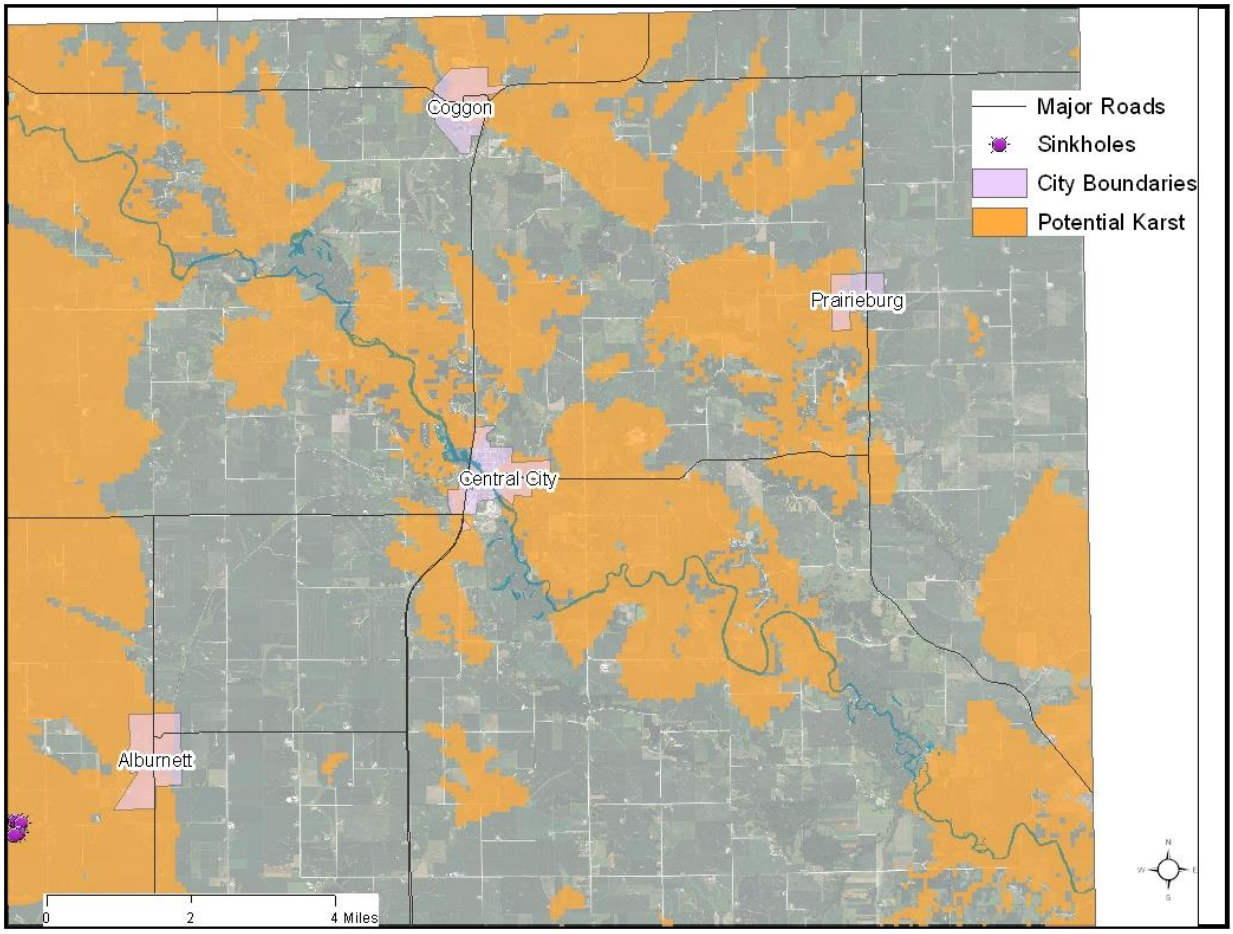
Data Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Figure 21: Southeast Linn County Documented Sinkholes and Potential Karst Soils



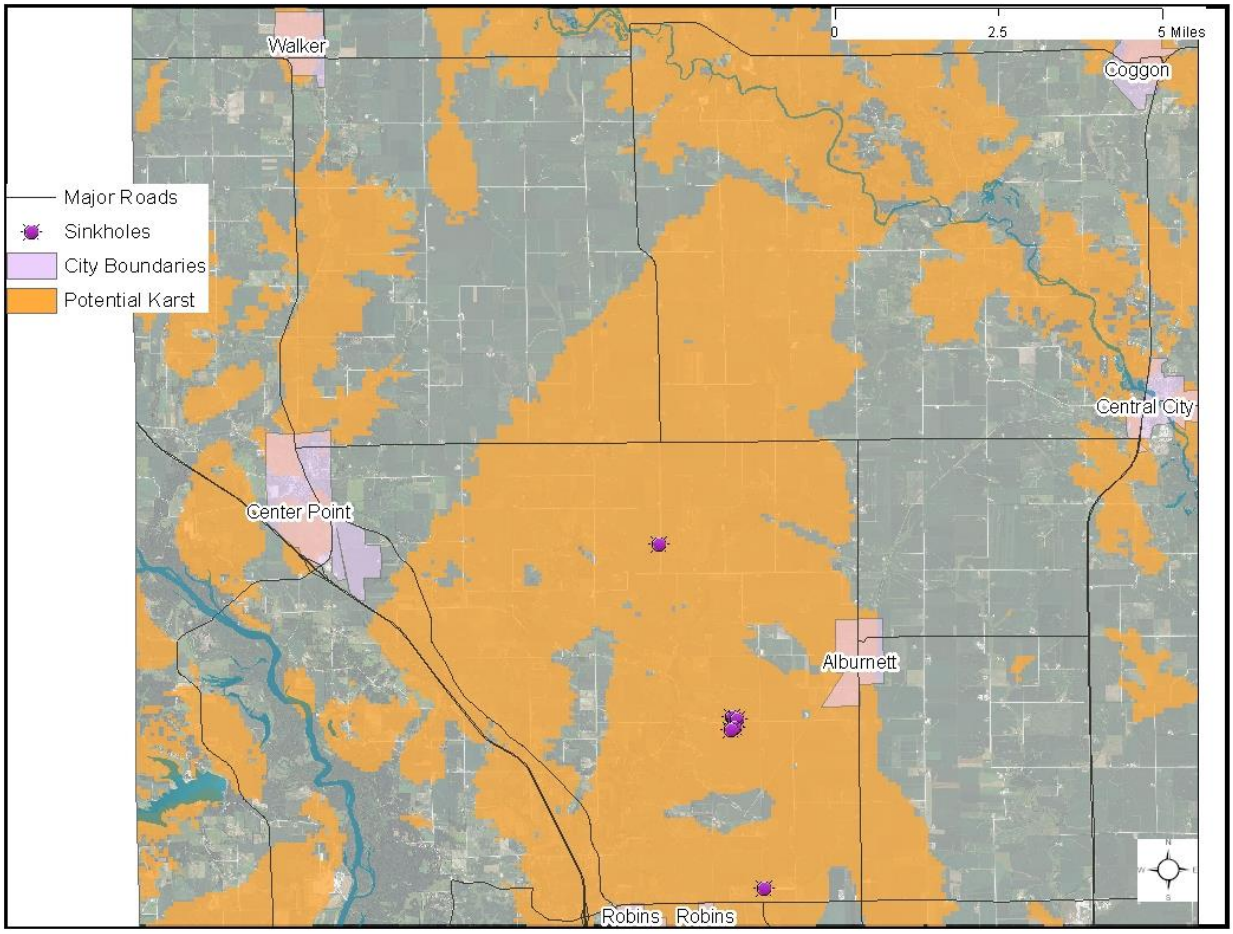
Data Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Figure 22: Northeast Linn County Documented Sinkholes and Potential Karst Soils



Data Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Figure 23: Northwest Linn County Documented Sinkholes and Potential Karst Soils



Data Source: Iowa Department of Natural Resources and Iowa Department of Transportation, 2013

Thunderstorm, Lightning, and Hail

DEFINITION OF HAZARD

A thunderstorm can occur singly, in clusters, or in lines resulting in heavy rains, winds reaching or exceeding 58 mph, producing a tornado, or hail. Most thunderstorms produce only thunder, lightning, and rain.

Severe storms, however, can produce tornadoes, straight-line winds, microbursts above 58 mph, lightning, hailstorms, and flooding. The National Weather Service considers a thunderstorm severe if it produces hail at least 1 inch in diameter, wind 58 mph or higher, or tornadoes.

Straight-line winds can often exceed 60 mph, are common occurrences, and are often mistaken for tornadoes. A number of thunderstorms have caused other hazards such as flash flooding, river flooding, and tornadoes.

Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. The temperature of lightning can reaches 50,000 degrees Fahrenheit in a split second. The rapid heating, expansion, and cooling of air near lightning creates thunder.

A hailstorm is an outgrowth of a severe thunderstorm in which pellets or irregularly shaped lumps of ice, otherwise known as hail, fall with rain. Hail can be smaller than a pea or as large as a softball.

Potential Hazard Area

The potential hazard area for thunderstorm, lightning, and hail in Linn County is countywide.

Historical Occurrences

Since 1996, there have been 263 thunderstorm events recorded in Linn County. Thunderstorms are the most frequently occurring natural hazards in Linn County. There are several thunderstorms every year, and multiple storms often develop in an area within just a few days. From the recorded thunderstorm events, there have been no deaths, five injuries, and over $8 million in reported property and crop damage. The majority of property damage occurred over several thunderstorm events in Cedar Rapids in 2003. Because Cedar Rapids is the most densely developed area in county, it often sustains higher amounts of damage. Overall, every community in the county has experienced a thunderstorm event that resulted in property or crop damage. Refer to Table 36.

Table 36: Linn County Thunderstorm Wind Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS ARPT	08/19/1996	0	0	0	0
CEDAR RAPIDS		0	0	0	0
MARION		0	0	0	0
CENTRAL CITY		0	0	0	0
MT VERNON	05/18/1997	0	0	$20,000	0
FAIRFAX		0	0	0	0
CENTER PT	06/21/1997	0	0	0	0
CENTRAL CITY		0	0	0	0
TROY MILLS		0	0	0	0
PRAIRIEBURG		0	0	0	0
ALBURNETT	09/16/1997	0	0	0	0
CEDAR RAPIDS		0	0	0	0
SPRINGVILLE		0	0	0	0
CEDAR RAPIDS	06/12/1998	0	0	$1,000	0
CEDAR RAPIDS	06/18/1998	0	1	0	0
MT VERNON		0	0	$5,000	0
FAIRFAX		0	0	0	0
CEDAR RAPIDS ARPT	06/29/1998	0	0	0	0
CEDAR RAPIDS ARPT		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS	05/16/1999	0	2	$500,000	0
WALKER		0	0	$20,000	0
CEDAR RAPIDS	06/10/1999	0	0	0	0
MT VERNON	07/02/1999	0	0	$8,000	0
PALO		0	0	0	0
CEDAR RAPIDS	05/08/2000	0	0	0	0
CEDAR RAPIDS		0	0	$2,000	0
CEDAR RAPIDS		0	0	$1,000	0
(CID)CEDAR RAPIDS AR	06/01/2000	0	0	0	0
MT VERNON		0	0	$2,000	0
CEDAR RAPIDS	07/09/2000	0	0	$250	0
HIAWATHA	08/06/2000	0	0	$2,000	0
CENTER PT	11/01/2000	0	0	0	0
PALO	05/10/2001	0	0	$50,000	0
TODDVILLE		0	0	$2,000	0
CEDAR RAPIDS	06/14/2001	0	0	0	0
CEDAR RAPIDS		0	0	0	0
PALO	07/08/2001	0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
HIAWATHA		0	0	0	0
MT VERNON		0	0	0	0
SPRINGVILLE		0	0	0	0

Table 36 (cont.): Linn County Thunderstorm Wind Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CENTRAL CITY	07/21/2001	0	0	0	0
SPRINGVILLE		0	0	0	0
CEDAR RAPIDS	03/09/2002	0	0	0	0
WALKER	04/18/2002	0	0	0	0
ELY	07/18/2002	0	0	0	0
MT VERNON		0	0	0	0
CEDAR RAPIDS	07/28/2002	0	0	0	0
ELY		0	0	0	0
MARION		0	0	0	0
CEDAR RAPIDS	07/29/2002	0	0	0	0
MT VERNON	08/12/2002	0	0	0	0
CEDAR RAPIDS	04/30/2003	0	0	0	0
CEDAR RAPIDS	05/04/2003	0	0	$1 million	0
CEDAR RAPIDS	07/05/2003	0	0	$100,000	0
PALO	07/20/2003	0	0	$250,000	$30,000
CENTER PT		0	0	$250,000	$30,000
CEDAR RAPIDS		0	0	$5 million	0
CENTER PT	08/20/2003	0	0	$3,000	0
LAFAYETTE		0	0	$3,000	0
CEDAR RAPIDS	08/25/2003	0	0	$150,000	0
FAIRFAX	05/17/2004	0	0	$15,000	$10,000
CEDAR RAPIDS	05/21/2004	0	0	$10,000	$5,000
CEDAR RAPIDS	05/23/2004	0	0	$5,000	0
CEDAR RAPIDS		0	0	$8,000	0
CEDAR RAPIDS		0	0	$12,000	0
CENTER PT	08/03/2004	0	0	$15,000	$7,000
PALO	08/26/2004	0	0	$3,000	0
HIAWATHA		0	1	$20,000	0
FAIRFAX		0	0	$10,000	0
MARION ARPT		0	0	20,000	$10,000
FAIRFAX	05/11/2005	0	0	$2,000	0
CEDAR RAPIDS	05/12/2005	0	0	$500	0
CEDAR RAPIDS	06/04/2005	0	0	0	0
MT VERNON		0	0	0	0
CEDAR RAPIDS	06/08/2005	0	0	0	0
FAIRFAX	06/25/2005	0	0	$8,000	0
WAUBEEK	06/29/2005	0	0	$7,000	$12,000
PRAIRIEBURG		0	0	$12,000	$4,000
WALKER	07/21/2005	0	0	0	$2,000
FAIRFAX	04/13/2006	0	0	$500	0
CEDAR RAPIDS	06/03/2006	0	0	0	0
TODDVILLE	06/21/2006	0	0	$4,000	0
COUNTYWIDE	07/17/2006	0	0	$3,000	$20,000
FAIRFAX		0	0	0	0
CEDAR RAPIDS		0	0	0	0

Table 36 (cont.): Linn County Thunderstorm Wind Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
MARION	07/25/2006	0	0	$3,000	0
CEDAR RAPIDS		0	0	$1,000	0
CENTER PT	08/10/2006	0	0	0	0
MARION		0	0	0	0
MARION		0	0	0	0
FAIRFAX		0	0	0	$15,000
SPRINGVILLE		0	0	$4,000	0
VIOLA		0	0	$4,000	0
PRAIRIEBURG	04/02/2007	0	0	0	0
LISBON	06/07/2007	0	0	0	0
CEDAR RAPIDS	06/21/2007	0	0	0	0
WAUBEEK	07/04/2007	0	0	$10,000	$5,000
CEDAR RAPIDS	07/09/2007	0	0	5,000	0
CEDAR RAPIDS	07/16/2007	0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
COVINGTON		0	0	0	0
MARION		0	0	0	0
MARION		0	0	0	0
MARION		0	0	0	0
FAIRFAX	07/17/2007	0	0	0	$5,000
TROY MILLS	07/18/2007	0	0	0	0
CENTRAL CITY		0	0	$5,000	0
ALBURNETT		0	0	$25,000	0
WALKER		0	0	0	0
MT VERNON		0	0	0	0
CENTRAL CITY		0	0	0	0
TROY MILLS	09/18/2007	0	0	0	0
CEDAR RAPIDS	09/21/2007	0	0	0	0
CEDAR RAPIDS		0	0	5,000	0
CEDAR RAPIDS	09/30/2007	0	0	0	0
CEDAR RAPIDS		0	0	$15,000	0
SPRINGVILLE	10/02/2007	0	0	0	0
MARION	05/25/2008	0	0	0	0
MARION		0	0	$5,000	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
(CID)CEDAR RAPIDS AR		0	0	0	0
MARION		0	0	0	0
MARION	05/30/2008	0	0	0	0

Table 36 (cont.): Linn County Thunderstorm Wind Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
(CID)CEDAR RAPIDS AR	06/08/2008	0	0	0	0
MARION		0	0	$15,000	0
CEDAR RAPIDS		0	0	0	0
MARION		0	0	0	0
MARION		0	0	0	0
MARION MC BRIDE ARPT		0	0	$25,000	0
ROBINS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
MARION		0	0	0	0
(CID)CEDAR RAPIDS AR	06/14/2008	0	0	0	0
FAIRFAX	06/25/2008	0	0	0	0
PRAIRIEBURG	07/02/2008	0	0	0	0
CEDAR RAPIDS	07/07/2008	0	0	0	0
CEDAR RAPIDS		0	0	0	0
MT VERNON	07/12/2008	0	0	0	0
MARION	07/19/2008	0	0	0	0
WALKER	06/19/2009	0	0	$250,000	0
WALKER		0	0	0	0
CENTER PT		0	0	0	0
TROY MILLS		0	0	$25,000	0
WALKER	06/23/2009	0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	1	0	0
(CID)CEDAR RAPIDS AR		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS	07/24/2009	0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS	08/09/2009	0	0	0	0
CEDAR RAPIDS ARPT		0	0	0	0
CEDAR RAPIDS ARPT		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
ALBURNETT	04/05/2010	0	0	$1,000	0
WALKER		0	0	$1,000	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	$1,000	0
BEVERLY	04/06/2010	0	0	$1,000	0

Table 36 (cont.): Linn County Thunderstorm Wind Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
(CID)CEDAR RAPIDS AR	06/18/2010	0	0	0	0
(CID)CEDAR RAPIDS AR		0	0	0	0
MT VERNON		0	0	$10,000	0
CEDAR RAPIDS		0	0	$5,000	0
HIAWATHA		0	0	0	0
HIAWATHA		0	0	0	0
CEDAR RAPIDS	05/29/2011	0	0	0	0
COVINGTON	06/08/2011	0	0	0	0
HIAWATHA		0	0	0	0
HIAWATHA		0	0	0	0
MARION		0	0	0	0
ROBINS		0	0	0	0
ROBINS		0	0	$10,000	0
ROBINS		0	0	0	0
ALBURNETT		0	0	0	0
MARION		0	0	$150,000	0
MARION		0	0	0	0
MARION		0	0	0	0
CEDAR RAPIDS	07/11/2011	0	0	0	0
MARION		0	0	0	0
CENTER PT		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CENTER PT		0	0	0	0
MT VERNON		0	0	$5,000	0
WALKER		0	0	$20,000	0
TODDVILLE		0	0	0	0
CENTER PT		0	0	$25,000	0
CENTER PT		0	0	0	0
PALO		0	0	0	0
TODDVILLE		0	0	$25,000	0
ALBURNETT		0	0	$25,000	0
WALKER		0	0	$50,000	0
MARION ARPT	07/22/2011	0	0	0	0
HIAWATHA		0	0	0	0
MT VERNON		0	0	$10,000	0
HIAWATHA	07/24/2011	0	0	0	0
HIAWATHA		0	0	0	0
MT VERNON		0	0	$2,000	0
HIAWATHA	08/08/2011	0	0	0	0
ELY	04/14/2012	0	0	0	0

Table 36 (cont.): Linn County Thunderstorm Wind Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
(CID)CEDAR RAPIDS AR	06/29/2012	0	0	0	0
WESTERN		0	0	$25,000	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
MARION		0	0	0	0
MARION		0	0	0	0
HIAWATHA		0	0	0	0
CENTER PT		0	0	0	0
BEVERLY		0	0	0	0
MARION		0	0	0	0
CENTER PT		0	0	$5,000	0
CENTER PT		0	0	0	0
CEDAR RAPIDS		0	0	0	0
SPRINGVILLE		0	0	0	0
SPRINGVILLE		0	0	0	0
SPRINGVILLE		0	0	0	0
CENTRAL CITY		0	0	$25,000	0
COVINGTON		0	0	$30,000	0
CEDAR RAPIDS		0	0	0	0
SPRINGVILLE		0	0	0	0
CEDAR RAPIDS	07/25/2012	0	0	0	0
(CID)CEDAR RAPIDS AR		0	0	0	0
CEDAR RAPIDS		0	0	0	0
MT VERNON		0	0	0	0
(CID)CEDAR RAPIDS AR	08/04/2012	0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
(CID)CEDAR RAPIDS AR		0	0	0	0
CEDAR RAPIDS		0	0	0	0
HIAWATHA		0	0	0	0
ELY		0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
MT VERNON	09/05/2012	0	0	0	0
(CID)CEDAR RAPIDS AR	09/07/2012	0	0	0	0
CEDAR RAPIDS	05/19/2013	0	0	0	0
CEDAR RAPIDS		0	0	0	0
CEDAR RAPIDS		0	0	0	0
(CID)CEDAR RAPIDS AR		0	0	0	0
COVINGTON		0	0	0	0
MARION		0	0	0	0
PARIS		0	0	0	0
ALBURNETT	06/21/2013	0	0	0	0
CEDAR RAPIDS		0	0	0	0
BERTRAM	06/26/2013	0	0	0	0

Table 36 (cont.): Linn County Thunderstorm Wind Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS	07/22/2013	0	0	0	0
PRAIRIEBURG		0	0	0	0
WESTERN	09/19/2013	0	0	0	0
CEDAR RAPIDS		0	0	0	0
HIAWATHA		0	0	0	0
Total	263 events	0	5	$8.347 million	$155,000

Source: National Climatic Data Center, January 2014

Considering lightning, there have been thirteen major events recorded in Linn County since 1996. In all except one, the lightning events occurred in the Cedar Rapids metropolitan area. One lightning related death occurred in September 2005, and three lightning related injuries occurred during different events in 1997, 2001, and 2005. Overall, the reported property damage totals $183,000. The largest amounts of damage were reported in June 2011 and September 2012. A house in Cedar Rapids was struck by lightning and caught fire in 2011, and a building on the Cornell College campus in Mount Vernon was struck by lightning in 2012. Refer to Table 37.

Table 37: Linn County Lightning Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS	06/21/1997	0	0	$15,000	0
CEDAR RAPIDS	07/27/1997	0	1	0	0
CEDAR RAPIDS	06/04/2000	0	0	$20,000	0
CEDAR RAPIDS	08/05/2000	0	0	$6,000	0
CEDAR RAPIDS	10/03/2000	0	0	0	0
FAIRFAX	07/08/2001	0	1	0	0
MARION	10/22/2004	0	0	$2,000	0
(CID)CEDAR RAPIDS AR	09/04/2005	1	1	0	0
CEDAR RAPIDS	04/13/2006	0	0	0	0
CEDAR RAPIDS	06/22/2007	0	0	$25,000	0
CEDAR RAPIDS		0	0	$15,000	0
COVINGTON	06/10/2011	0	0	$50,000	0
MT VERNON	09/07/2012	0	0	$50,000	0
Total	13 events	1	3	$183,000	0

Source: National Climatic Data Center, January 2014

Because hail often accompanies a thunderstorm, hail events are also frequent in Linn County. Since 1996, there have been 184 recorded hail events in the county. There are no death or injuries reported, but there is over $6 million in reported property and crop damage. The majority of damage, approximately $5 million, occurred during a hail event in May 2003 in Fairfax and Cedar Rapids. Aside from this major event, a hail event in September 2010 resulted in $500,000 of reported damage in Marion. All other hail events resulted in $250,000 or less in reported property damage, and the majority of hail events resulted in relatively small amount of damage. Refer to Table 38.

Table 38: Linn County Hail Events 1996 – 2013

Location	Date	Size	Deaths	Injuries	Property Damage	Crop Damage
VIOLA	04/19/1996	0.75 in.	0	0	0	0
CEDAR RAPIDS	05/18/1997	1.00 in.	0	0	0	0
COGGON		2.00 in.	0	0	0	0
COGGON	06/21/1997	1.75 in.	0	0	0	0
PRAIRIEBURG		1.75 in.	0	0	0	0
COGGON	06/18/1998	2.00 in.	0	0	$14,000	0
ELY	05/18/2000	1.75 in.	0	0	0	0
CEDAR RAPIDS		1.75 in.	0	0	0	0
PALO		1.75 in.	0	0	0	0
CEDAR RAPIDS		2.50 in.	0	0	0	0
PALO	06/01/2000	1.00 in.	0	0	0	0
WALKER	07/26/2000	0.88 in.	0	0	0	0
MARION	09/10/2000	0.75 in.	0	0	0	0
PRAIRIEBURG	09/11/2000	1.50 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
CEDAR RAPIDS	05/10/2001	1.00 in.	0	0	0	0
FAIRFAX		1.75 in.	0	0	0	0
CEDAR RAPIDS		1.75 in.	0	0	$50,000	0
CEDAR RAPIDS		1.75 in.	0	0	0	0
ALBURNETT		1.00 in.	0	0	0	0
WALKER	12/05/2001	1.00 in.	0	0	0	0
FAIRFAX	03/09/2002	0.75 in.	0	0	0	0
ALBURNETT	05/30/2002	1.00 in.	0	0	0	0
SPRINGVILLE		1.00 in.	0	0	0	0
MARION		1.00 in.	0	0	0	0
SPRINGVILLE		0.88 in.	0	0	0	0
SPRINGVILLE		0.75 in.	0	0	0	0
CEDAR RAPIDS	06/04/2002	0.88 in.	0	0	0	0
PALO		0.88 in.	0	0	0	0
MARION	07/28/2002	0.88 in.	0	0	0	0
FAIRFAX	05/10/2003	1.75 in.	0	0	$3 million	0
CEDAR RAPIDS		1.75 in.	0	0	$2 million	0
CEDAR RAPIDS		0.75 in.	0	0	0	0
CEDAR RAPIDS	05/14/2003	1.00 in.	0	0	$250,000	0
(CID)CEDAR RAPIDS AR		0.75 in.	0	0	0	0
HIAWATHA		0.75 in.	0	0	0	0
HIAWATHA	06/18/2003	0.88 in.	0	0	0	0
SPRINGVILLE	07/05/2003	0.75 in.	0	0	$15,000	$10,000
COGGON	07/31/2003	1.50 in.	0	0	$200,000	$10,000
CEDAR RAPIDS	08/25/2003	1.00 in.	0	0	$30,000	0

Table 38 (cont.): Linn County Hail Events 1996 – 2013

Location	Date	Size	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS	05/07/2004	0.75 in.	0	0	0	0
CEDAR RAPIDS		0.88 in.	0	0	0	0
TODDVILLE		0.75 in.	0	0	0	$5,000
HIAWATHA		0.75 in.	0	0	0	$2,000
ROBINS		1.75 in.	0	0	$20,000	$2,000
MARION		1.75 in.	0	0	$20,000	$2,000
SPRINGVILLE		1.75 in.	0	0	$20,000	$10,000
FAIRFAX	05/17/2004	0.75 in.	0	0	0	$2,000
CEDAR RAPIDS		1.00 in.	0	0	$5,000	0
FAIRFAX		1.00 in.	0	0	$5,000	$10,000
(CID)CEDAR RAPIDS AR		1.00 in.	0	0	$10,000	0
MT VERNON		0.75 in.	0	0	0	$5,000
CEDAR RAPIDS	05/21/2004	1.75 in.	0	0	$4,000	0
SPRINGVILLE		1.75 in.	0	0	$5,000	0
MARION	10/22/2004	1.75 in.	0	0	$8,000	0
WALKER	06/04/2005	1.00 in.	0	0	$3,000	0
CEDAR RAPIDS		0.88 in.	0	0	0	0
HIAWATHA	06/29/2005	0.88 in.	0	0	0	0
LISBON	04/02/2006	1.00 in.	0	0	$1,000	0
CEDAR RAPIDS	04/13/2006	0.88 in.	0	0	0	0
ALBURNETT		1.75 in.	0	0	0	0
ALBURNETT		1.75 in.	0	0	$8,000	0
CEDAR RAPIDS		1.00 in.	0	0	$8,000	0
FAIRFAX		1.50 in.	0	0	$2,000	0
CEDAR RAPIDS		1.00 in.	0	0	$3,000	0
CEDAR RAPIDS		1.00 in.	0	0	$10,000	0
CEDAR RAPIDS		1.50 in.	0	0	$50,000	0
HIAWATHA		1.25 in.	0	0	$4,000	0
CEDAR RAPIDS		1.00 in.	0	0	$2,000	0
CEDAR RAPIDS		1.50 in.	0	0	0	0
MARION		0.75 in.	0	0	0	0
LISBON		1.00 in.	0	0	$2,000	0
CEDAR RAPIDS		1.00 in.	0	0	$2,000	0
FAIRFAX		1.75 in.	0	0	$3,000	0
CEDAR RAPIDS		0.75 in.	0	0	0	0
CEDAR RAPIDS	04/16/2006	0.75 in.	0	0	0	0
TODDVILLE	06/06/2006	0.75 in.	0	0	0	0
MARION		0.88 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	$5,000	0
MARION		0.75 in.	0	0	0	0
BERTRAM		0.88 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
PALISADES KEPLER SP		0.88 in.	0	0	0	0
MARION	07/25/2006	0.75 in.	0	0	0	0
VIOLA		1.00 in.	0	0	$2,000	$1,000

Table 38 (cont.): Linn County Hail Events 1996 – 2013

Location	Date	Size	Deaths	Injuries	Property Damage	Crop Damage
MARION	08/10/2006	0.88 in.	0	0	0	0
CEDAR RAPIDS	03/31/2007	0.88 in.	0	0	0	0
MT VERNON		0.75 in.	0	0	0	0
MARION	04/02/2007	0.75 in.	0	0	0	0
TODDVILLE		0.88 in.	0	0	0	0
LAFAYETTE		0.75 in.	0	0	0	0
CEDAR RAPIDS	07/16/2007	1.00 in.	0	0	0	0
CEDAR RAPIDS		0.88 in.	0	0	0	0
MARION MC BRIDE ARPT		1.00 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
CEDAR RAPIDS	08/15/2007	0.75 in.	0	0	0	0
CEDAR RAPIDS		0.88 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
ELY		0.75 in.	0	0	0	0
PALO	04/25/2008	0.75 in.	0	0	0	0
CEDAR RAPIDS	06/12/2008	0.75 in.	0	0	0	0
BERTRAM		0.88 in.	0	0	0	0
SPRINGVILLE		2.00 in.	0	0	0	0
CEDAR RAPIDS	06/14/2008	0.75 in.	0	0	0	0
MT VERNON	06/15/2008	0.75 in.	0	0	0	0
MARION	06/25/2008	0.75 in.	0	0	0	0
PRAIRIEBURG	07/02/2008	0.88 in.	0	0	0	0
PRAIRIEBURG		0.88 in.	0	0	0	0
CEDAR RAPIDS	04/25/2009	0.75 in.	0	0	0	0
CENTER PT	04/26/2009	0.88 in.	0	0	0	0
LAFAYETTE		1.00 in.	0	0	0	0
COGGON		1.75 in.	0	0	0	0
LAFAYETTE	06/19/2009	0.88 in.	0	0	0	0
CENTER PT	07/24/2009	1.00 in.	0	0	0	0
LAFAYETTE	04/05/2010	1.00 in.	0	0	0	0
CENTRAL CITY		1.00 in.	0	0	0	0
COGGON		1.25 in.	0	0	0	0
PARIS	04/06/2010	0.75 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
MARION		1.00 in.	0	0	0	0
BEVERLY	05/25/2010	0.75 in.	0	0	0	0
CENTER PT	06/18/2010	0.75 in.	0	0	0	0
FAIRFAX		1.00 in.	0	0	0	0
BERTRAM	07/23/2010	0.88 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
MARION		0.75 in.	0	0	0	0
MARION		1.00 in.	0	0	0	0
MARION		1.00 in.	0	0	0	0

Table 38 (cont.): Linn County Hail Events 1996 – 2013

Location	Date	Size	Deaths	Injuries	Property Damage	Crop Damage
HIAWATHA	09/21/2010	1.00 in.	0	0	0	0
HIAWATHA		1.00 in.	0	0	0	0
CEDAR RAPIDS		1.75 in.	0	0	0	0
MARION		1.00 in.	0	0	0	0
MARION		1.75 in.	0	0	$500,000	0
MARION		1.50 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
CENTER PT	03/22/2011	0.75 in.	0	0	0	0
(CID)CEDAR RAPIDS AR	04/03/2011	1.75 in.	0	0	0	0
HIAWATHA		1.00 in.	0	0	0	0
CENTRAL CITY ARPT		1.00 in.	0	0	0	0
PRAIRIEBURG		1.25 in.	0	0	0	0
ELY	05/22/2011	0.88 in.	0	0	0	0
MT VERNON		0.88 in.	0	0	0	0
WAUBEEK	06/08/2011	1.75 in.	0	0	0	0
ROBINS		0.75 in.	0	0	0	0
PRAIRIEBURG		1.00 in.	0	0	0	0
PRAIRIEBURG		1.00 in.	0	0	0	0
CENTER PT		0.75 in.	0	0	0	0
HIAWATHA		0.88 in.	0	0	0	0
CEDAR RAPIDS		1.25 in.	0	0	0	0
MARION		1.75 in.	0	0	0	0
CEDAR RAPIDS		2.00 in.	0	0	0	0
CEDAR RAPIDS		1.75 in.	0	0	0	0
CEDAR RAPIDS		1.50 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
MARION		1.00 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
MARION ARPT		1.00 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
MT VERNON		1.00 in.	0	0	0	0
HIAWATHA	08/08/2011	1.00 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
HIAWATHA		1.00 in.	0	0	0	0
HIAWATHA		1.00 in.	0	0	0	0
CEDAR RAPIDS		0.88 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0

Table 38 (cont.): Linn County Hail Events 1996 – 2013

Location	Date	Size	Deaths	Injuries	Property Damage	Crop Damage
SPRINGVILLE	03/31/2012	1.00 in.	0	0	0	0
HIAWATHA		0.88 in.	0	0	0	0
HIAWATHA		1.00 in.	0	0	0	0
HIAWATHA		1.00 in.	0	0	0	0
MARION MC BRIDE ARPT		0.75 in.	0	0	0	0
CEDAR RAPIDS		0.88 in.	0	0	0	0
MARION		0.75 in.	0	0	0	0
CEDAR RAPIDS		0.75 in.	0	0	0	0
MARION		0.75 in.	0	0	0	0
CEDAR RAPIDS		0.75 in.	0	0	0	0
MARION		0.75 in.	0	0	0	0
CEDAR RAPIDS	04/09/2013	0.75 in.	0	0	0	0
CEDAR RAPIDS		1.00 in.	0	0	0	0
CEDAR RAPIDS		0.75 in.	0	0	0	0
MARION	08/05/2013	0.88 in.	0	0	0	0
WESTERN	09/19/2013	0.88 in.	0	0	0	0
Total	184 events		0	0	$6.261 million	$59,000

Source: National Climatic Data Center, January 2014

In combination, the thunderstorm, lightning, and hail hazard is the most frequently occurring natural hazard in Linn County. Every community has been affected, although not every community has reported injuries, deaths, or damage. The urban area, due to relatively dense development, have been affected more severely than rural areas in terms of reported property damage.

Probability

Iowa experiences on average between 30 and 50 thunderstorm days per year. Several of these thunderstorms days include Linn County each year. Because of the humid continental climate in Iowa, the conditions that create severe thunderstorms are typically present. To become severe, a storm needs moisture to form clouds and rain, relatively warm and unstable air that can rise rapidly, and weather fronts and convective systems that lift air masses.

In Linn County, it is highly likely a thunderstorm and lighting event will occur at least once each year, if not several times during a severe summer season. Thunderstorm and lightning events are of the mostly frequently occurring hazards in Linn County. This probability estimate is based historical occurrences, the *2013 Iowa Hazard Mitigation Plan*, and local knowledge.

Based on historical occurrences in Linn County, a hail event is highly likely with a probability of occurring at least once each year. In a year with severe weather, Linn County will highly likely experience several hail events in the spring and summer months.

Magnitude and Severity

Severe thunderstorms can be quite expansive with areas of localized severe conditions. Most severe thunderstorm cells are 5 to 25 miles wide with a larger area of heavy rain and strong winds around the main cell. Depending on the size, a thunderstorm can affect several or just one community in Linn County.

Like tornadoes, thunderstorms and lightning can cause death, serious injury, and substantial property damage. Those in unprotected areas, mobile homes, or automobiles during a storm are at risk. Sudden strong winds often accompany a severe thunderstorm and may blow down trees across, power lines, homes, especially mobile homes, and businesses. High winds can also push vehicles off of the road. Straight-line winds are typically responsible for most damage during a thunderstorm event.

Lightning presents the greatest immediate danger to people and livestock during a thunderstorm. It is the second most frequent weather-related killer in the U.S. with nearly 100 deaths and 500 injuries each year according to the *2010 Iowa Hazard Mitigation Plan*. Floods and flash floods are the number one cause of weather related deaths in the United States. Livestock and people who are outdoors, especially under a tree or other natural lightning rods, in or on water, or on or near hilltops are at risk from lightning. The power of lightning's electrical charge and intense heat can electrocute people and livestock on contact, split trees, ignite fires, and cause electrical failures.

Thunderstorms can produce hail that can cause injury, damage homes and businesses, break glass, and destroy vehicles. Flash floods and tornadoes can develop during thunderstorms as well. People who are in automobiles or along low-lying areas when flash flooding occurs and people who are in mobile homes are vulnerable to the impacts of severe thunderstorms. One or more severe thunderstorms occurring over a short period, especially on saturated ground, can lead to flooding and cause extensive power and communication outages as well as agricultural damage.

In Linn County, when a future thunderstorm event occurs, the magnitude and severity will likely be limited. Injuries will likely not result in permanent disability, although one thunderstorm has resulted in one death. Severe damage could affect 10% to 25% of Linn County, and any facility shutdown could last a week or more.

The land area affected by a hail event is often the same size or smaller than the area affected by the storm that produces the hail. Typically, a hail event occurs within a 15 mile diameter around the center of the storm. Historical hail events in Linn County have been widespread overall due to the storms moving through an entire community.

Hails events are rarely a direct cause of death but can cause injuries to humans, pets, and livestock that are outdoors during a storm. Hail can cause widespread damage to buildings, infrastructure, and vehicles. Damage to buildings is usually limited to damaged windows, roofs, and exteriors.

Agricultural crops are extremely vulnerable because a hailstorm can strip leaves or completely destroy plants. The peak time for hailstorm events to occur in Iowa coincides with the agricultural season making hail damage a common risk. Factoring agricultural crop damage, hailstorm events can cause millions in damage annually in Iowa. It is important to note, most of the financial impacts of hail damage are covered by crop and hazard insurance.

In a future hail event in Linn County, the magnitude and severity of the event is likely to be limited based on historical occurrences. For property damage, 10% to 25% could be severely damaged, and injuries would not likely result in permanent disability. There is a possibility that some facilities and services may shutdown, but the period of time would likely be short, lasting less than a week.

Warning Time

The National Weather Service issues severe thunderstorm watches and warnings as well as statements about severe weather and localized storms. These messages are broadcast over NOAA Weather Alert Radios and area television and radio stations. Weather forecasting and severe weather warnings issued by the National Weather Service usually provide residents and visitors adequate warning time, which is 12 to 24 hours. Problems arise when warnings are ignored or not understood by residents and visitors.

Hail events can usually be predicted in conjunction with a severe storm that has conditions suitable for creating hail. The National Weather Service issues severe thunderstorm watches and warnings as well as statements about what type of severe weather might be produced during a storm. These messages are broadcast over NOAA Weather Alert Radios, television, and regular radio stations. Most often, warnings provide residents and visitors adequate time to prepare for a storm, which is approximately 12 to 24 hours in advance. Some hail events, though, may occur without warning during periods of volatile severe weather, typically when conditions are ideal for a tornado.

Duration

Depending on the size and severity of a thunderstorm and lightning event, the negative impacts can affect a community for a relatively short period of time. Typically, thunderstorm and lightning events that occur in conjunction with other hazards like flash flood, flood, hail, tornado, etc. affect a community for an extended period of time due to damage and shutdown of facilities and services. Independently, a thunderstorm and lightning event will likely impact Linn County for less than a day.

A hail event is typically short-term lasting not more than six hours. In most occurrences, hailstorm events are just a few minutes within a larger storm that can occur over several hours.

Definition of Hazard

A tornado is a violent whirling wind with a rotating funnel shaped cloud extending down. Rotating wind speeds can exceed 300 mph and travel across the ground at average speeds of 25 - 30 mph. A tornado path can be a few yards to a mile wide, but an average tornado is a few hundred yards wide. A tornado can move over land for distances ranging from short hops to miles.

Before 2007, the Fujita scale was used to rate the magnitude of a tornado. The scale is a range of values for wind speed, frequency, average damage path width, and potential damage. The current rating scale is the Enhanced Fujita scale, which uses more accurate ranges for wind speed and more detailed analysis of damage.

Fujita Scale		Enhanced Fujita Scale	
Scale	**Wind Speed**	**Scale**	**Wind Speed**
F0	40-72 mph	EF0	68-85 mph
F1	73-112 mph	EF1	86-110 mph
F2	113-157 mph	EF2	111-135 mph
F3	158-206 mph	EF3	136-165 mph
F4	207-260 mph	EF4	166-200 mph
F5	261-318 mph	EF5	200+ mph

A windstorm is the extreme wind associated with severe storms. Windstorms may have a destructive path of up to tens of miles wide. These events can produce straight lines winds in excess of 64 knots. The Beaufort scale, which ranges 0 – 12, is typically used to determine the magnitude of a windstorm.

Beaufort Scale	Description	Wind Speed
0	Calm	<1 knot
1	Light air	1-3 knots
2	Light breeze	4-6 knots
3	Gentle breeze	7-10 knots
4	Moderate breeze	11-16 knots
5	Fresh breeze	17-21 knots
6	Strong breeze	22-27 knots
7	Near gale	28-33 knots
8	Gale	30-40 knots
9	Strong gale	41-47 knots
10	Storm	48-55 knots
11	Violent storm	56-63 knots
12	Hurricane	>64 knots

Potential Hazard Area

The potential hazard area for a tornado and windstorm in Linn County is countywide.

Historical Occurrences

Since 1996, there have been 20 tornados in Linn County. In most years, there is at least one tornado and often several, but there were no tornados reported in 1996, 2002, and not since 2009. In total, one injury has been reported, and over $3.4 million in property and crop damage has been reported. Refer to Table 39. The injury, due to sheet metal ripped from a barn, was reported in May 2000 in a tornado that affected Alburnett. The highest magnitude tornado occurred in May 2004 in Palo, and there was $300,000 in property and crop damage. The most damage occurred in Cedar Rapids in July 2003. Like all severe weather hazards, Cedar Rapids often sustains higher amounts of damage due to dense development.

Table 39: Linn County Tornados 1996 – 2013

Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
LISBON	05/18/1997	F1	0	0	0	0
CENTER PT	05/08/1998	F0	0	0	$500	0
TODDVILLE		F0	0	0	0	0
PALO	05/28/1998	F0	0	0	0	0
CEDAR RAPIDS AIRPARK		F0	0	0	0	0
LISBON	06/18/1998	F0	0	0	0	0
CEDAR RAPIDS	06/10/1999	F0	0	0	0	0
COGGON		F0	0	0	0	0
ALBURNETT	05/31/2000	F1	0	1	$50,000	0
CEDAR RAPIDS	04/11/2001	F0	0	0	0	0
COVINGTON	07/20/2003	F2	0	0	$500,000	$45,000
CEDAR RAPIDS		F2	0	0	2 million	0
MT VERNON		F1	0	0	$10,000	$10,000
PALO	05/21/2004	F3	0	0	$250,000	$50,000
MARION	08/26/2004	F1	0	0	$10,000	0
WHITTIER		F1	0	0	0	$10,000
WAUBEEK	06/29/2005	F0	0	0	0	$5,000
MARION	04/13/2006	F0	0	0	$70,000	0
PARIS	07/18/2007	EF1	0	0	$50,000	0
LAFAYETTE	04/26/2009	EF1	0	0	$500,000	0
Total	20 events		0	1	$3.44 million	$120,000

Source: National Climatic Data Center, January 2014

A funnel cloud is a visible predictor for a tornado event. In Linn County there have been twelve funnel cloud events since 1996. See Table 40.

Table 40: Linn County Funnel Cloud Events 1996 – 2013

Location	Date
PALO	07/10/2000
(CID)CEDAR RAPIDS AR	05/10/2001
FAIRFAX	
CEDAR RAPIDS	
PRAIRIEBURG	
MT VERNON	
PALO	06/12/2002
PALO	
CEDAR RAPIDS	
CEDAR RAPIDS	07/20/2003
CEDAR RAPIDS	
(CID)CEDAR RAPIDS AR	05/17/2004
Total	12 events

Source: National Climatic Data Center, January 2014

Considering windstorms in general rather than a tornado, there have been two strong wind events and ten high wind events in Linn County. A high wind event is a windstorm with measurable wind speed that is gale force and stronger. Among all windstorm events, there were no deaths or injuries reported. On the other hand, over $800,000 in property and crop damage were reported. Refer to Tables 41 – 42.

Table 41: Linn County Strong Wind Events 1996 – 2013

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	04/23/2001	0	0	0	0
LINN (ZONE)	05/12/2010	0	0	$500	0
Total	2 events	0	0	$500	0

Source: National Climatic Data Center, January 2014

Table 42: Linn County High Wind Events 1996 – 2013

Location	Date	Deaths	Injuries	Magnitude	Property Damage	Crop Damage
LINN (ZONE)	04/06/1997	0	0	50 knots	$250,000	0
LINN (ZONE)	09/29/1997	0	0	52 knots	0	0
LINN (ZONE)	11/09/1998	0	0	53 knots	0	0
LINN (ZONE)	02/25/2001	0	0	46 knots	0	0
LINN (ZONE)	02/11/2003	0	0	50 knots	0	0
LINN (ZONE)	06/10/2003	0	0	50 knots	$500,000	$50,000
LINN (ZONE)	10/26/2008	0	0	50 knots	0	0
LINN (ZONE)	08/03/2009	0	0	53 knots	$5,000	0
LINN (ZONE)	05/11/2011	0	0	52 knots	0	0
LINN (ZONE)	06/27/2011	0	0	52 knots	0	0
Total	10 events	0	0		$755,000	$50,000

Source: National Climatic Data Center, January 2014

Probability

According to the *2010 Iowa Hazard Mitigation Plan*, Iowa is ranked third in the nation for the number of tornadoes that occur per 10,000 square miles. From 1950 – 2010, Iowa averaged 47 tornado events per year. Most tornadoes occur in the spring and summer months, but tornadoes have occurred in every month of the year.

Tornado events do not occur every year in Linn County. When a tornado event does occur, there are typically several tornadoes produced within a short period of time affecting multiple areas in the county. Funnel cloud events, which indicate the strong chance of a tornado occurring, also do not occur annually, but several funnel clouds are typically spotted in a short period of time. The average period of time between tornado and funnel cloud events is approximately three years.

The entire United States is subject to various types of windstorm events. According to the *2010 Iowa Hazard Mitigation Plan*, Iowa is likely to experience 15-20 windstorm events per year. Windstorm events in Iowa are usually associated with thunderstorms and winter storms.

Looking toward the future, it is likely a tornado or windstorm event will occur in Linn County within the next five years. The estimated probability of a tornado event occurring is approximately once every three years. This probability estimate is based on historical occurrences, parameters defined in the *2013 Iowa Hazard Mitigation Plan*, and local knowledge.

Magnitude and Severity

The most severe tornado events that have occurred in Linn County are F2 and F3 rated, but the majority of tornadoes are F0 and F1. Based on historical occurrences, Linn County will most likely be affected by an EF0 or EF1 tornado in the next five years although a higher magnitude tornado is possible.

The most severe windstorm event that occurred in Linn County since 1996 had a wind speed of 53 knots, but generally the majority of windstorms had a wind speed in the 50 knots range. Based on historical occurrences, Linn County will most likely be affected by windstorm events rated 10 and 11 on the Beaufort scale, although hurricane winds are possible.

During a tornado and windstorm event, everyone located in or near the path of the tornado is vulnerable. There are several groups of people who are especially vulnerable during tornado events. These people include mobile or manufacturing home residents, outdoor recreation and campground visitors, outdoor workers, motorists, elderly, young, disabled individuals with limited mobility, and residents or workers in buildings without basements.

Generally the destructive path of a tornado is a few hundred feet in width, but stronger tornadoes can leave a path of devastation up to a mile wide. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. In rare tornado events, entire neighborhoods and even communities have been destroyed.

Windstorms can have a destructive path that is several miles wide. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with windstorms and may cause significant damage to a wider area. It is often difficult to separate windstorm and tornado damage when wind speed exceeds 64 knots.

Damage from a tornado or windstorm can range from broken tree branches, shingle damage to roofs, and broken windows all the way to complete destruction of well-constructed buildings, infrastructure, and large trees. Tornadoes can also impact critical services, especially electrical power. Buried services such as water and gas are less vulnerable but can be negatively affected by their system components located above ground.

For Iowa and Linn County, it is important to note varying degrees of crop damage can occur during a tornado or windstorm event. Wind can flatten fields, break plant stalks, or twist plants. Windstorm events can completely destroy a crop or cause limited damage than can reduce crop yields. Both circumstances can cause economic hardship for the agricultural sectors of Iowa and Linn County's economy.

If a tornado or windstorm were to occur in Linn County, the magnitude and severity would likely be limited. A future tornado event may result in injuries that do not result in permanent disability, 10% to 25% of a jurisdiction's property severely damaged, and shutdown of facilities and services for approximately a week. This magnitude and severity estimate is based on historical occurrences, parameters defined in the *2010 Iowa Hazard Mitigation Plan*, and local knowledge.

Warning Time

Advancement in weather forecasting has allowed tornado watches to be issued hours in advance of a tornado event. The best lead time is approximately 30 minutes. A tornado can change paths very rapidly limiting the amount of warning time for the people located in its path. Outside of weather forecasting, there may not be visible indicators of a tornado on the ground due to blowing dust or driving rain and hail, which limits the ability to spot and report a tornado.

A future tornado event in Linn County will likely have minimal, less than six hours, or no warning time. This warning time estimate is based on historical occurrences, the *2010 Iowa Hazard Mitigation Plan*, and local knowledge.

The National Weather Service has developed a windstorm warning system that issues windstorm watches 12 to 24 hours in advance. Advisories are issued when existing or imminent windstorms could impact an area. Similar to tornado warnings, the typical warning time for a windstorm is 30 minutes. It is important to note that Linn County activates the outdoor warning system for storm events that are predicted to have a wind speed of 70 mph or greater, which are rated 11 and greater on the Beaufort scale.

Duration

Normally a tornado will stay on the ground for no more than 20 minutes. However, a tornado can touch ground several times in different areas. Typically, local response during a tornado event is for the immediate threat to life and property. After a tornado event, local response is for the individuals, services, and structures that were negatively impacted by the tornado.

Based on historical occurrences in Linn County, a series of tornadoes can develop in a few hours prolonging the amount of time jurisdictions can be impacted by a tornado event but the event lasts less than six hours. In Linn County, a windstorm event can last several hours but usually not more than an entire day. This duration estimate is based on historical occurrences, the *2010 Iowa Hazard Mitigation Plan*, and local knowledge.

Hazardous Materials Incident

Definition of Hazard

Generally, a hazardous materials incident includes the accidental release of flammable, explosive, toxic, noxious, corrosive, oxidizing, an irritant or radioactive substances or mixtures that can pose a risk to life, health or property possibly requiring evacuation.

A hazardous materials event includes fixed hazardous materials, transportation of hazardous materials, and pipeline transportation, which are 2007 Iowa Hazard Mitigation Plan hazards.

A fixed hazardous materials incident is the accidental release of hazardous materials during handling, storage, or production at a facility. Fixed incidents generally affect a localized area.

A transportation hazardous materials incident involves the accidental release of hazardous materials during the transport of materials. Transportation incidents generally affect the area where the incident occurs.

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.

Potential Hazard Area

The potential hazard area for a hazardous materials event is conditionally identified as the entire county. Areas surrounding a facilities using hazardous materials or along transportation infrastructure are immediate potential hazard areas. If materials are released in the air or water, the potential hazard area may be expanded downwind or downstream of the incident.

Historical Occurrences

Since 2000, there have been 60 hazardous materials incidents in Linn County that involve 500 or more pounds or gallons of a hazardous material. Most incidents in Linn County involve a relatively small amount of materials and are well-contained. Data for all hazardous materials incidents are available through the Hazardous Substance Incident Tracking Database maintained by the Iowa Department of Natural Resources. Refer to Table 43 for hazardous materials incidents involving 500 or more pounds or gallons, although none exceeded local capabilities.

Since 2000, the largest hazardous materials incident involved 400,000 gallons of cooling water in 2002. The most common hazardous materials released into the environment in Linn County include fuel, oil, and anhydrous ammonia, which is due to the strong agricultural sector in Iowa. Regardless of the amount of materials involved in a hazardous materials event, spillage in handling, storage, and transportation is most common.

Table 43: Linn County Hazardous Materials Events 500 gallon/pounds+ 2000 - 2013

Reported Date	Mode	Material Name	Amount	Unit
2/11/2000	Handling And Storage	Sodium Hydroxide	12,000	gal
3/15/2000	Handling And Storage	Sulfur Dioxide	500	lbs
5/23/2000	Handling And Storage	Starch Slurry	500	gal
5/31/2000	Handling And Storage	Process Wastewater	4,000	gal
7/8/2000	Handling And Storage	Acetic Acid	1,000	gal
8/29/2000	Handling And Storage	Furfural	900	gal
1/8/2001	Handling And Storage	Process Wastewater	500	gal
5/9/2001	Other	Wastewater	4,000	gal
6/26/2001	Handling And Storage	Filtrate with Sludge Mixture	500	gal
9/7/2001	Handling And Storage	Anhydrous Ammonia	6,000	lbs
9/18/2001	Handling And Storage	Sodium Hydroxide	3,000	gal
3/8/2002	Other	Thickened Primary Sludge	500	gal
3/8/2002	Handling And Storage	Soy Meal Process Water	1,000	gal
4/15/2002	Handling And Storage	Sulfuric Acid 93%	1,200	gal
8/2/2002	Handling And Storage	Sewage Sludge	97,000	gal
8/12/2002	Handling And Storage	Corn Starch	1,500	gal
9/20/2002	Handling And Storage	Corn Wet Milling Water	1,830	gal
12/19/2002	Handling And Storage	Cooling Water	400,000	gal
12/29/2002	Handling And Storage	Sulfuric Acid	2,500	gal
4/14/2003	Handling And Storage	Mill Water	4,000	gal
6/17/2003	Handling And Storage	Cooling Water	50,000	gal
7/13/2003	Handling And Storage	Low pH Water from Ion Exchange Tanks	100,000	gal

Table 43 (cont.): Linn County Hazardous Materials Events 500 gallon/pounds+ 2000 – 2013

Reported Date	Mode	Material Name	Amount	Unit
4/13/2004	Transportation	Anhydrous Ammonia	3,500	lbs
5/20/2004	Transformer	1,3-Butadiene	1,400	lbs
7/26/2004	Handling And Storage	Hydrochloric Acid	10,000	gal
10/5/2004	Handling And Storage	Denatured Alcohol	5,027	gal
10/22/2004	Transportation	Coal	710	ton
12/3/2004	Transportation	Anhydrous Ammonia	5,484	lbs
12/17/2004	Handling And Storage	Salt Water	7,000	gal
1/31/2005	Handling And Storage	Process Wastewater	4,000	gal
11/10/2005	Handling And Storage	Low pH Cooling Tower Water	7,560	gal
12/10/2005	Handling And Storage	Bilge Water	500	gal
12/16/2005	Handling And Storage	Bilge Water	1,800	gal
12/23/2005	Handling And Storage	Bilge Water	6,480	gal
12/6/2006	Handling And Storage	Corn Syrup	1,980	gal
1/2/2007	RR Incident	Diesel Fuel	1,000	gal
5/29/2007	Pipeline	Anhydrous Ammonia	612	gal
6/8/2007	Handling And Storage	Salt Water	1,500	gal
6/16/2007	Transportation	32% liquid fertilizer	700	gal
12/10/2007	Handling And Storage	Diesel Fuel	1,000	gal
12/23/2007	Handling And Storage	Corn Mash and Water	22,000	gal
2/19/2008	Other	Chlorine	100,000	gal
2/22/2008	Other	Water	100,000	gal
5/3/2008	Fire	Tires	50,000	units
5/26/2008	Handling And Storage	Starch Slurry	1,000	gal
10/5/2008	Handling And Storage	Corn Mash and Water	5,000	gal
11/3/2008	Vandalism	Anhydrous Ammonia	1,700	gal
10/23/2009	Handling And Storage	Process Wastewater	1,350	gal

Table 43 (cont.): Linn County Hazardous Materials Events 500 gallon/pounds+ 2000 – 2013

Reported Date	Mode	Material Name	Amount	Unit
5/28/2010	Fire	Petroleum Contaminated Water	100,000	gal
10/17/2010	Handling And Storage	Anhydrous Ammonia	935	lbs
6/30/2011	Handling And Storage	Water	750	gal
10/13/2011	Handling And Storage	Sodium Hydroxide	10,800	gal
3/15/2012	Handling And Storage	Anhydrous Ammonia	1,156	lbs
8/14/2012	Transportation	Bio-solids	500	lbs
12/22/2012	Handling And Storage	Jet A fuel	6,000	gal
4/15/2013	Railroad	#1 Diesel Fuel	1,500	gal
4/18/2013	Handling And Storage	Caustic Soda	1,000	gal
5/13/2013	Transportation	32% Liquid Nitrogen Fertilizer	700	gal
9/6/2013	Pipeline	Water	10,000	gal
10/31/2013	Handling And Storage	Maltose	500	lbs
Total	60 events			

Source: Iowa Hazardous Substance Incident Tracking Database, January 2014

Since 2000, there have been two pipeline transportation incidents in Linn County. The incidents involved anhydrous ammonia and water. Also see Table 39 for pipeline transportation incidents in Linn County.

Probability

Minor hazardous materials incidents occur frequently in Linn County. Most incidents are not a major threat due to small quantities or immediate containment. Any of the frequent incidents could become a major event if materials are released in a densely populated or environmentally sensitive area and/or involves a large amount of material.

The probability of a major hazardous materials incident occurring in Linn County is occasional, which is a probability between 10% and 19% in any given year. This probability estimate is based on historical occurrences and local capability to manage the common types of hazardous materials incidents.

Magnitude and Severity

People, pets, livestock, and vegetation in close proximity to facilities producing, storing, or transporting hazardous substances are at risk. Some hazardous materials may cause immediate death, disablement, or sickness if absorbed through the skin, injected, ingested, or inhaled. Some chemicals may cause painful and damaging burns to skin if they come in direct contact with your body.

Populations downstream, downwind, and downhill of a released substance are particularly vulnerable. Depending on the characteristics of the substance released, a larger area may be in danger from explosion, absorption, injection, ingestion, or inhalation. Occupants of areas previously contaminated by a persistent material may also be harmed either directly or through consumption of contaminated food and water.

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

Facilities are required to have an off-site consequence plan that addresses the population of the surrounding area. Responding personnel are required to be trained to HAZMAT Operations Level to respond to the scene, and those personnel that come into direct contact with the substances released are required to have HAZMAT Technician level training.

Throughout Linn County, there are fixed facilities with hazardous materials—farm cooperatives, manufacturers, waste and water treatment facilities, etc. In addition, Linn County has major travel routes including Interstate 380, Highway 30, 100, and 13, railroad lines, and pipelines. Refer to the risk assessment maps for transportation incident.

Hazardous materials incidents can be widespread and severe, but historical occurrences in Linn County had negligible impact. It is most likely potential hazardous materials incidents will continue to have negligible impacts, although it is possible an incident can be severe.

Warning Time

Hazardous materials incidents usually occur rapidly with minimal or no warning. Even if reported immediately, people in the area have very little time to react and/or evacuate. During some events, sheltering in-place is the best alternative to evacuation because there is no time to evacuate safely. Public address systems, television, radio, and weather radios disseminate emergency messages about incidents.

Duration

A hazardous materials incident can affect a community for a short period of time if the amount of material is relatively small and well-contained. On the other hand, a hazardous materials incident can be widespread, extremely dangerous and require long-term remediation and recovery. Response to a hazardous materials release is generally limited to the immediate effects, but response is expanded for environmental emergencies.

Infrastructure Failure

DEFINITION OF HAZARD

This hazard encompasses communication failure, energy failure, structural failure, and structural fire. This includes an extended interruption, widespread breakdown, or collapse (part or all) of any public or private infrastructure that threatens life and property.

Potential Hazard Area

The potential hazard area for infrastructure failure in Linn County is countywide.

Historical Occurrences

There have been no widespread communication failures in Linn County. There are typically multiple power outages throughout Linn County each year. The most recent and widespread power outage occurred during a major flash flooding event, which limited the use of pumps in structures.

The majority of major infrastructure failure, such as roads, bridges, or water infrastructure, is due to natural hazards that occur in Linn County. The persistent infrastructure failure that occurs in Linn County is backup of stormwater due to insufficient capacity during heavy rains or infiltration due to cracks in stormwater sewer lines. The most notable and recent infrastructure failure in Linn County occurred during a flash flood event in July 2014. A portion of the bridge on Highway 151 through Fairfax collapsed, and several portions of major highways were damaged. A driver was injured during the bridge collapse in Fairfax.

Structural fires occur often throughout Linn County, but typically, local capabilities are sufficient to respond and control the fire.

Probability

No widespread communications failures have occurred in Iowa or Lin County. Local incidents due to weather conditions, equipment failure, excavation incidents, and traffic accidents have been reported, but outages have usually been resolved in a timely manner. Widespread communications losses are unlikely due to backup systems and redundant system designs.

An extended interruption of electric, petroleum, or natural gas service, which by an actual or impending acute shortage of usable energy, could create a potential health problem for the population and possibly even mass panic. International events could potentially 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 severe winter storms can disrupt power distribution systems. If disruptions are long lasting, public shelters may need to be opened to provide shelter from extreme cold or extreme heat. Stockpiles of energy products like power generators and fuel can eliminate short disruptions.

In Linn County, there have been structural failures, primarily structural damage, which is severe weather and flood-related. Throughout Linn County, local jurisdictions inspect and maintain structures or enforce local regulations to prevent failures that can cause injury, death, or property damage. Most often, structures are closed or decommissioned before a major failure event can occur, but there is still a likely probability of a failure occurring in Linn County.

Structural fires are a frequent occurrence in some communities, but nearly all are quickly extinguished by on-site personnel or local fire departments. In Linn County, there have been recent structural fires requiring major emergency response and recovery efforts. Despite comprehensive fire prevention and education in public, commercial, and residential structures, there is a likely probability for a major structural fire to occur in Linn County.

Magnitude and Severity

Most critical communication systems have backup and redundant designs to provide continuity of service. It should be noted that Linn County has the Joint Communications Center, located in Cedar Rapids, which coordinates emergency communications emergency calls in Linn County. If a communications failure were to affect the communication center, the entire county would be affected and at risk, especially if the failure event occurred during a hazard event.

Energy failure, or power outages, can be widespread and last for several hours or a few days. Depending on the time of year, an extended period of time without power can be dangerous in extreme cold or heat conditions. In addition, power outages can limit the use of pumps or other necessary equipment to protect structures during other hazards, like flash food, that may affect an area during the outage.

Any structure in Linn County could become hazardous in the event of flooding, earthquake, fire, high winds, or other natural events. All structures are vulnerable due to normal deterioration and natural elements. Expected increases in traffic volume and weight will likely increase the vulnerability of transportation facilities in Iowa and Linn County.

The impacts of a failed structure would likely be contained to the immediate area and adjacent properties. The area could be as small as the house and yard of a fallen chimney, or the area could be relatively extensive if a failed structure is a multi-story building or a tall communication tower. Dam and levee failures would affect a much larger area and are discussed as separate hazards.

Occupants of older structures with outdated electrical systems not built to current fire codes are particularly vulnerable to fire. Structures with combustible materials are more vulnerable than steel or concrete structures. In addition, structures without early detection devices are more likely to be completely destroyed before containment by response agencies.

Structures in areas served by older, smaller, or otherwise inadequate water distribution infrastructure are also at significant risk. The fire death risk for the elderly and children under 5 years of age is more than two times that of the average population.

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. Certain circumstances, such as the involvement of highly combustible materials or high winds, can threaten a larger area. The density of a neighborhood can also make occupants and structures more vulnerable due to the potential of fire spreading.

Warning Time

A communications failure would likely occur with little or no warning. It is usually impossible to predict a communications failure. Some communications may be shut down for a short period of time for improvements or maintenance. These disruptions are usually made during periods of low demand and the people who rely on them are given notice that the system will be out of service.

A typical, more frequent type of energy failure, which is an electrical outage, does not have a warning. If an outage occurs because of severe weather, then warnings for severe weather events can be considered a warning, but it is difficult to predict whether or not utilities will be impacted. Overall, this type of energy failure cannot usually be predicted.

The failure of a structure would likely occur suddenly with little or no warning. Inspection and maintenance of public structures and enforcement of local regulation usually prevents failure or removes people who are vulnerable. Causal hazards can include fire, explosion, overloading of ice and snow, earthquakes, flooding, high wind, erosion, chemical corrosion, subsidence, and lack of general upkeep.

While fires usually start with little or no warning time, alert devices can allow time for responders to contain the fire and allow occupants to evacuate the area.

Duration

With the exception of structural failure and fires, which are handled by local response personnel, communication failure and energy failure are usually widespread in nature and may require outside resources to assist the county in emergency response.

Levee and Dam Failure

Definition of Hazard

Levee failure can be attributed to the loss of structural integrity of a flood wall or berm by erosion, piping, saturation, or under seepage causing water to inundate normally dry areas.

Dam failure is the uncontrolled release of impounded water resulting in downstream flooding, which can affect life and property. Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation, and recreation.

Dams are classified as a high, moderate, or low hazard to indicate the potential impacts of failure. Classification descriptions are:

- High Hazard – Failure may result in loss of life and extensive damage
- Moderate Hazard – Failure may damage isolated homes or cabins, industrial or commercial buildings, moderately traveled roads, interrupt major utility services; and there is no substantial risk of loss of life. Or, the dam and its impoundment are of public importance, such as water supply, public recreation, or a feature in a private development complex.
- Low Hazard – Failure would be limited to loss of the dam, livestock, farm outbuildings, agricultural lands and lesser used road, and loss of life is unlikely.

Potential Hazard Area

There are fifteen dams located throughout Linn County. The potential hazard area for dam failure is generally the areas surrounding and downstream of the dam. Overall, dam classification determines the potential risk if failure were to occur. Of the fifteen dams in Linn County, all are low hazard except two dams that are classified as high hazard dams. The high hazard dams are the Pleasant Creek Lake Dam, which creates the Pleasant Creek Lake north of Palo, and the McLeod Dam in south Cedar Rapids. Refer to the risk assessment maps.

Aside from the levee constructed along the Cedar River at the Quaker Oats facility in downtown Cedar Rapids, there are currently no effective levee structures in Linn County. Some levee structures had been constructed in Cedar Rapids, but according to the Army Corps of Engineers, the structures were not sufficient before the major flood in 2008. Cedar Rapids is currently in the process of designing and constructing comprehensive flood protection, which includes levee structures. Failure of these structures would result in major flooding in nearby flood prone areas.

Historical Occurrences

There have been no major failures of dams or *effective* levee structures in Linn County.

Probability

Major dams and levee structures in Linn County are regularly inspected and maintained so it is unlikely a major dam failure would occur. In addition to historical occurrences, this probability estimate is based on the *2010 Iowa Hazard Mitigation Plan* and local knowledge.

Magnitude and Severity

Most of the dams in Linn County are low risk so failure would likely result in flooding of the surrounding area and downstream flood prone areas. For the high hazard dams, Pleasant Creek Lake Dam and McLeod Dam, there is a risk of loss of life and severe property damage. It should be noted, the 5-in-1 Dam in Cedar Rapids is classified as a low hazard dam despite its substantial presence on the Cedar River. The potential impacts of a failure would likely be widespread but not an immediate threat to safety. Refer to the risk assessment maps.

Warning Time

There is usually little to no warning in the event of a dam or levee break unless a potential failure is being monitored. Because of close monitoring, if major local dams were to fail, there would likely be several hours for people in the surrounding and vulnerable downstream areas to evacuate.

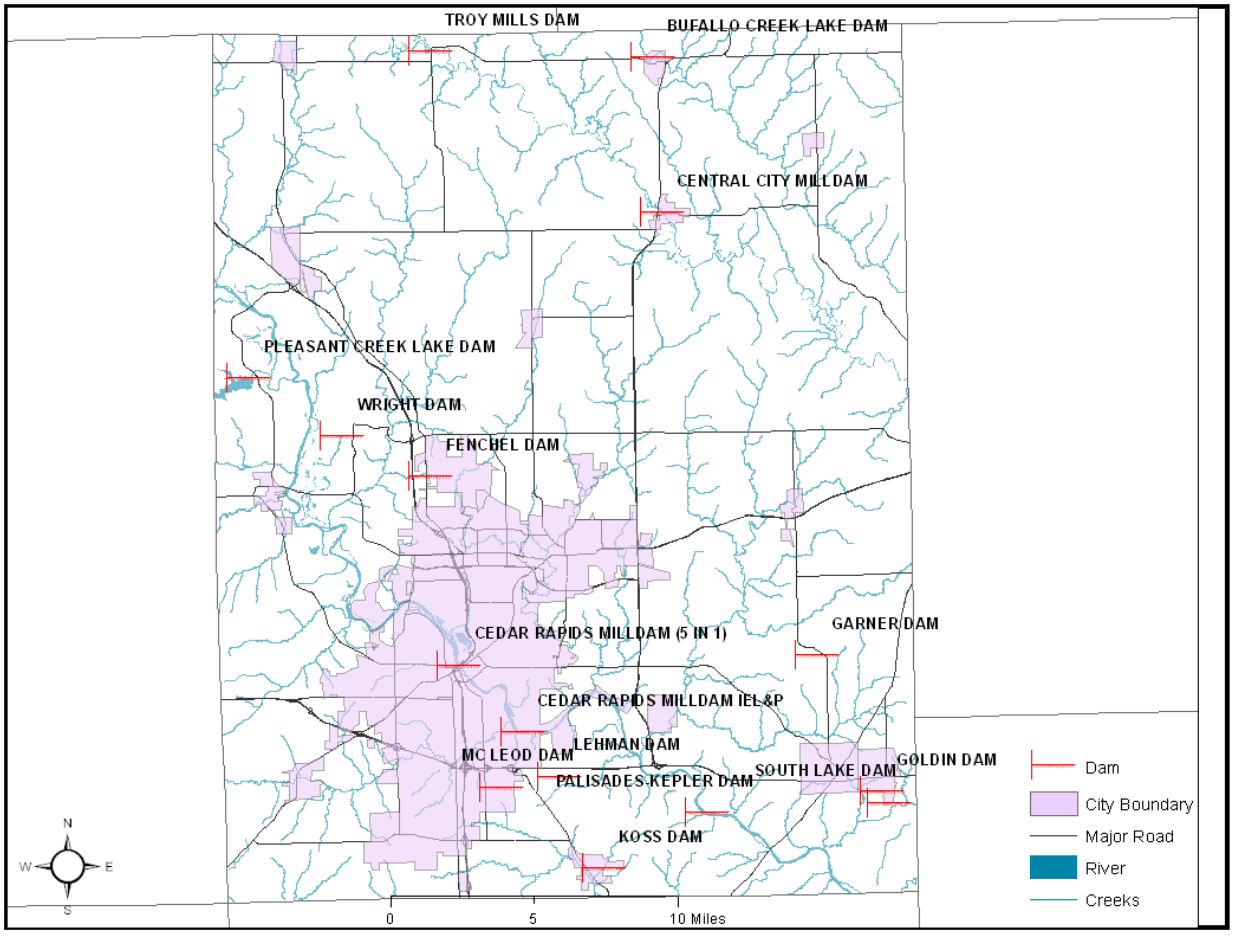
Duration

Response to a dam or levee failure would be extensive and require wide ranging recovery efforts for reconstruction of the original flood control structures and any damaged property.

Risk Assessment Maps

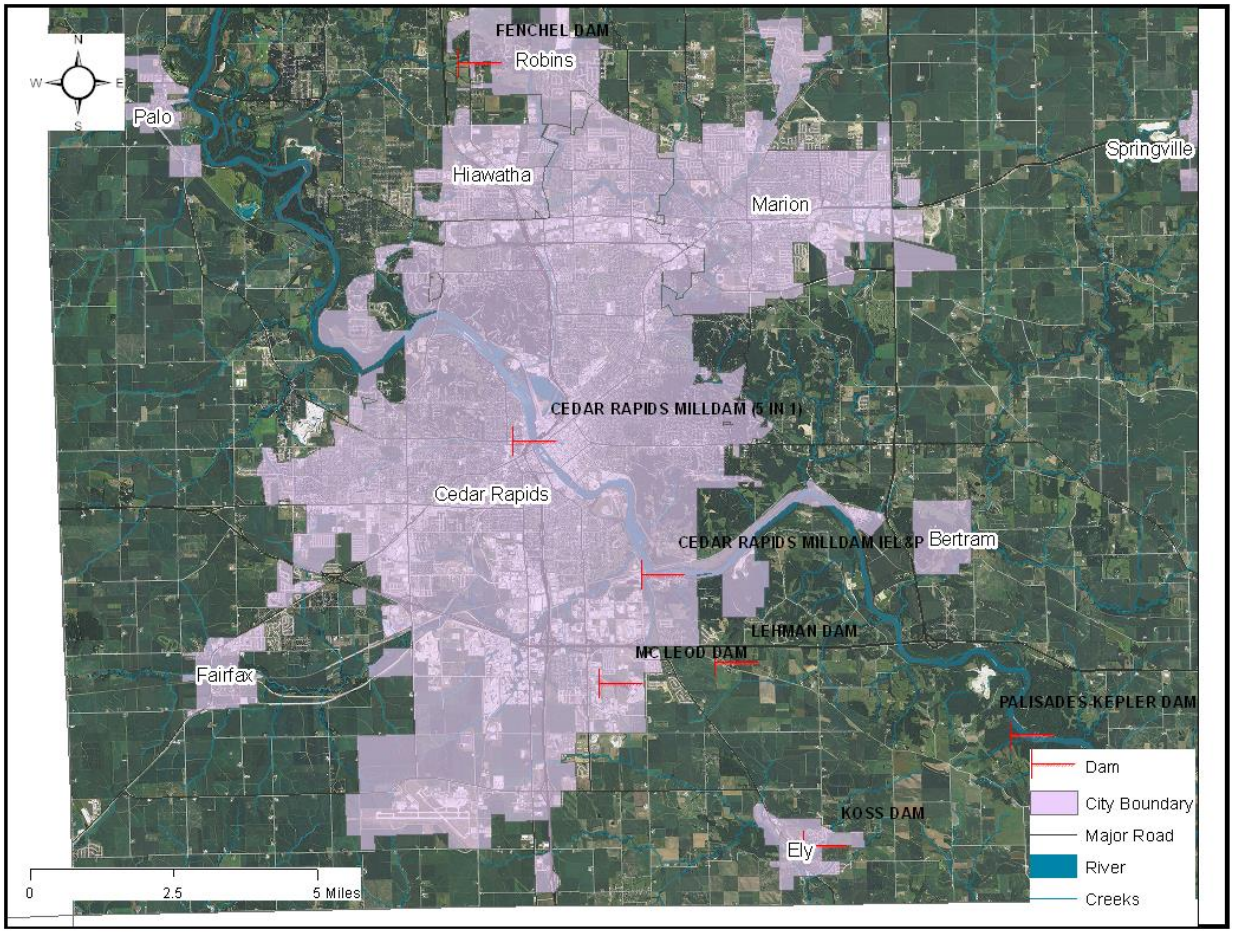
The surrounding and downstream areas of a dam are at risk during a dam failure event. The type of dam and severity of failure ultimately determine the geographic extent of risk. To indicate immediate and downstream areas directly at risk if a dam failure were to occur, the risk assessment maps include the location of dams in Linn County. Refer to Figures 24 – 28.

Figure 24: Linn County Dams



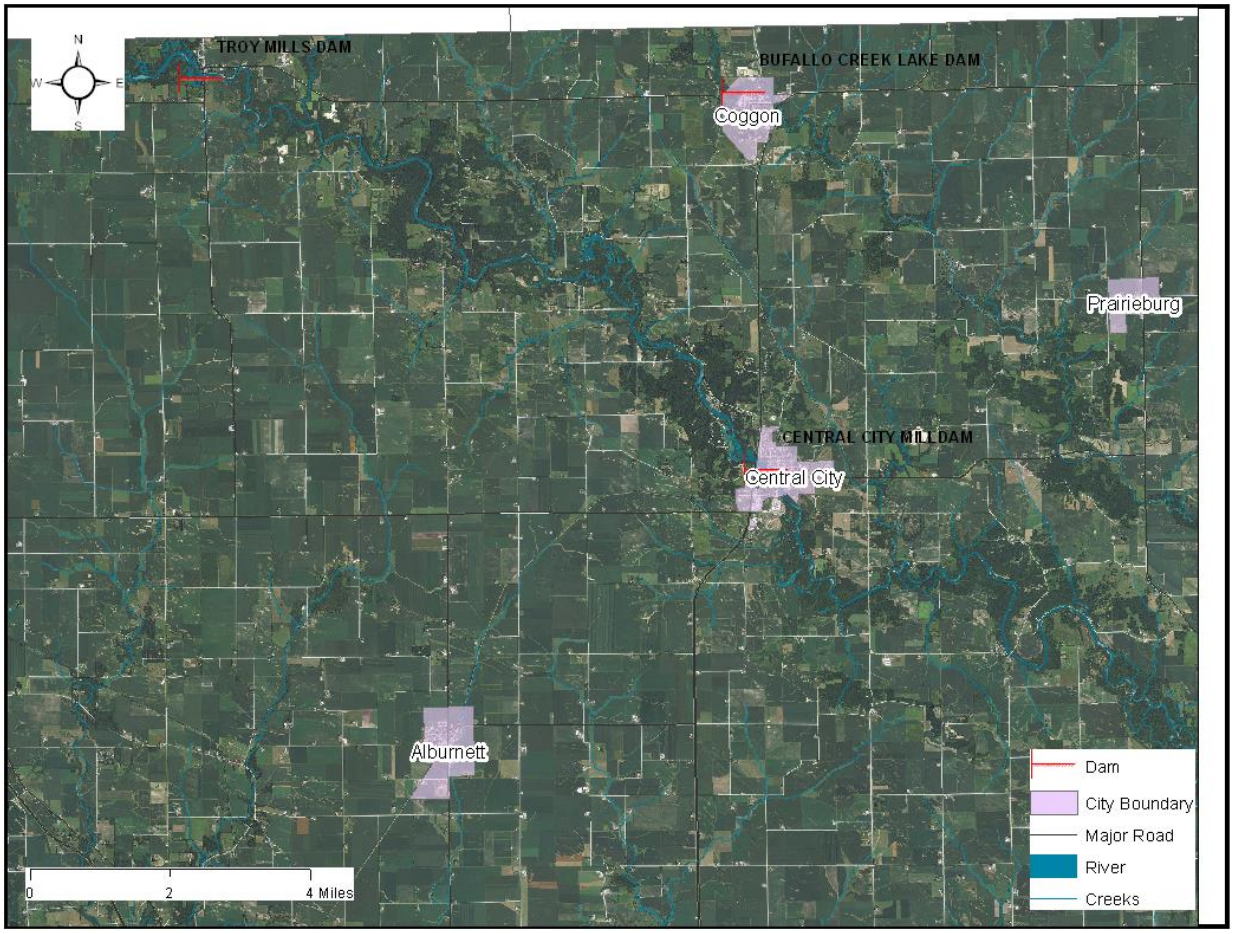
Data Source: Iowa Department of Natural Resource and Iowa Department of Transportation, 2013

Figure 25: Cedar Rapids Metropolitan Area Dams



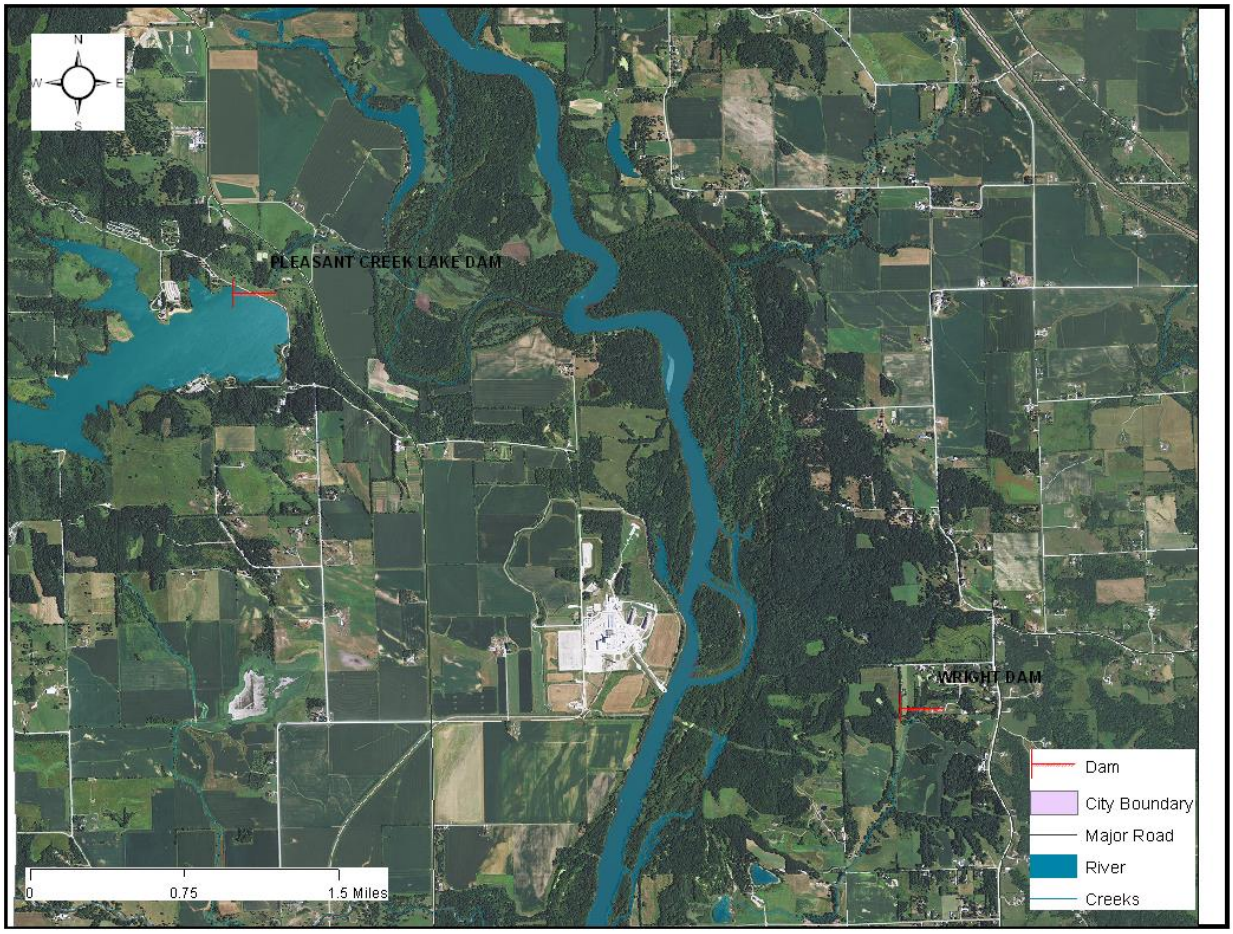
Data Source: Iowa Department of Natural Resource and Iowa Department of Transportation, 2013

Figure 26: North Linn County Dams



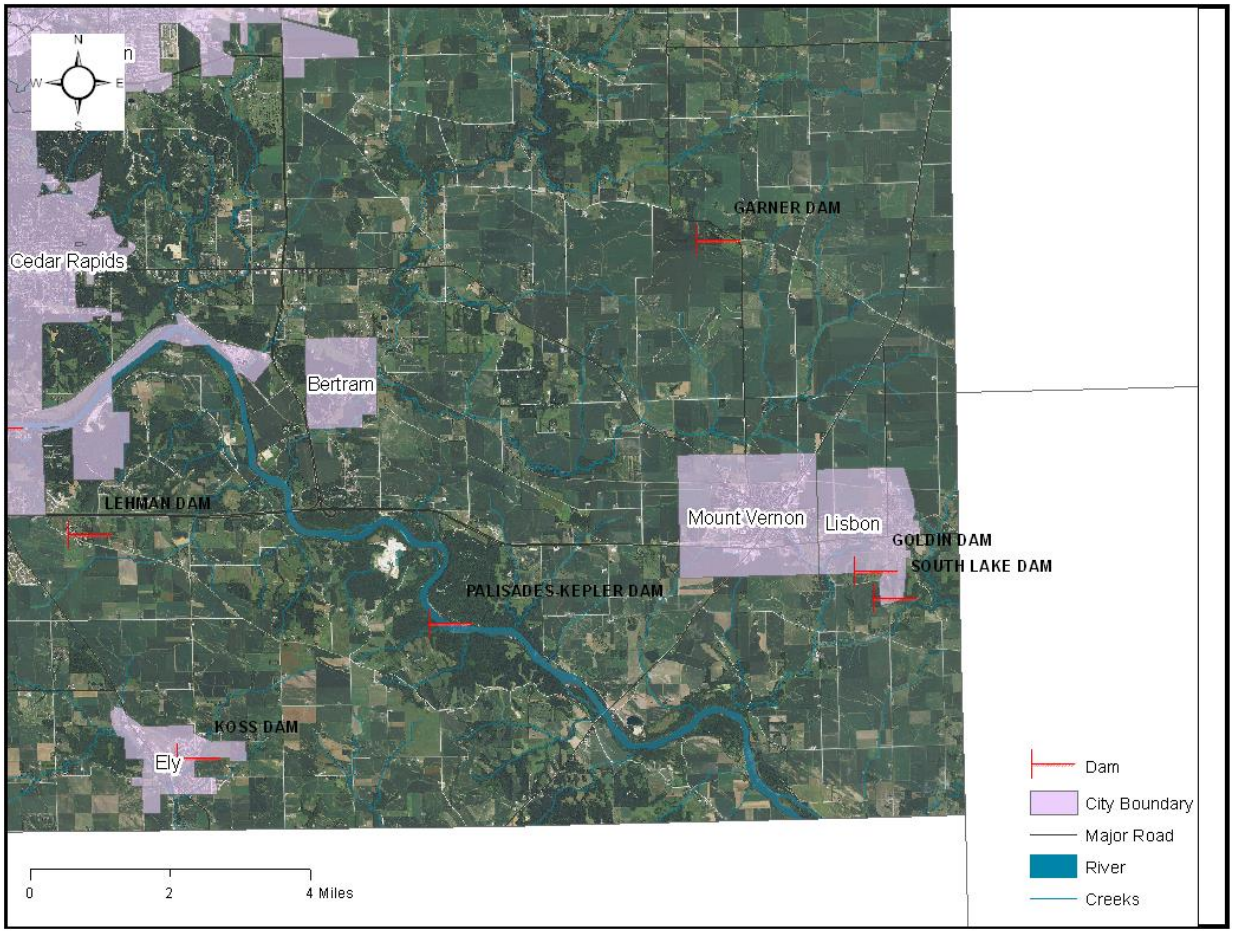
Data Source: Iowa Department of Natural Resource and Iowa Department of Transportation, 2013

Figure 27: Northwest Linn County Dams



Data Source: Iowa Department of Natural Resource and Iowa Department of Transportation, 2013

Figure 28: Southeast Linn County Dams



Data Source: Iowa Department of Natural Resource and Iowa Department of Transportation, 2013

Radiological Incident

DEFINITION OF HAZARD

This hazard encompasses fixed radiological incident and transportation radiological incident, which involve an incident resulting in a release of radiological material in transport or at a fixed facility to include power plants, hospitals, laboratories, and other facilities with radioactive material.

Potential Hazard Area

The potential hazard area for a radiological incident in Linn County is countywide. The Duane Arnold Energy Center, which is the nuclear power plant north of Palo, maintains warning sirens in all areas within the evacuation area if an event were to occur. Refer to the risk assessment maps.

Historical Occurrences

There is no history of radiological incidents in Iowa.

Probability

Historically there have been no significant releases of radiation from fixed facilities in Iowa or even the United States. Iowa does have one nuclear power plant located within its borders. Duane Arnold Energy Center is located near Palo in Linn County. Three other nuclear facilities border Iowa.

There have also been no occurrences of radiological incidents in Iowa. Transportation accidents are the most common type of incident involving radioactive materials because of the high frequency of radioactive shipments. Radioactive materials are transported through the United States and Iowa regularly.

Operators of facilities with radioactive materials and transporters of radioactive waste are trained in the packaging, handling. In addition, the shipment of radioactive waste is closely regulated. The likelihood of an incident is unlikely but still possible.

Magnitude and Severity

Sources of radioactive materials include medical products, industrial products, nuclear power plant fuel, nuclear weapons, and radioactive waste from hospitals, laboratories, nuclear reactors, and military facilities.

Both the Duane Arnold and the Fort Calhoun Nuclear Power Plants have completed construction of on-site storage facilities for spent nuclear fuel.

In over 50 years of nuclear power production in the U.S., no deaths or injuries from radiation have been recorded among the general public. Each of the nuclear facilities in the country identifies a 10 mile radius Emergency Planning Zone and a 50-mile radius Ingestion Pathway Zone.

Depending on the level of exposure, radiation can cause loss of life and long and short term health effects. Time, distance, and shielding minimize radiation exposure to the body. Nuclear radiation above normal levels could be a health and safety consideration because of its ability to damage human cells.

Specialized training is needed to respond to these types of incidents. If inadequately trained personnel attempt to respond, the impacts could be the same as those for the general public exposed to the toxic materials. Proper training and equipment greatly reduce the risk to response personnel.

If the land and facilities cannot be used for weeks, months, or even years, the loss of production would be devastating. Economic impacts would be multi-sector and long-lasting, especially in and around the affected region.

Warning Time

A radiological incident in Iowa could result from an incident in handling or transporting radioactive materials. This accident could occur with little or no warning. Ionizing radiation cannot be detected with human senses. Detection instruments are needed to indicate the existence of radiation. Distance from the incident would dictate the amount of time needed to avoid exposure from damaging radiation.

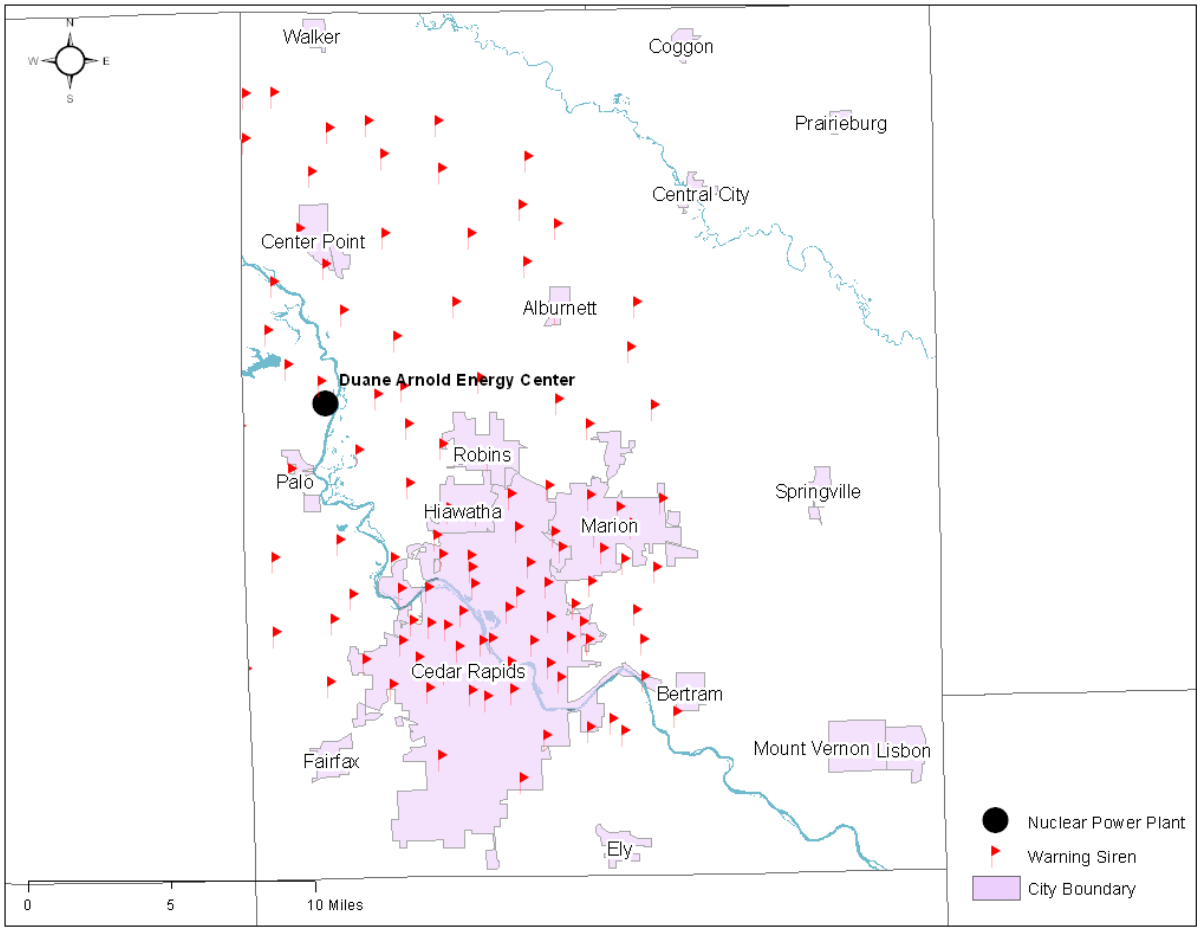
Duration

Responding to the effects of a radiological release in Iowa is extensive and will require resources and assistance from several Federal agencies to determine and evaluate the threat to life and the environment in the affected sub-areas.

Risk Assessment Map

For the location of the Duane Arnold Energy Center and warning sirens maintained by the facility in evacuation areas, refer to Figure 29.

Figure 29: Duane Arnold Energy Center and Warning Sirens



Data Source: Linn County Planning and Development

Transportation Incident

Definition of Hazard

A transportation incident is generally an accident involving any mode of transportation that directly threatens life and results in a combination of death, injury, property damage, 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 incidents can occur in the air or on the ground. In addition, incidents can occur at or near an airport, in remote unpopulated areas, residential areas, or dense urban areas.

A highway transportation incident can be a single or multi-vehicle incident requiring response exceeding normal daily capabilities.

A railway transportation incident may include derailment, collision, and at-grade highway crossing accidents. Train incidents can result from a variety of causes including human error, mechanical failure, faulty signals, or problems with the track. Results of an incident can range from minor "track hops" to catastrophic hazardous material incidents and even human or animal casualties.

A waterway incident involves any incident with a water vessel. In addition, waterway incidents may include events in which a person or object falls through the ice on partially frozen bodies of water.

Potential Hazard Area

The potential hazard area for a transportation incident in Linn County is countywide, but transportation infrastructure and surrounding areas are the primary potential hazard areas. For an air transportation incident, though, anywhere below a flight path in Linn County could be affected.

Historical Occurrences

Since 2000, there have been five airway incidents in Linn County. There were no deaths reported for any of the incidents. The majority of incidents were reported in Cedar Rapids, which is where the Eastern Iowa Airport is located. The Cedar Rapids municipal airport is the main airport in Linn County, and one of the major regional airports in Iowa. Marion is the other city in Linn County with a municipal airport. Refer to Table 44.

Table 44: Airway Incidents 2000 – 2014

Date	Location	Severity
12/20/2004	Cedar Rapids	Nonfatal
4/20/2008	Fairfax	Nonfatal
7/28/2008	Marion	Nonfatal
1/16/2010	Cedar Rapids	Nonfatal
1/17/2010	Cedar Rapids	Nonfatal
Total	5 incidents	

Source: National Transportation Safety Board Database, July 2014

Overall, highway transportation incidents in Linn County are regularly handled by local emergency responders. Highway transportation incidents will rarely exceed local capabilities because the local emergency responders complete ongoing and interagency training for incidents that could occur along major and minor travel routes. Incidents that could exceed local capabilities would be crashes involving a large number of vehicles or may involve large amounts of dangerous materials.

There is a high frequency of crashes involving a few vehicles, with a small amount resulting in a fatality, each year in Linn County. The majority of crashes involve only property damage. As the largest urban jurisdiction, Cedar Rapids logically has the highest frequency of crashes in Linn county. It should be noted, detailed analysis of auto crash data is available for unincorporated areas, Cedar Rapids, and Marion. Over time, the crash frequency has generally decreased in all areas since 2007. Refer to Tables 45 – 47.

Table 45: Linn County Auto Crashes 2007 – 2011

Year	Crashes	Fatal	Major	Minor	Unknown	Property Damage
2007	743	10	26	77	88	542
2008	764	6	31	78	88	561
2009	738	6	17	90	92	533
2010	661	6	16	68	75	496
2011	648	6	9	78	90	465
Total	3,554	34	99	391	433	2,597

Source: Iowa Department of Transportation, September 2012

Table 46: Cedar Rapids Crashes 2008 – 2012

Year	Crashes	Fatal	Major	Minor	Unknown	Property Damage
2008	2,354	5	54	315	412	1,568
2009	2,166	7	37	262	377	1,483
2010	1,982	5	33	189	349	1,406
2011	1,838	1	29	199	343	1,266
2012	1,889	6	41	183	363	1,296
Total	10,229	24	194	1148	1,844	7,019

Source: Iowa Department of Transportation, September 2013

Table 47: Marion Crashes 2008 - 2012

Year	Crashes	Fatal	Major	Minor	Unknown	Property Damage
2008	578	0	9	43	82	444
2009	520	1	1	56	67	395
2010	466	0	6	41	56	363
2011	404	0	4	40	50	310
2012	472	3	6	53	68	342
Total	2,440	4	26	233	323	1,854

Source: Iowa Department of Transportation, October 2013

A major transportation incident concern in participating jurisdictions is train incidents involving vehicles at railroad crossings. In Linn County, there have been 32 incidents involving a train and vehicle since 2003. In total, there was one death and nine injuries as a result of the incidents. In each of the incidents involving death or injury, the driver in the vehicle failed to stop for the train at the crossing. Refer to Table 48.

Table 48: Reported Train and Vehicle Incidents in Linn County 2003 – 2013

Year	City	Deaths	Injuries	Incident Description
2004	Fairfax	0	0	
	Cedar Rapids	0	1	Driver failed to stop
	Cedar Rapids	0	0	
	Linn County	0	0	
2005	Cedar Rapids	0	0	Truck driver failed to stop prior to track
2006	Cedar Rapids	0	0	
	Cedar Rapids	0	1	Driver failed to stop for train
	Cedar Rapids	0	0	
	Cedar Rapids	0	0	
	Linn County	0	1	Driver failed to stop for train
2007	Cedar Rapids	0	0	
	Central City	0	0	
	Alburnett	0	0	
	Cedar Rapids	0	0	
	Cedar Rapids	0	0	
2008	Cedar Rapids	0	0	
	Cedar Rapids	0	0	
	Linn County	0	1	Driver failed to stop for train
	Linn County	0	1	Driver failed to stop for train
	Cedar Rapids	0	0	
	Cedar Rapids	0	0	
2009	Cedar Rapids	0	0	
	Cedar Rapids	0	1	Driver failed to stop for train
	Cedar Rapids	0	0	
	Cedar Rapids	0	1	Driver failed to stop for train
2010	Cedar Rapids	0	0	
	Linn County	0	0	

Table 48 (cont.): Reported Train and Vehicle Incidents in Linn County 2003 – 2013

Year	City	Deaths	Injuries	Incident Description
2011	Linn County	0	0	
	Linn County	0	1	Operation of a crop sprayer failed to stop for train
2012	Linn County	1	0	Driver failed to stop for train
	Cedar Rapids	0	1	Driver stopped on crossing before gates descended
2013	Central City	0	0	
Total	32 incidents	1	9	

Source: Federal Railroad Administration Office of Safety Analysis Database, July 2014

The remaining type of transportation incident is a waterway incident. According to the *2013 Iowa Hazard Mitigation Plan*, there have been no waterway incidents involving large water vessels in Iowa. Across state, there have been numerous waterway incidents that involve a single person or private boats with only a few people on board. See Table 49 for information about the type of recreational boating accidents in Iowa. Comprehensive accident data is not widely available at the local or county level.

Table 49: Iowa Recreational Boating Accidents 2005 - 2011

Accident Event	Accidents	Vessels	Injuries	Deaths
Capsizing	29	29	25	12
Collision with Commercial Vessel	1	2	0	0
Collision with Fixed Object	26	26	19	1
Collision with Floating Object	6	6	3	0
Collision with Governmental Vessel	1	2	0	0
Collision with Recreational Vessel	29	58	26	6
Collision with Submerged Object	8	8	5	2
Collision with Vessel	41	83	31	2
Fall in Vessel	9	9	13	0
Fall Overboard	29	31	18	12
Fire/explosion (fuel)	10	10	8	0
Fire/explosion (non-fuel)	1	1	2	0
Flooding/swamping	21	21	8	0
Grounding	26	26	3	0
Other	7	7	9	0
Person Departed Vessel	11	12	4	5
Person Ejected from Vessel	17	17	17	5
Person Struck by Propeller	9	10	8	1
Person Struck by Vessel	8	11	8	0
Sinking	1	1	0	0
Skier Mishap	50	52	53	1
Total	340	422	260	47

Source: United States Coast Guard Boating Safety Resource Center Database, October 2013

Major water recreation areas in Linn County include the Pleasant Creek Lake near Palo, Cedar Lake in Cedar Rapids, Buffalo Creek near Coggon, and areas of the Cedar River. There are small lakes, ponds, and creeks located throughout Linn County that are also used for recreation. Refer to the river and flash flood hazard assessment for the location of Linn County waterways.

Probability

Since 2000, there have been five air transportation incidents resulting in no fatalities in Linn County. Flight paths over the county and several municipal airports, present a risk for an air transportation incident to occur within the county. A fairly limited history of air transportation incidents does indicate a low probability of an air transportation incident occurring in the future, but the risk does exist. As part of the larger transportation incident hazard, an air transportation incident has an unlikely probability, especially relative to a highway transportation incident.

At least a few major or minor traffic accidents occur every day in Linn County. These accidents often result in injury, death, and property damage. Although traffic engineering, inspection and maintenance of infrastructure, land use management, and the readiness of local response agencies have increased, highway incidents continue to occur. As the volume of traffic in Linn County increases, the number of traffic accidents will likely also increase. The combination of large numbers of people on the road, wildlife, weather conditions, potential mechanical problems, and human error increases the probability of a transportation incident occurring in Linn County.

In Linn County, there have been 32 train and vehicle incidents involving nine injuries and one fatality since 2003. There have also been several derailments, but all of the incidents were fairly minor. Although recent incidents have not been fatal or exceeded local capabilities, rail traffic will continue in Linn County so there is an occasional probability of a rail incident occurring.

There have been few waterway incidents across Iowa and essentially none in Linn County that have exceeded local capabilities. There have been search and rescue events involving a single person or small boats with only a couple people on board. Small scale incidents have resulted in loss of life from pleasure craft collisions and falls from vessels, but the probability of a waterway incident is unlikely.

Magnitude and Severity

For airway incidents, people aboard airplanes are the most vulnerable. 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 a flight. As a result, developed areas adjacent to the airports and in airport flight paths are particularly vulnerable to this hazard. For areas away from the airport, a smaller percentage of the population would be directly in the area of impact. Because of the infrequency of aircraft in the skies above areas away from the airport, these areas would not be considered as vulnerable.

As mentioned, most accidents occur during takeoffs and landings. Accordingly, the spatial extent of the majority of incidents would occur on airport grounds or adjacent areas. In Linn County, there are several municipal airports including the Eastern Iowa Airport in Cedar Rapids and several helipads. Compared to many other hazards, an air transportation accident would occupy a relatively small area. For airport and helipad locations in Linn County, refer to the risk assessment maps.

The extent to which the impacts would be felt would depend on the materials involved. For example, if a cargo plane transporting volatile or hazardous substances were involved in an accident, the area of concern would be significantly larger than the area for an accident involving a small personal aircraft carrying stable materials. The largest share of accidents would likely affect only a few city blocks.

The people who use the surface transportation system are most vulnerable in a highway transportation incident. Travelers, truckers, delivery personnel, and commuters are at risk at all times that they are on the road. During rush hours and holidays the number of people on the road in Iowa is significantly higher. This is also true before and after major gatherings such as sporting events, concerts, and conventions. Pedestrians and citizens of the community are less vulnerable but are still vulnerable in a highway transportation incident.

Linn County is crisscrossed by city streets, county roads, Iowa highways, and a U.S. Interstate. Refer to the risk assessment maps for major transportation infrastructure in Linn County. Highway incidents are usually contained to areas on the roadway or directly adjacent to the roadway. Very few highway incidents affect areas outside the traveled portion of the road and the right-of-way. Extensive segments of the transportation system can be impacted during significant weather events, such as a large snowstorm, when multiple and separate accidents occur. The area of impact can extend beyond the localized area if the vehicle(s) involved transporting hazardous materials.

Three major railways crisscross in Linn County. For railway locations, refer to the risk assessment maps. People and property in close proximity to railroad tracks, crossings, sidings, switching stations, and loading/unloading points are most at risk. Those away from railroad tracks and facilities are vulnerable only to large-scale incidents including those in which hazardous materials are involved.

Rail and highway incidents are usually limited to areas in and near at-grade crossing. Rarely, the incident will result in widespread effects. The direct area of impact is usually quite small, but depending on the vehicle(s) and materials involved, the area could become extensive. If hazardous materials are involved, the effects could reach miles beyond the incident. Harmful products may contaminate streams, rivers, water distribution systems, and storm water systems. The ability of response agencies to contain the product on-scene usually limits the area affected.

Passengers of pleasure craft are most vulnerable in a waterway incident. The maximum extent of a waterway incident would be limited. Impacts would not extend beyond the immediate incident scene. The only exception would include a search and rescue event that could expand downstream.

For transportation incidents in Linn County, the potential magnitude and severity is estimated to be limited. A transportation incident could result in injuries, up to 10% to 25% of property damaged, and shutdown of facilities for a week. The property damage estimate is estimated relatively high, because if a transportation incident were to occur in a small jurisdiction, a high percentage of the community can be impacted. Overall, the magnitude and severity estimate is based on historical occurrences, existing hazard mitigation plans, the *2010 Iowa Hazard Mitigation Plan*, and local knowledge.

Warning Time

The amount of warning time prior to an aircraft accident could vary from several minutes to a matter of seconds. Crew aboard a troubled aircraft can radio to ground crew to prepare for the incident, but little can be done to lessen the direct effects of the impact. Rarely, there is adequate time to do more than position on-site emergency response personnel.

There is usually no warning of highway incidents. During snow storms and other severe weather events that may impede travel, travelers, response agencies, and hospitals alike can be notified of hazardous travel conditions. Flash flooding is a common travel hazard in Linn County, and warnings are often issued several hours before the flooding may occur.

Like other transportation incidents, a railway incident would occur with no warning. There may be a limited amount of time to warn those in the pathway of the harmful effects.

Leading causes of waterway incidents are inclement weather and operator error and incidents would occur with little or no warning. Weather forecasts are usually available days in advance and would give ample time to take shelter away from water.

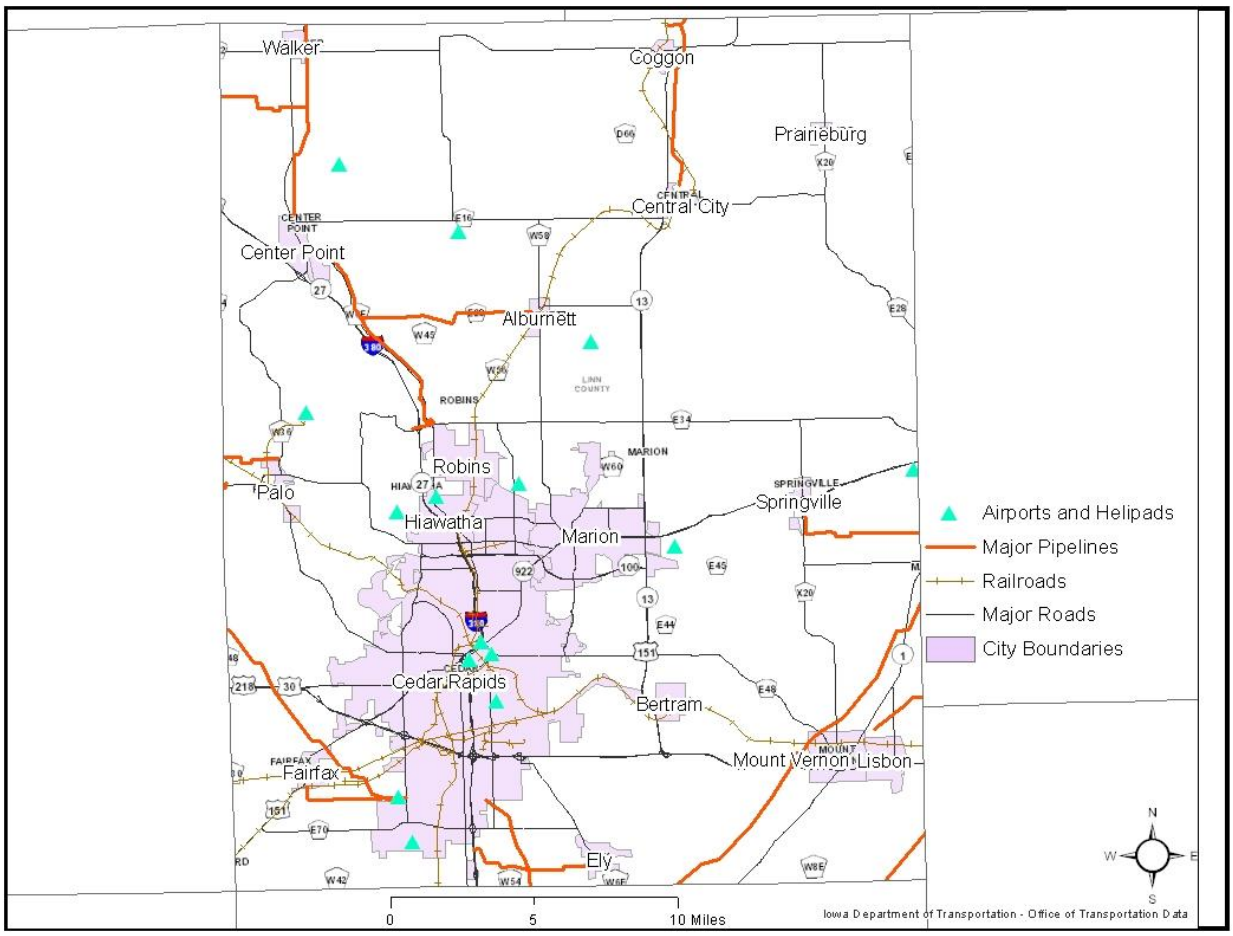
Duration

Transportation incidents, particularly rail, air, and waterway related hazards are likely to create more intensive response and resources to protect life and safety of those affected.

Risk Assessment Maps

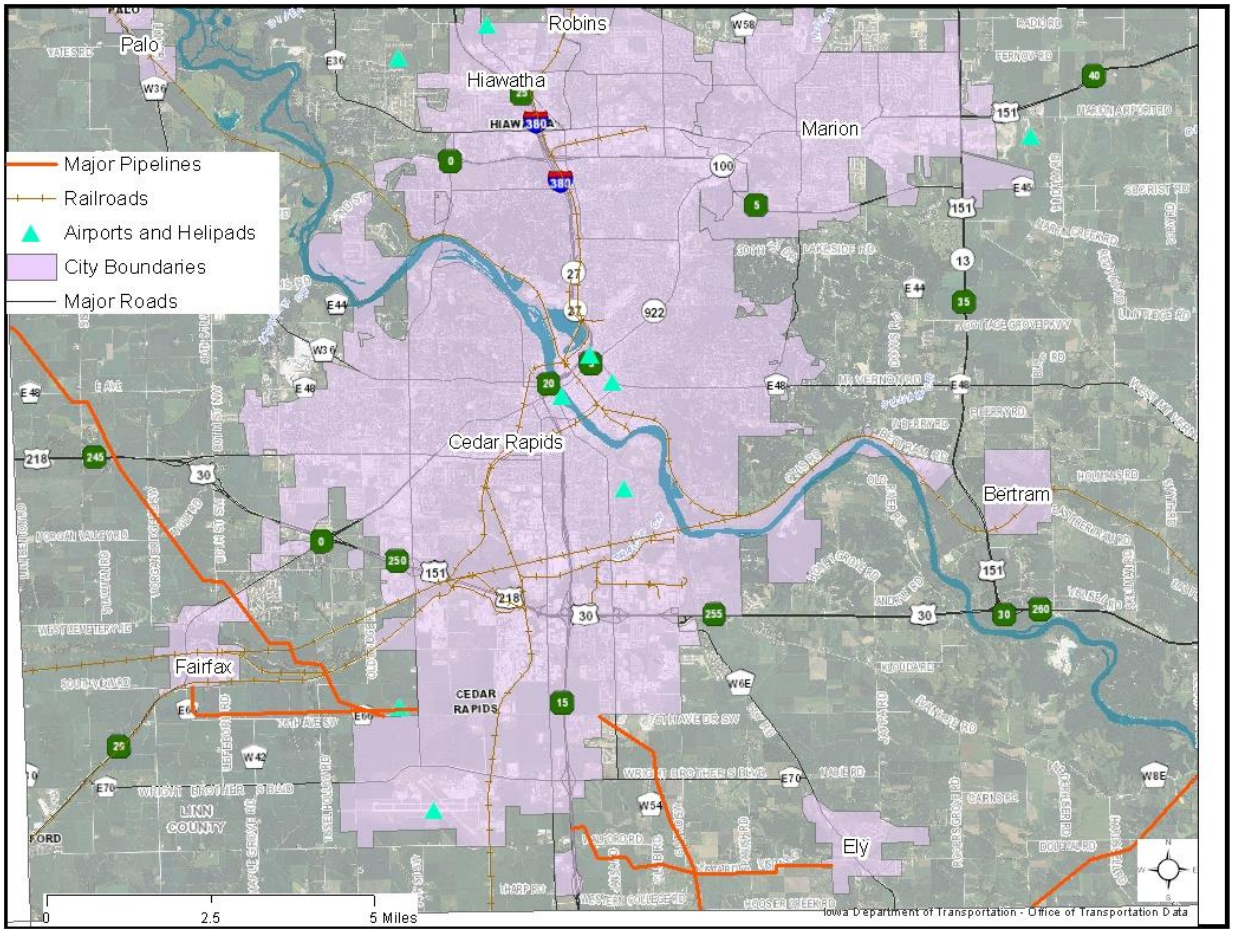
For the location of major transportation infrastructure in Linn County, refer to Figures 30 – 34.

Figure 30: Linn County Major Transportation Infrastructure



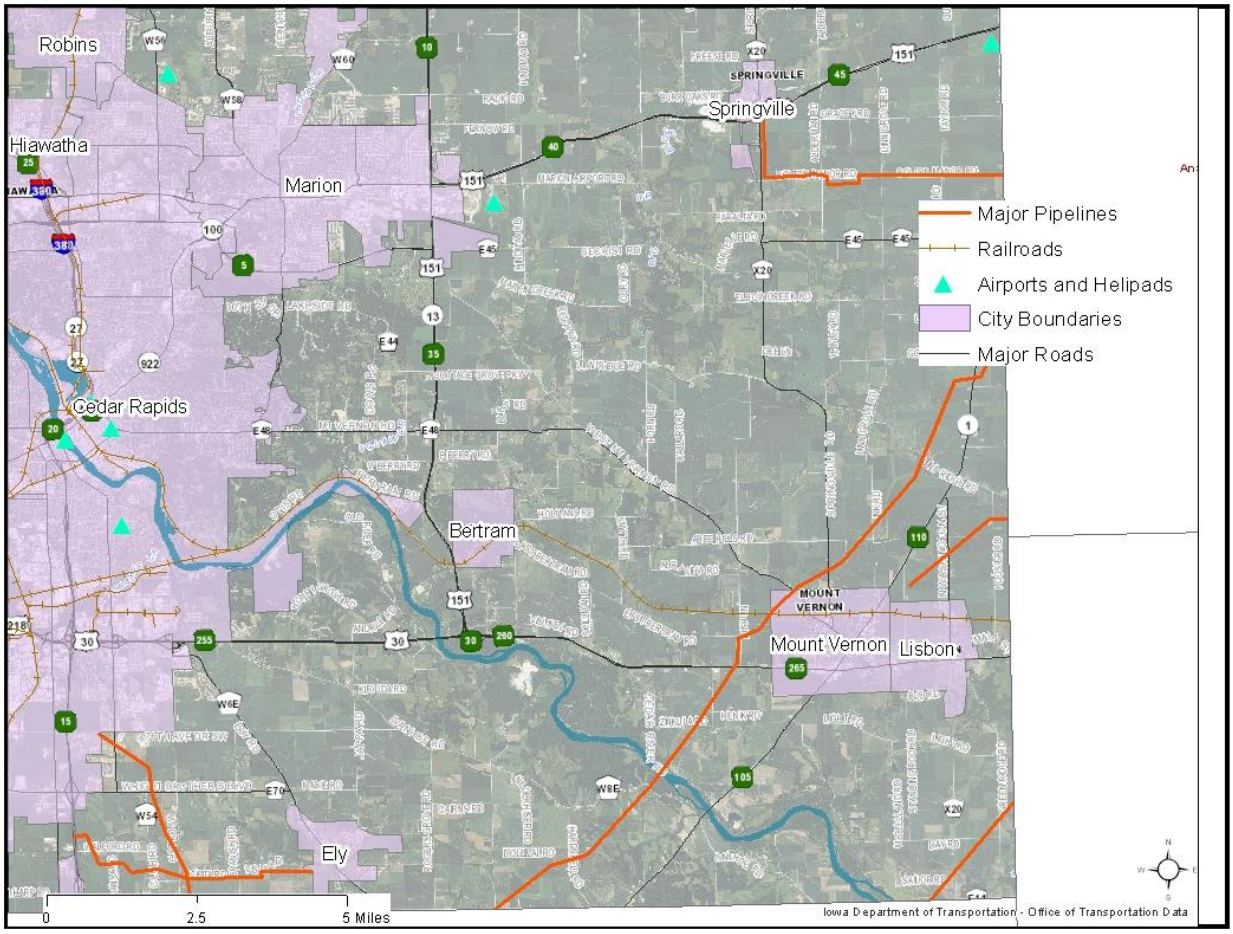
Data Source: Iowa Department of Transportation, 2013

Figure 31: Cedar Rapids Metropolitan Area Major Transportation Infrastructure



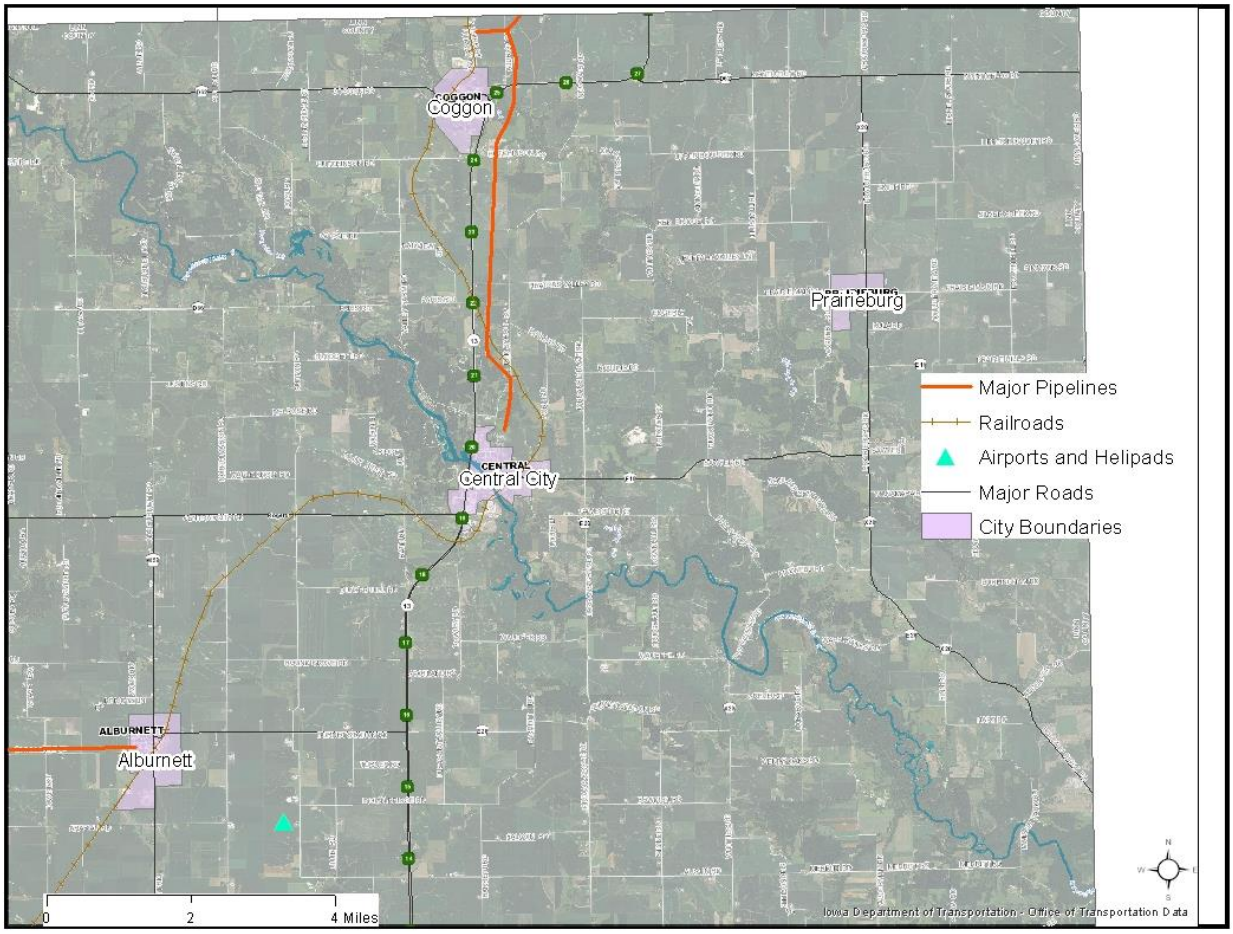
Data Source: Iowa Department of Transportation, 2013

Figure 32: East Linn County Major Transportation Infrastructure



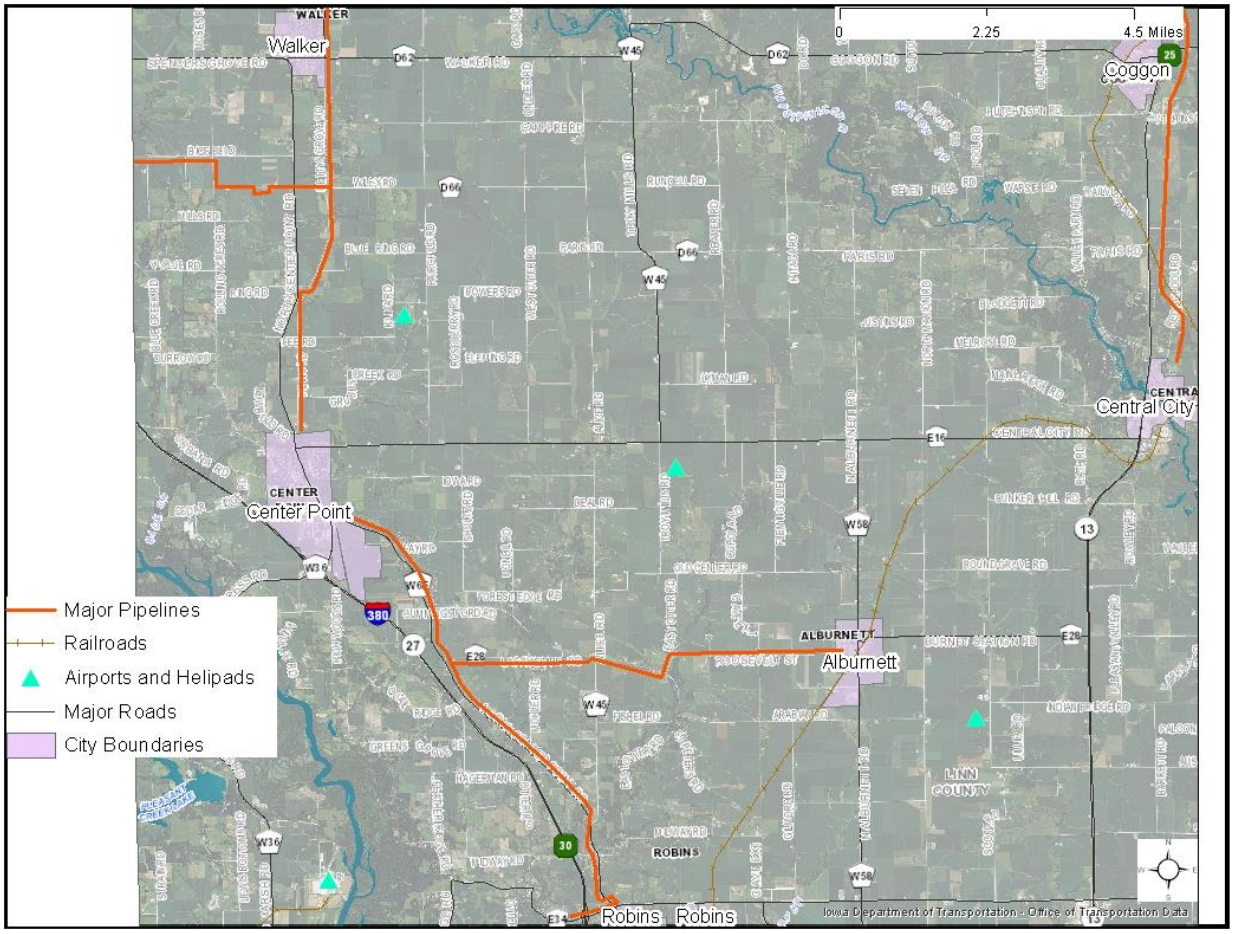
Data Source: Iowa Department of Transportation, 2013

Figure 33: Northeast Linn County Major Transportation Infrastructure



Data Source: Iowa Department of Transportation, 2013

Figure 34: Northwest Linn County Major Transportation Infrastructure



Data Source: Iowa Department of Transportation, 2013

Terrorism

DEFINITION OF HAZARD

This hazard encompasses the following specific hazards: 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.

Potential Hazard Area

The potential hazard area for terrorism event in Linn County is countywide.

Historical Occurrences

Linn County has not been the direct target of a major terrorism event. There have been threats and potential acts of terrorism but none have resulted in injury, death, or destruction.

Probability

The federal government monitors the international political and military activities of other nations and would notify the State of Iowa of escalating military threats. 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. In Linn County, an Iowa National Guard facility is located in Cedar Rapids.

There have been no enemy attacks on or in Iowa in modern times. The only history of enemy attack dates back to early settlement and the Civil War in the 1800s. The breakup of the Soviet Union and other Soviet-Bloc nations has ended the Cold War. An enemy attack is a remote possibility due to international conflicts and the large number of weapons still in existence throughout the world. Although a fairly dense and populated metropolitan area is located in Linn County, in an all-out military attack on the United States, it is unlikely that Iowa and Linn County would be a primary target during a conventional attack.

Despite not experiencing a full terrorism event, Iowa has experienced many terrorist threats. Most incidents have been limited to reported “suspect” powders, actual threats, and hoaxes. Beginning in October 2001, following the original “Amerithrax” scares, Iowa experienced a large number of responses for suspicious powders. Following the development of a threat assessment and response protocol, the number of responses to suspicious powders has been reduced.

Incidents of agro-terrorism have occurred in Iowa. In the past ten years, Iowa has experienced incidents in which animal rights activists have vandalized or released animals in agricultural facilities. There have been cases of vandalism of agricultural facilities or incidents of disgruntled employees causing damage to animals and animal products.

Chemical terrorism has been limited in Iowa. Throughout the country, public officials have received suspicious letters, and this certainly can happen in Iowa. In 2005, a subject mailed “rat poison” to several state and local officials. One of the letters was torn open in a mail-sorting machine in Des Moines, which led to the closure of the Main Post Office and the Emergency Room of Mercy Medical Center.

There has been at least one event where subjects broke into a city’s water supply and it was suspected that chemicals may have been deposited in the water supply. There have been many releases of anhydrous ammonia by persons engaged in drug manufacturing, but terrorism is likely not the intent.

Iowa has experienced many bomb threats. During the spring of 2002, 18 pipe bombs were found in mailboxes in five states stretching from Illinois to Texas, including Iowa. Six people were injured in the bombings in Iowa and Illinois. In 2005 and 2006, pipe bombs were used in attempted murder cases in two Iowa cities.

For cyber terrorism, it is difficult to track incidents and threats, but there are definite incidents where account information has been jeopardized. Many of these notifications are concerning private companies where there could be financial concerns with data breach. In Linn County, there are large institutions and businesses that may be potential targets of cyber terrorism.

There is no history of radiological terrorism in Iowa. A nuclear power plant is located near Palo. This facility could be a potential target. Otherwise, there is international concern regarding unstable countries potential developing nuclear weapons. It is unlikely that radiological terrorism could affect the Midwest United States, but potential targets are located in Iowa and near Linn County.

As for public disorder, there have been no recent mass demonstrations, or direct conflicts among large groups of citizens, as in marches, protest rallies, riots, and non-peaceful strikes in Iowa. Although large-scale destructive civil disturbances are rare, the potential exists for an incident to occur. Alcohol is often involved in public disorder, especially related to college campuses, sporting events, and concerts.

Labor strikes and work stoppages are not considered in this hazard unless they become a threat to the community. Vandalism is usually initiated by a small number of individuals and limited to a small target group or institution. Overall, most events of this type are within the capacity of local law enforcement.

Recent national events have increased awareness of school safety. Although there has not been a major incident, schools in Linn County complete training to teach staff to response during a potential intruder event. Many schools have also installed limited access entrance systems.

Magnitude and Severity

For all types of terrorism, people who are targets, people located within targets, or people located within or near a targeted area are extremely vulnerable. The potential injuries and deaths caused by a terrorism event depends on the type of terrorism, the scale of the event, and whether or not the terrorism attempt is successful. In general, it is difficult to assume who and what structures are potential targets.

The type, scale, and success of a terrorism attempt will also determine how much of Linn County can potentially be affected by a terrorism event. Some terrorism attempts are limited in scale with specific targets while others are widespread. If a terrorism event is large scale, it is likely more than just Linn County will be affected by the event. Aside from public disorder type events, a terrorism event in Linn County has the potential to affect the entire county.

Warning Time

The United States federal government monitors worldwide political and military activity. The citizens and states of the U.S. would be put on heightened alert during periods of intense political or military conflict. With Iowa's position in the interior of the U.S., there would likely be significant warning of an impending enemy attack.

Acts of terrorism can be immediate and often come after little or no warning. There are occasions when terrorists have warned the targeted organization beforehand, but often the attack comes without previous threat. Terrorists threaten people and facilities through "bomb threats" and other scare tactics. Even if it is a shallow threat, precautions must be taken to ensure the safety of the people and property involved.

In most incidents we would have no warning time. The only exception would be if someone called in a threat. Acts of terrorism can be immediate and often come after little or no warning. There are occasions where terrorists have warned the targeted organization beforehand, but often the attack comes without previous threat. Even if it is a shallow threat, precautions must be taken to ensure the safety of the people and property involved. Explosions are usually instantaneous; additional secondary devices may be used, lengthening the duration of the hazard until the attack site is determined to be clear.

Duration

The response to all sources of terrorism are extensive and will result in the need for outside resources and response from federal agencies in both the investigation of a crime scene and in the response to the direct threats to life and property.

Hazard Prioritization

To determine the extent a mitigation strategy should focus on hazards, the full set of hazards that can potentially affect Linn County were prioritized using the criteria in the *2013 Iowa Hazard Mitigation Plan*. The assessment is based on hazard probability, magnitude, severity, warning time, and duration. Each element of assessment is detailed in Tables 50 – 53. In the hazard profiles, each element of the assessment is discussed in the context of Linn County.

Probability 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. This factor was weighted 0.45 in the assessment. See scoring criteria in Table 50.

Table 50: Probability Scoring Criteria

Score	Description	
1	Unlikely	Less than 10% probability in any given year, history of events is less than 10%, or event is unlikely but there is a possibility of occurrence
2	Occasional	Greater than 10% up to 19% probability in any given year, history of events is greater than 10% up to 19%, or the event could possibly occur
3	Likely	Greater than 19% up to 33% probability in any given year, history of events is greater than 20% up to 33%, or the event is likely to occur
4	Highly Likely	More than 33% probability in any given year, history of events is greater than 33% likely, or the event is highly likely to occur

The magnitude and severity of the impacts of a hazard event is related directly to the extent that a hazard affects the community. It is measured using technical measures specific to the hazard, which are ideally determined with standard scientific scales. This is also a function of when the event occurs, year-round or seasonal, the location affected, the resilience of the community, and the effectiveness of emergency response and disaster recovery efforts. The factor was weighted 0.30 in the assessment. See scoring criteria in Table 51.

Table 51: 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, and/or injuries/illnesses treatable with first aid
2	Limited	Greater than 10% up to 25% of property severely damaged, shutdown of facilities and services for more than a week, and/or injuries/illnesses that do not result in permanent disability
3	Critical	Greater than 25% up to 50% of property severely damaged, shutdown of facilities and services for at least 2 weeks, and/or injuries/illnesses that result in permanent disability
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths

Warning time or the speed of onset is the amount of warning time available before a hazard occurs. The average rather than shortest or longest warning time is considered in the hazard assessment. For many natural hazards, there is a considerable amount of warning time as opposed to the human caused hazards that occur instantaneously or without any significant warning time. This factor was weighted 0.15 in the assessment. See scoring criteria in Table 52.

Table 52: Warning Time Scoring Criteria

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

Duration is the typical amount of time that the community is impacted by a hazard. As an example, a snowstorm will likely last several hours, whereas a lightning strike would last less than a second. This factor was weighted 0.10 in the assessment. See scoring criteria in Table 53.

Table 53: Duration Scoring Criteria

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

With the weight value applied to each factor, the sum of the assessment criteria is used to determine the priority level of each hazard. The priority level determines how much focus is given to the hazard in the overall mitigation strategy. See Table 54 for the description of each priority level. The priority level determined for each hazard may not completely reflect the description of each level. The priority level that most accurately fits a hazard is applied, or due to local conditions and/or the planning committee, priority level may be adjusted.

Table 54: Hazard Priority Level

Hazard Priority		Description
1	High	Risk assessment score is high relative to other hazards; hazards may have occurred recently with severe impacts and long-term recovery; the hazard is generally a high priority in the community; the planning committee will identify potential mitigation projects
2	Medium	Risk assessment score is mid-range relative to other hazards; mitigation actions for hazards may already be complete or in progress; the hazard is generally a medium priority in the community; the planning committee will identify potential mitigation projects that may also address other hazards
3	Low	Risk assessment score is low relative to other hazards; mitigation actions for hazards may already be complete; the hazard is generally a low priority in the community; the planning committee will discuss potential mitigation projects

The multi-jurisdictional hazard risk assessment results for Linn County are included in Table 55. The assessment was used by each participating jurisdiction as a base for their specific hazard risk assessment. The planning committee was given an opportunity to modify the priority level of hazards to reflect local conditions and priorities.

Table 55: Linn County Multi-Jurisdictional Hazard Analysis and Risk Assessment

Hazard	Probability	.45	Magnitude and Severity	.30	Warning Time	.15	Duration	.10	Total	Priority Level
Animal, Plant, Crop Disease	1	0.45	2	0.6	4	0.6	4	0.4	2.05	2
Drought	3	1.35	1	0.3	1	0.15	4	0.4	2.2	2
Earthquake	1	0.45	1	0.3	4	0.6	1	0.1	1.45	3
Expansive Soils	1	0.45	1	0.3	1	0.15	1	0.1	1	3
Extreme Heat	3	1.35	2	0.6	1	0.15	4	0.4	2.5	1
Flash Flood	3	1.35	2	0.6	2	0.3	1	0.1	2.35	1
Grass and Wildland Fire	3	1.35	1	0.3	1	0.15	1	0.1	1.9	2
Hazardous Materials Incident	2	0.9	1	0.3	4	0.6	4	0.4	2.2	2
Human Disease	1	0.45	2	0.6	2	0.3	4	0.4	1.75	3
Infrastructure Failure	3	1.35	2	0.6	4	0.6	4	0.4	2.95	1
Landslide	1	0.45	1	0.3	2	0.3	1	0.1	1.15	3
Levee and Dam Failure	1	0.45	1	0.3	4	0.6	4	0.4	1.75	3
Radiological Incident	2	0.9	1	0.3	4	0.6	4	0.4	2.2	3
River Flood	4	1.8	2	0.6	1	0.15	4	0.4	2.95	1
Severe Winter Storm	3	1.35	3	0.9	3	0.45	2	0.2	2.9	1
Sinkholes	2	0.9	1	0.3	2	0.3	1	0.1	1.6	3
Terrorism	1	0.45	2	0.6	4	0.6	2	0.2	1.85	3
Thunderstorm, Lightning, and Hail	4	1.8	2	0.6	3	0.45	2	0.2	3.05	1
Tornado and Windstorm	3	1.35	2	0.6	3	0.45	2	0.2	2.6	1
Transportation Incident	2	0.9	2	0.6	4	0.6	2	0.2	2.3	2

Linn County Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Linn County has an existing plan so the priority level in the existing plan and the new priority, if changed, for a hazard is indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 56.

Table 56: Linn County Hazard Prioritization

Hazard	Type	Existing Priority Level	New Priority Level
Thunderstorm, Lightning and Hail	Natural	1	1
Infrastructure Failure	Technological	1	1
River Flood	Natural	1	1
Severe Winter Storm	Natural	1	1
Tornado and Windstorm	Natural	1	1
Extreme Heat	Natural	1	1
Flash Flood	Natural	1	1
Drought	Natural	1	1
Hazardous Materials Incident	Technological	2	1
Transportation Incident	Technological	2	2
Animal, Plant, Crop Disease	Natural	3	2
Grass and Wild Land Fire	Natural	2	2
Terrorism	Human Caused	2	2
Radiological Incident	Technological	1	3
Human Disease	Natural	3	3
Levee and Dam Failure	Technological	3	3
Sinkholes	Natural	Not applicable	3
Earthquake	Natural	3	3
Landslide	Natural	3	3
Expansive Soils	Natural	3	3
Radon	Natural	1	Not applicable

The priority level for several hazards was updated by the planning committee. The most notable change is for radiological incident, which had the highest priority level and was decreased to the lowest priority level for the multi-jurisdictional plan. The priority level was reduced by the planning committee because the likelihood of an occurrence is low despite the radiological facility located in Linn County. In addition, any hazard mitigation measures associated with a radiological incident are already established and maintained.

One natural hazard, radon, was removed due to the ongoing nature of this hazard and a well-established mitigation program administered by Linn County Public Health. Sinkholes were not included as a natural hazard in the county's existing hazard mitigation plan, and the hazard was added due to the presence of sinkholes and potential karst soils throughout Linn County.

Alburnett Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Refer to Table 57.

Table 57: Alburnett Hazard Prioritization

Hazard	Type	Priority Level
Thunderstorm, Lightning, and Hail	Natural	1
Infrastructure Failure	Technological	1
Severe Winter Storm	Natural	1
Tornado and Windstorm	Natural	1
Extreme Heat	Natural	1
Flash Flood	Natural	1
Transportation Incident	Technological	2
Hazardous Materials Incident	Technological	2
River Flood	Natural	3
Drought	Natural	3
Animal, Plant, Crop Disease	Natural	3
Grass and Wildland Fire	Natural	3
Terrorism	Human Caused	3
Human Disease	Natural	3
Radiological Incident	Technological	3
Earthquake	Natural	3
Levee and Dam Failure	Technological	Excluded
Sinkholes	Natural	Excluded
Landslide	Natural	Excluded
Expansive Soils	Natural	Excluded

Four hazards were excluded from the risk assessment for Alburnett including levee and dam failure, sinkholes, landslide, and expansive soils. These hazards were excluded due to minimal risk or lack of historical occurrences. For levee and dam failure, there are no major dams or flood protection structures near Alburnett.

Bertram Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Refer to Table 58.

Table 58: Bertram Hazard Prioritization

Hazard	Type	Priority Level
Thunderstorm, Lightning and Hail	Natural	1
Infrastructure Failure	Technological	1
River Flood	Natural	1
Severe Winter Storm	Natural	1
Tornado and Windstorm	Natural	1
Extreme Heat	Natural	1
Flash Flood	Natural	1
Drought	Natural	1
Hazardous Materials Incident	Technological	1
Transportation Incident	Technological	2
Animal, Plant, Crop Disease	Natural	2
Grass and Wild Land Fire	Natural	2
Terrorism	Human Caused	3
Radiological Incident	Technological	3
Human Disease	Natural	3
Sinkholes	Natural	3
Earthquake	Natural	3
Landslide	Natural	3
Expansive Soils	Natural	3
Levee and Dam Failure	Technological	Excluded

The only hazard that was excluded by the planning committee in Bertram is the levee and dam failure hazard. There are no major dam or flood protection structures within or near that city that would, if failure occurs, have a direct significant impact on the community.

Cedar Rapids Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Cedar Rapids has an existing plan so the priority level in the existing plan and the new priority, if changed, for a hazard is indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 59.

Table 59: Cedar Rapids Hazard Prioritization

Hazard	Type	Existing Plan Priority Level	New Priority Level
Flash Flood	Natural	1	1
Thunderstorm, Lightning, and Hail	Natural	2	1
River Flood	Natural	1	1
Drought	Natural	3	1
Severe Winter Storm	Natural	1	1
Tornado and Windstorm	Natural	1	1
Extreme Heat	Natural	3	2
Infrastructure Failure	Technological	1	2
Hazardous Materials Incident	Technological	2	2
Transportation Incident	Technological	2	2
Terrorism	Human Caused	1	2
Radiological Incident	Technological	3	2
Levee and Dam Failure	Technological	3	3
Human Disease	Natural	3	3
Animal, Plant, Crop Disease	Natural	3	3
Earthquake	Natural	3	3
Grass and Wildland Fire	Natural	2	3
Sinkholes	Natural	Excluded	3
Landslide	Natural	3	3
Expansive Soils	Natural	3	3

The priority level for several hazards was updated by the planning committee to reflect local conditions and priorities. The thunderstorm, lightning, and hail hazard was updated from the lowest to the highest priority level. Similarly, drought was the lowest priority level but the planning committee updated the hazard to the highest priority level to reflect recent drought and associated water supply concerns.

Considering lower priority hazards, extreme heat and radiological incident were updated to medium rather than the lowest priority level. Finally, the grass and wildland fire hazard was updated to reflect a reduced priority level, from medium to the lowest priority level. Refer to Table 7.

In the existing plan, sinkholes were eliminated as a potential hazard in Cedar Rapids. The planning committee reconsidered and added sinkholes as a hazard that can potentially affect the area. The probability of a major sinkhole developing is low so the priority level is low.

Center Point Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Refer to Table 60.

Table 60: Center Point Hazard Prioritization

Hazard	Type	Priority Level
Tornado and Windstorm	Natural	1
Hazardous Materials Incident	Technological	1
Infrastructure Failure	Technological	1
Terrorism	Human Caused	1
Flash Flood	Natural	1
River Flood	Natural	1
Radiological Incident	Technological	1
Extreme Heat	Natural	2
Expansive Soils	Natural	2
Thunderstorm, Lightning, and Hail	Natural	2
Sinkholes	Natural	2
Severe Winter Storm	Natural	2
Drought	Natural	3
Grass or Wildland Fire	Natural	3
Transportation Incident	Technological	3
Earthquake	Natural	3
Animal, Plant, Crop Disease	Natural	3
Levee and Dam Failure	Technological	Excluded
Landslide	Natural	Excluded
Human Disease	Natural/Technological	Excluded

The dam and levee failure hazard was excluded because there are no public dams or flood protections structures located within the city. In addition, there is minimal risk of a dam or levee failure impacting the city. The landslide hazard was excluded because the risk in Center Point is minimal. The local planning committee perceived minimal risk for the human disease hazard to occur in the city so this hazard was also excluded for Center Point.

Central City Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Refer to Table 61.

Table 61: Central City Hazard Prioritization

Hazard	Type	Priority Level
River Flood	Natural	1
Severe Winter Storm	Natural	1
Tornado and Windstorm	Natural	1
Extreme Heat	Natural	2
Flash Flood	Natural	2
Hazardous Materials Incident	Technological	2
Infrastructure Failure	Technological	2
Thunderstorm, Lightning, and Hail	Natural	2
Transportation Incident	Technological	2
Animal, Plant, Crop Disease	Natural	3
Drought	Natural	3
Grass and Wildland Fire	Natural	3
Human Disease	Natural	3
Landslide	Natural	3
Levee and Dam Failure	Technological	3
Radiological Incident	Natural	3
Sinkholes	Natural	3
Terrorism	Human Caused	3
Earthquake	Natural	3
Expansive Soils	Natural	Excluded

Expansive soils were excluded during the risk assessment for Central City because there are no historical occurrences and risk is minimal. For the levee and dam failure hazard, there are no levee structures but there is a dam on the Wapsipinicon River, which runs through Central City.

Coggon Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Coggon has an existing plan so the priority level in the existing plan and the new priority, if changed, for a hazard is indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 62.

Table 62: Coggon Hazard Prioritization

Hazard	Type	Existing Plan Priority Level	New Priority Level
Thunderstorm, Lightning, and Hail	Natural	1	2
Infrastructure Failure	Technological	1	1
River Flood	Natural	1	1
Severe Winter Storm	Natural	1	2
Tornado and Windstorm	Natural	1	1
Extreme Heat	Natural	3	2
Flash Flood	Natural	1	1
Drought	Natural	3	3
Hazardous Materials Incident	Technological	2	1
Transportation Incident	Technological	2	1
Animal, Plant, Crop Disease	Natural	3	2
Grass and Wildland Fire	Natural	2	1
Terrorism	Human Caused	2	1
Radiological Incident	Technological	2	1
Human Disease	Natural	3	1
Levee and Dam Failure	Technological	3	3
Earthquake	Natural	3	1
Landslide	Natural	3	3
Expansive Soils	Natural	3	2
Sinkholes	Natural	Excluded	Excluded

To clarify, Buffalo Creek Dam is located in Coggon, so dam failure rather than levee failure is the potential hazard. The sinkholes hazard is excluded from the risk assessment by the planning committee in Coggon because there is minimal risk and no historical occurrences. The priority level for several hazards was changed in Coggon's risk assessment to reflect the current conditions and priorities in the city. Refer to Table 62 for all hazard priority level changes.

Ely Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Ely has an existing plan so the priority level in the existing plan and the new priority, if changed, for a hazard is indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 63.

Table 63: Ely Hazard Prioritization

Hazard	Type	Existing Plan Priority Level	Priority Level
Thunderstorm, Lightning, and Hail	Natural	1	1
Severe Winter Storm	Natural	1	1
Tornado and Windstorm	Natural	1	1
Infrastructure Failure	Technological	1	1
Grass or Wildland Fire	Natural	1	1
Flash Flood	Natural	1	1
Extreme Heat	Natural	1	1
Hazardous Materials Incident	Technological	2	2
Drought	Natural	2	2
Earthquake	Natural	2	3
Terrorism	Human Caused	2	3
Human Disease	Natural	2	3
Transportation Incident	Technological	2	2
Animal, Plant, Crop Disease	Natural	3	2
River Flood	Natural	Excluded	1
Radiological Incident	Technological	Excluded	3
Levee and Dam Failure	Technological	Excluded	Excluded
Sinkholes	Natural	Excluded	Excluded
Landslide	Natural	Excluded	Excluded
Expansive Soils	Natural	Excluded	Excluded

Excluded hazards include levee and dam failure, sinkholes, landslide, and expansive soils. The levee and dam failure hazard was excluded because there are no major dams or flood protection structures in the area. The remaining geological hazards were excluded due to minimal risk and no historical occurrences.

The major changes in Ely's risk assessment are including the river flood and radiological incident hazard. The river flood hazard was added to reflect the potential risk for slow rising, creek flooding. The radiological incident hazard was included due to proximity to the Duane Arnold Energy Center and transportation of radiological materials in the county. Changes in priority level include a decrease for the earthquake, terrorism, and human disease hazard from medium to low. The priority level for the animal, plant, crop disease hazard was increased from low to medium.

Fairfax Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Fairfax has an existing plan so the priority level in the existing plan and the new priority, if changed, for a hazard is indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 64.

Table 64: Fairfax Hazard Prioritization

Hazard	Type	Existing Plan Priority Level	Priority Level
Infrastructure Failure	Technological	1	1
Hazardous Materials Incident	Technological	1	1
Tornado and Windstorm	Natural	1	1
Thunderstorm, Lightning, and Hail	Natural	1	1
Severe Winter Storm	Natural	2	1
Flash Flood	Natural	2	1
River Flood	Natural	2	1
Transportation Incident	Technological	2	2
Terrorism	Human Caused	2	2
Radiological Incident	Technological	2	2
Animal, Plant, Crop Disease	Natural	3	2
Extreme Heat	Natural	2	2
River Flood	Natural	3	2
Drought	Natural	3	2
Grass and Wildland Fire	Natural	3	2
Earthquake	Natural	3	3
Human Disease	Natural	3	3
Expansive Soils	Natural	3	Excluded
Landslide	Natural	Excluded	Excluded
Levee and Dam Failure	Technological	Excluded	Excluded
Sinkholes	Natural	Excluded	Excluded

Excluded hazards include levee and dam failure, expansive soils, landslide, and sinkholes. The planning committee excluded the dam and levee failure hazard from the risk assessment because there is no major dam or flood protection structures in the area. The expansive soils, landslide, and sinkholes hazard was excluded due to minimal risk and lack of historical occurrences.

Hiawatha Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Hiawatha has an existing plan so the priority level in the existing plan and the new priority, if changed, for a hazard is indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 65.

Table 65: Hiawatha Hazard Prioritization

Hazard	Type	Existing Plan Priority Level	New Priority Level
Infrastructure Failure	Technological	1	1
Tornado and Windstorm	Natural	1	1
Severe Winter Storm	Natural	1	1
Thunderstorm, Lightning, and Hail	Natural	1	1
Flash Flood	Natural	1	1
Hazardous Materials Incident	Natural	2	1
Transportation Incident	Natural	2	1
Extreme Heat	Natural	2	2
Radiological Incident	Technological	2	2
Drought	Natural	2	2
Animal, Plant, Crop Disease	Natural	3	3
Human Disease	Natural	3	3
Terrorism	Human Caused	3	3
River Flood	Natural	3	3
Earthquake	Natural	3	3
Expansive Soils	Natural	3	3
Landslide	Natural	3	3
Grass and Wildland Fire	Natural	Excluded	3
Levee and Dam Faiulre	Technological	Excluded	Excluded
Sinkholes	Natural	Excluded	Excluded

Excluded hazards include dam and levee failure, grass and wildland fire, and sinkholes. The levee and dam failure hazard was excluded the planning committee because there is no major dam or flood protection structure located in or near Hiawatha that poses a risk. The sinkholes hazard was eliminated due to minimal risk and few historical occurrences.

The only significant changes in hazard prioritization in Hiawatha are the addition of the grass and wildland fire hazard and an increase in priority level of the hazardous materials incident and transportation incident hazards. Both hazards were considered medium priority in the existing plan, but due to local concerns about increased transport of hazardous materials and potential railroad incidents, the planning committee increased the priority level to high.

Lisbon Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Lisbon has an existing plan so the priority level in the existing plan and the new priority, if changed, for a hazard is indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 66.

Table 66: Lisbon Hazard Prioritization

Hazard	Type	Existing Plan Priority Level	New Priority Level
Thunderstorm, Lightning, and Hail	Natural	1	1
Transportation Incident	Technological	1	1
Flash Flood	Natural	1	1
Tornado and Windstorm	Natural	1	1
Hazardous Materials Incident	Technological	1	1
Infrastructure Failure	Technological	1	1
Extreme Heat	Natural	2	1
Severe Winter Storm	Natural	2	2
Radiological Incident	Technological	2	2
Drought	Natural	2	2
Terrorism	Human Caused	2	2
Human Disease	Natural	3	3
Animal, Plant, Crop Disease	Natural	3	3
Levee and Dam Failure	Technological	Excluded	Excluded
Earthquake	Natural	Excluded	Excluded
Grass or Wildland Fire	Natural	Excluded	Excluded
Landslide	Natural	Excluded	Excluded
Expansive Soils	Natural	Excluded	Excluded
Sinkholes	Natural	Excluded	Excluded
River Flood	Natural	Excluded	Excluded

The main hazard prioritization change made by the planning committee is upgrading the extreme heat hazard from a medium to a high priority level. The levee dam failure hazard continues to be excluded because there is no major or flood protection structure within or near Lisbon that would have a direct, significant impact on the community. The river flood hazard was excluded because flash flood type events rather than slow-rising flood events impact Lisbon. The remaining geologic hazards were excluded due to minimal risk and lack of historical occurrences within the community.

Marion Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Marion has an existing plan so the priority level in the existing plan and the new priority, if changed, for a hazard is indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 67.

Table 67: Marion Hazard Prioritization

Hazard	Type	Existing Plan Priority Level	New Priority Level
Severe Winter Storm	Natural	1	1
Infrastructure Failure	Technological	1	1
Tornado and Windstorm	Natural	1	1
Extreme Heat	Natural	1	1
Thunderstorm, Lightning, and Hail	Natural	1	1
Grass and Wildland Fire	Natural	1	3
Flash Flood	Natural	1	1
Hazardous Materials Incident	Technological	2	2
Transportation Incident	Technological	2	2
Radiological Incident	Technological	2	2
Human Disease	Natural	2	2
Drought	Natural	2	2
Earthquake	Natural	3	3
Terrorism	Human Caused	3	3
Expansive Soils	Natural	3	3
Landslide	Natural	3	3
Animal, Plant, Crop Disease	Natural	3	2
River Flood	Natural	Excluded	3
Levee and Dam Failure	Technological	Excluded	Excluded
Sinkholes	Natural	Excluded	Excluded

The levee and dam failure hazard was excluded from the risk assessment by the planning committee because there is no major dam or flood protection structure in the area that poses a risk. The sinkholes hazard was also excluded by the planning committee due to minimal risk and few historical occurrences.

The only significant changes in Marion's hazard risk assessment include adding a hazard and changing the priority level of two hazards. The planning included the river flood hazard in order to include the risk of slow rising, creek flooding although flash flooding is the typical flooding that affects the city. The priority level for the grass and wildland fire hazard was decreased from high to low, and the priority level for the animal, plant, and crop disease hazard was increased from low to medium. Overall, the city's hazard prioritization has not changed since the existing plan was developed.

Mount Vernon Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Mount Vernon has an existing plan so the priority level in the existing plan and the new priority, if changed, for a hazard is indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 68.

Table 68: Mount Vernon Hazard Prioritization

Hazard	Type	Existing Plan Priority Level	Priority Level
Thunderstorm, Lightning, and Hail	Natural	1	1
Transportation Incident	Natural	1	1
Flash Flood	Natural	1	1
Tornado and Windstorm	Natural	1	1
Hazardous Materials Incident	Technological	1	1
Infrastructure Failure	Technological	1	1
Severe Winter Storm	Natural	2	2
Radiological Incident	Technological	2	2
Drought	Natural	2	2
Terrorism	Natural	2	2
Human Disease	Natural	3	3
Extreme Heat	Natural	3	3
Animal, Plant, Crop Disease	Natural	3	3
Dam and Levee Failure	Technological	Excluded	Excluded
Earthquake	Natural	Excluded	Excluded
Grass and Wildland Fire	Natural	Excluded	Excluded
Landslide	Natural	Excluded	Excluded
Expansive Soils	Natural	Excluded	Excluded
Sinkholes	Natural	Excluded	Excluded
River Flood	Natural	Excluded	Excluded

The dam and levee failure hazard was excluded because there is no major dam or flood protection structure located in close proximity to Mount Vernon. The excluded natural hazards include earthquake, grass and wildland fire, landslide, expansive soils, sinkholes, and river flood. These hazards were excluded due to minimal risk or few historical occurrences. For the landslide, expansive soils, and sinkholes hazard, if the hazard does pose a risk, the hazard is mitigated in the infrastructure design and construction process. Overall, the planning committee did not change the hazard prioritization because the risks and priorities have not substantially changed in Mount Vernon.

Palo Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Palo has an existing plan so the priority level in the existing plan and the new priority, if changed, for a hazard is indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 69.

Table 69: Palo Hazard Prioritization

Hazard	Type	Existing Plan Priority Level	New Priority Level
Flash Flood	Natural	1	1
River Flood	Natural	1	1
Thunderstorm, Lightning, and Hail	Natural	2	2
Radiological Incident	Technological	2	2
Transportation Incident	Technological	2	2
Tornado and Windstorm	Natural	2	2
Drought	Natural	2	2
Grass and Wildland Fire	Natural	Excluded	2
Extreme Heat	Natural	3	3
Severe Winter Storm	Natural	3	3
Terrorism	Human Caused	3	3
Animal/Plant/Crop Disease	Natural	3	3
Hazardous Materials Incident	Technological	3	3
Infrastructure Failure	Technological	3	3
Human Disease	Natural	3	3
Dam and Levee Failure	Technological	3	3
Earthquake	Natural	Excluded	3
Landslide	Natural	Excluded	Excluded
Expansive Soils	Natural	Excluded	Excluded
Sinkholes	Natural	Excluded	Excluded

Excluded hazards include landslide, expansive soils, and sinkholes, which are geologic hazard with minimal risk and few historical occurrences. Hazards that were excluded in the existing hazard mitigation plan include grass and wildland fire and earthquake. The planning committee included these hazards in the new hazard risk assessment because there is a risk of both hazard occurring in Palo. Aside from including two additional hazards, there were no major changes to the risk assessment for Palo.

For the dam and levee failure hazard, it should be noted that dam failure is the potential risk in Palo. Pleasant Creek Lake has a dam structure, and it's located along the northeast boundary of the city. The lake is part of the Pleasant Creek State Recreation area, which is not within the city boundary.

Prairieburg Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Refer to Table 70.

Table 70: Prairieburg Hazard Prioritization

Hazard	Type	Priority Level
Tornado and Windstorm	Natural	1
Earthquake	Natural	1
Thunderstorm, Lightning, and Hail	Natural	1
Infrastructure Failure	Technological	1
Hazardous Materials Incident	Technological	1
Transportation Incident	Technological	1
Severe Winter Storm	Natural	2
Extreme Heat	Natural	2
Grass and Wildland Fire	Natural	3
Flash Flood	Natural	3
Drought	Natural	3
River Flood	Natural	Excluded
Dam and Levee Failure	Technological	Excluded
Expansive Soils	Natural	Excluded
Sinkholes	Natural	Excluded
Landslide	Natural	Excluded
Radiological Incident	Technological	Excluded
Terrorism	Human Caused	Excluded
Human Disease	Natural	Excluded
Animal, Plant, Crop Disease	Natural	Excluded

Six natural hazards were exclude by the planning committee because risk is minimal and few historical occurrences in the area. Excluded natural hazards include river flood, expansive soils, sinkholes, landslide, human disease, and animal, plant, crop disease. The planning committee also excluded two technological and one human caused hazard. The dam levee failure hazard was excluded because there are no major dams or flood protection structures located in the area. The radiological incident hazard and terrorism hazard were excluded because a significant amount of resources address these hazards.

Robins Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Refer to Table 71.

Table 71: Robins Hazard Prioritization

Hazard	Type	Priority Level
Thunderstorm, Lightning, and Hail	Natural	1
Infrastructure Failure	Technological	1
River Flood	Natural	1
Severe Winter Storm	Natural	1
Tornado and Windstorm	Natural	1
Flash Flood	Natural	1
Transportation Incident	Technological	1
Extreme Heat	Natural	2
Drought	Natural	2
Hazardous Materials Incident	Technological	2
Animal, Plant, Crop Disease	Natural	2
Grass and Wildland Fire	Natural	2
Terrorism	Human Caused	3
Human Disease	Natural	3
Radiological Incident	Technological	3
Sinkholes	Natural	3
Earthquake	Natural	3
Landslide	Natural	3
Levee and Dam Failure	Technological	Excluded
Expansive Soils	Natural	Excluded

During the Robins planning committee discussion, the levee and failure hazard and expansive soils hazard were excluded from the city's hazard risk assessment. The levee and dam failure hazard was excluded because there is no major dam or flood protection structure located within or near Robins that would have a direct, significant impact on the community. The expansive soils hazard was eliminated due to minimal risk and lack of historical occurrences.

Springville Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Refer to Table 72.

Table 72: Springville Hazard Prioritization

Hazard	Type	Priority Level
Thunderstorm, Lightning, and Hail	Natural	1
Infrastructure Failure	Technological	1
River Flood	Natural	1
Severe Winter Storm	Natural	1
Tornado and Windstorm	Natural	1
Extreme Heat	Natural	1
Flash Flood	Natural	1
Transportation Incident	Technological	2
Drought	Natural	2
Hazardous Materials Incident	Technological	2
Animal, Plant, Crop Disease	Natural	2
Grass and Wildland Fire	Natural	2
Terrorism	Human Caused	3
Human Disease	Natural	3
Radiological Incident	Technological	3
Sinkholes	Natural	3
Earthquake	Natural	3
Landslide	Natural	3
Levee and Dam Failure	Technological	Excluded
Expansive Soils	Natural	Excluded

During planning committee discussion, levee and dam failure hazard was excluded from the risk assessment because there are no major dams or flood protection structures in the Springville area. In addition, the expansive soils hazard was eliminated due to minimal risk and lack of historical occurrences.

Walker Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Refer to Table 73.

Table 73: Walker Hazard Prioritization

Hazard	Type	Priority Level
Thunderstorm, Lightning, and Hail	Natural	1
Infrastructure Failure	Technological	1
River Flood	Natural	1
Severe Winter Storm	Natural	1
Tornado and Windstorm	Natural	1
Extreme Heat	Natural	1
Flash Flood	Natural	1
Expansive Soils	Natural	1
Transportation Incident	Technological	2
Drought	Natural	2
Hazardous Materials Incident	Technological	2
Animal, Plant, Crop Disease	Natural	2
Grass and Wildland Fire	Natural	2
Terrorism	Human Caused	3
Human Disease	Natural	3
Radiological Incident	Technological	3
Earthquake	Natural	3
Levee and Dam Failure	Technological	Excluded
Sinkholes	Natural	Excluded
Landslide	Natural	Excluded

One technological hazard, levee and dam failure, was excluded by the planning committee because there are no levee or dam structures located in Walker. In addition, two natural hazards were excluded. Both the sinkholes and landslide hazard were excluded because risk is minimal and there are no historical occurrences.

Center Point – Urbana Community School District Hazard Prioritization

The district's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Refer to Table 74.

Table 74: Center Point – Urbana Community School District Hazard Prioritization

Hazard	Type	Priority Level
Thunderstorm, Lightning, and Hail	Natural	1
Infrastructure Failure	Technological	1
Severe Winter Storm	Natural	1
Tornado and Windstorm	Natural	1
Extreme Heat	Natural	1
Flash Flood	Natural	1
Transportation Incident	Technological	2
Hazardous Materials Incident	Technological	2
Terrorism	Human Caused	3
Human Disease	Natural	3
Radiological Incident	Technological	3
Earthquake	Natural	3
River Flood	Natural	Excluded
Drought	Natural	Excluded
Animal, Plant, Crop Disease	Natural	Excluded
Grass and Wildland Fire	Natural	Excluded
Levee and Dam Failure	Technological	Excluded
Sinkholes	Natural	Excluded
Landslide	Natural	Excluded
Expansive Soils	Natural	Excluded

Seven natural hazards and one technological hazard were excluded from the district's risk assessment. All excluded natural hazards are minimal risk with no historical occurrences for the district. The levee and dam failure hazard was excluded because there is no major dam or flood protection structure located within close proximity of school district facilities.

College Community School District Hazard Prioritization

The district's planning committee used the multi-jurisdictional risk assessment prepared for the planning areas as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the hazards and priority level on local conditions and priorities. Refer to Table 75.

Table 75: College Community School District Hazard Prioritization

Hazard	Type	Priority Level
Thunderstorm, Lightning, and Hail	Natural	1
Infrastructure Failure	Technological	1
River Flood	Natural	1
Severe Winter Storm	Natural	1
Tornado and Windstorm	Natural	1
Flash Flood	Natural	1
Transportation Incident	Technological	2
Hazardous Materials Incident	Technological	2
Grass and Wildland Fire	Natural	2
Terrorism	Human Caused	2
Human Disease	Natural	3
Radiological Incident	Technological	3
Earthquake	Natural	3
Extreme Heat	Natural	Excluded
Drought	Natural	Excluded
Animal, Plant, Crop Disease	Natural	Excluded
Levee and Dam Failure	Technological	Excluded
Sinkholes	Natural	Excluded
Landslide	Natural	Excluded
Expansive Soils	Natural	Excluded

The planning committee excluded six natural hazards and one technological hazard from its risk assessment. The excluded natural hazards include extreme heat, drought, animal, plant, and crop disease, sinkholes, landslide, and expansive soils. The extreme heat hazard was excluded because all district facilities are air conditioned. The drought and animal, plant, crop disease hazards were excluded because the district is not likely to be directly affected by these hazards. The remaining natural hazards are geologic hazards that are a minimal risk to the district and there are no historical occurrences.

The only technological hazard that was excluded is the levee and dam failure hazard. The College Community School District is located in a campus type area on the southwest side of Cedar Rapids. There are no major dams or flood protection structures located in close proximity to the district. The 5-in-1 Dam, existing flood protection structures in downtown, and future flood protection structures in Cedar Rapids will not likely have a major impact on Prairie Creek, which runs through the district's campus. During the 2008 flood, the district was not directly impacted by the major flooding in Linn and Johnson County.

Key Considerations

In a multi-jurisdictional plan, it is important to identify local conditions and priorities that differ among participating jurisdictions. These differences are important to consider before identifying a jurisdiction's final mitigation strategy. Despite a relatively small planning area based on county boundaries, variation in topography, hydrology, etc. result in different risks for each jurisdiction. In addition, the jurisdiction's population, critical facilities, and overall hazard mitigation progress factor into how a jurisdiction should approach each hazard.

KEY CONSIDERATIONS

- Vulnerable Populations
- Critical Facilities
- Hazard Mitigation Progress

Photo Source: Linn County Planning and Development

Linn County Flood Damage in August 2009
Photo Source: Linn County Planning and Development

Vulnerable Populations

A major focus in hazard mitigation planning is vulnerable populations, which are groups of people who may be vulnerable during a hazard event due to lack of mobility or extended exposure. In all communities, elderly, ill, or disabled living in their home, retirement facilities, or long-term care facilities may be vulnerable due to mobility issues or dependence on medical devices. Daycare and school facilities may also be vulnerable due to a high ratio of children to adults.

To assist individuals, the Linn County Emergency Management Agency maintains a registry of people who have a disability or medical condition and may potentially require assistance evacuating their home in an emergency. The registry is voluntary, and there are currently 1,266 people registered in Linn County. Refer to Table 76.

Table 76: Linn County Emergency Assistance Registry

Area	Registered Individuals
Alburnett	8
Cedar Rapids	824
Center Point	21
Central City	19
Coggon	17
Ely	9
Fairfax	13
Hiawatha	38
Lisbon	6
Marion	208
Mount Vernon	37
Palo	21
Prairieburg	2
Robins	12
Springville	6
Toddville	5
Viola	1
Walker	19
Total	1,266

Source: Linn County Emergency Management Agency, April 2014

Daycare and school facilities are located throughout Linn County. The location of daycare facilities is only available in jurisdictions that are in the Duane Arnold Energy Center Emergency Planning Zone. For school facilities, location and attendance of all major school facilities is available. The location and attendance for school facilities is included in the critical facilities information for participating jurisdictions.

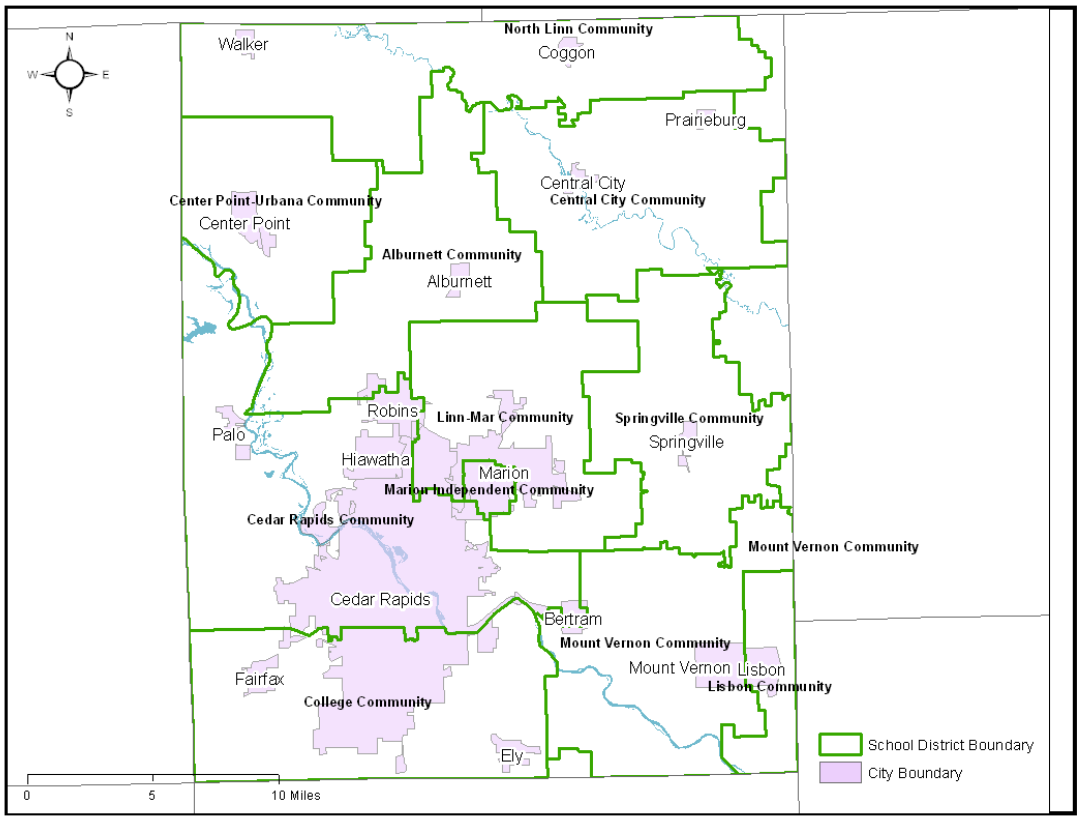
Regarding exposure, people who work outdoors or use outdoor recreation facilities are vulnerable during severe weather events. There are recreation areas, large and small, throughout Linn County and trails that stretch for miles. Shelters are provided in most areas, but the existing shelters may not be sufficient for severe weather events.

Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in a community. In each jurisdiction, the planning committee identified the primary critical facilities in their community. Generally, all jurisdiction property and infrastructure are considered critical facilities.

In the county and city jurisdictions, the facilities maintained by the associated school district are considered critical facilities. Although operated by the school district, students use school facilities several hours a day and the community may depend on certain school facilities for services. In addition, school facilities may be ideal for shelter during or after hazard event occurs in a community. For the location of school facilities in participating school jurisdictions, refer to their critical facilities section in this plan. For school district boundaries, refer to Figure 35.

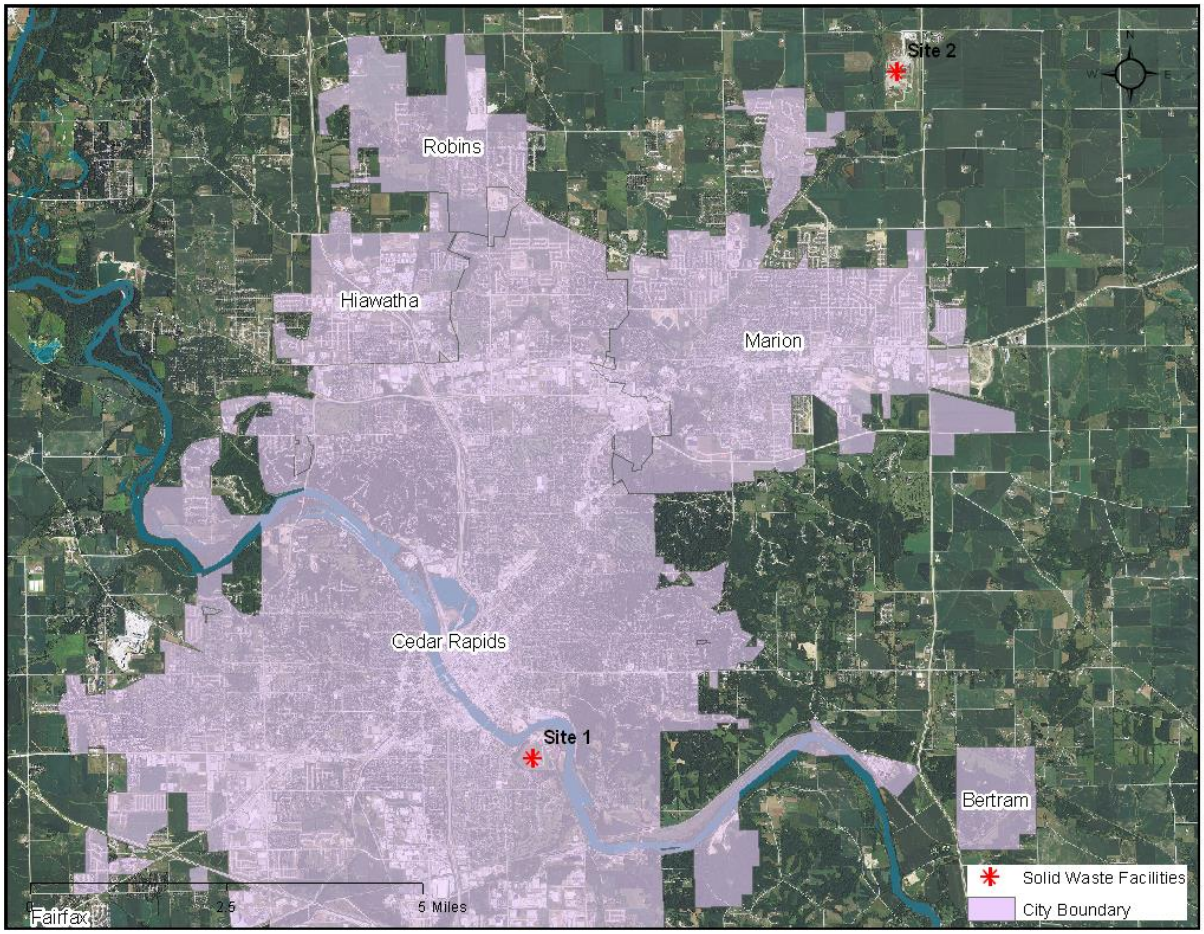
Figure 35: Linn County School District Boundaries



It should be noted that medical clinics are located throughout Linn County, but the only major medical facilities are located in Cedar Rapids. Two large hospitals that offer general and specialized care are located in downtown Cedar Rapids. Other nearby cities with major hospitals include Cedar Falls, Waterloo, and Iowa City, but for residents in Linn County, the hospitals in Cedar Rapids are most often the closest option for urgent medical care.

Another set of important critical facilities in Linn County include the Cedar Rapids/Linn County Solid Waste Agency's Site 1 and Site 2. All solid waste is currently deposited at Site 2, and Site 1 is officially in its closure period. See Figure 36.

Figure 36: Solid Waste and Recycling Facilities



Linn County Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. For Linn County, all county property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figures 37 – 43.

Figure 37: Specific Critical Facilities in Linn County

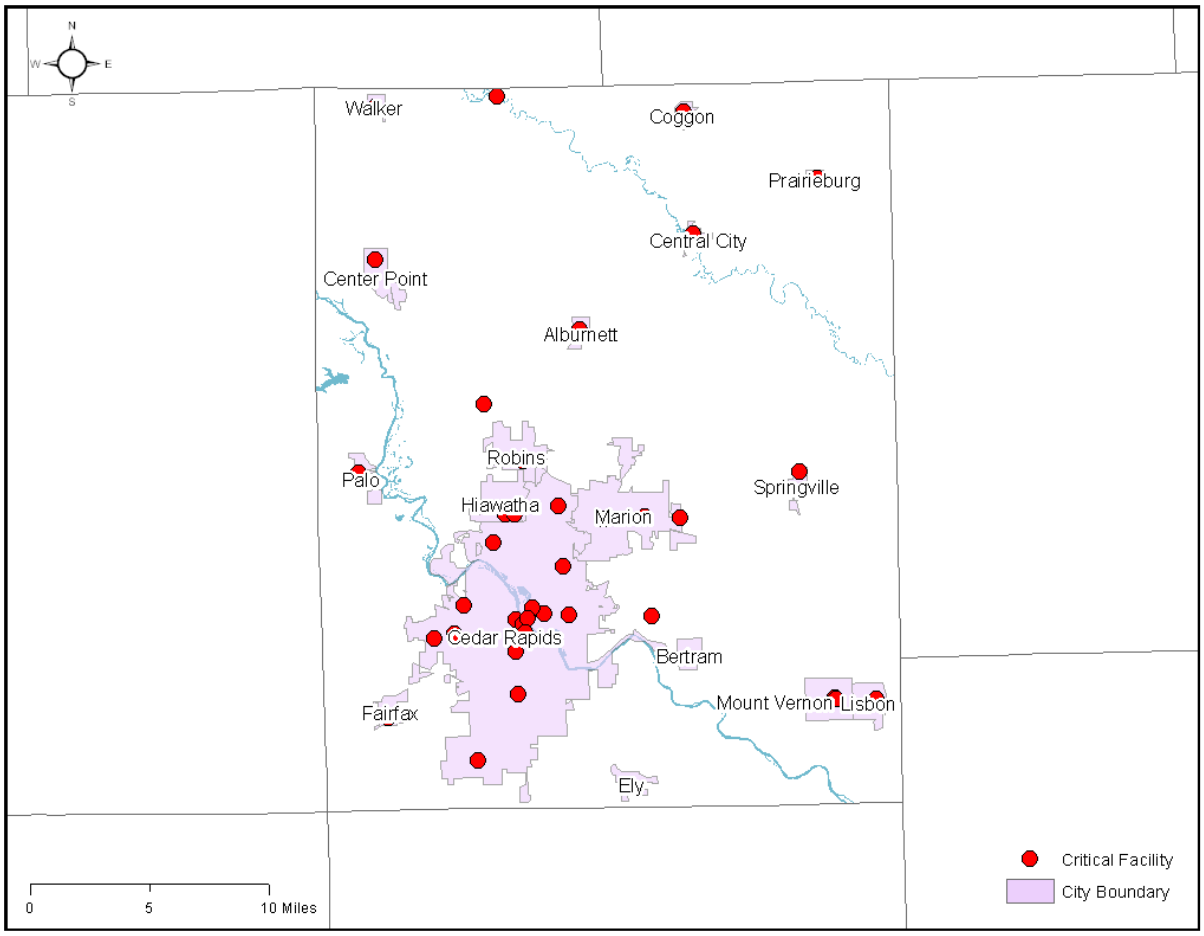


Figure 38: Specific Critical Facilities in North Cedar Rapids Metropolitan Area

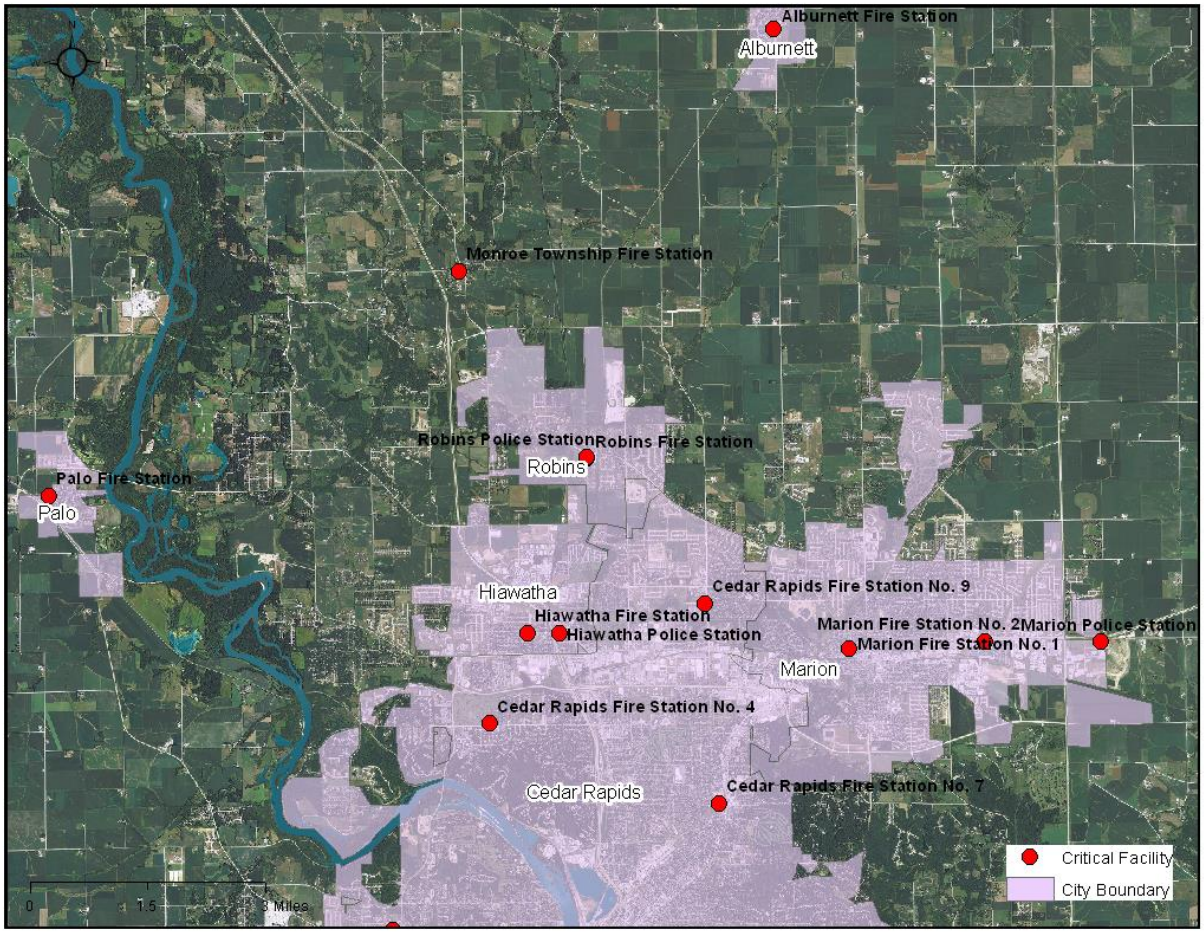


Figure 39: Specific Critical Facilities in Central Cedar Rapids Metropolitan Area

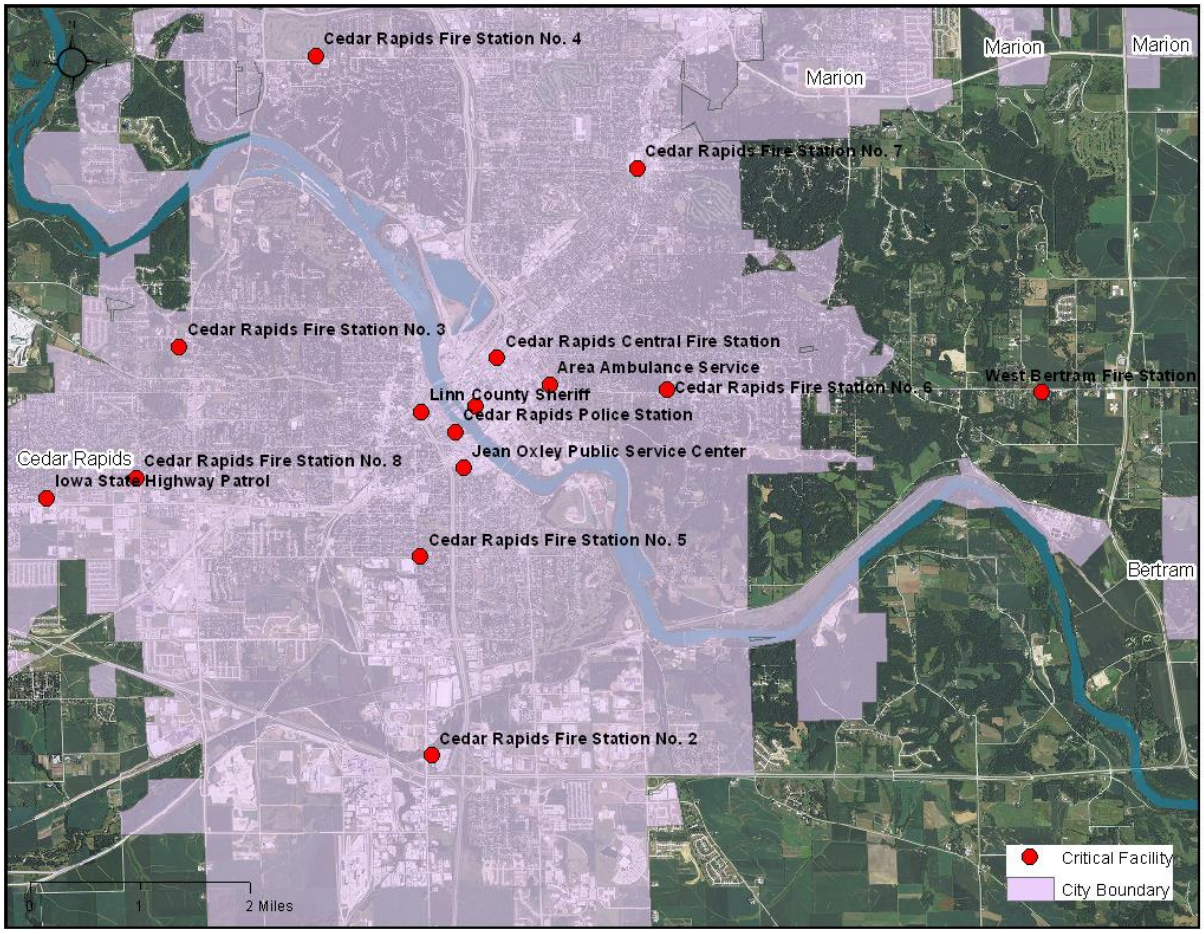


Figure 40: Specific Critical Facilities in South Cedar Rapids Metropolitan Area

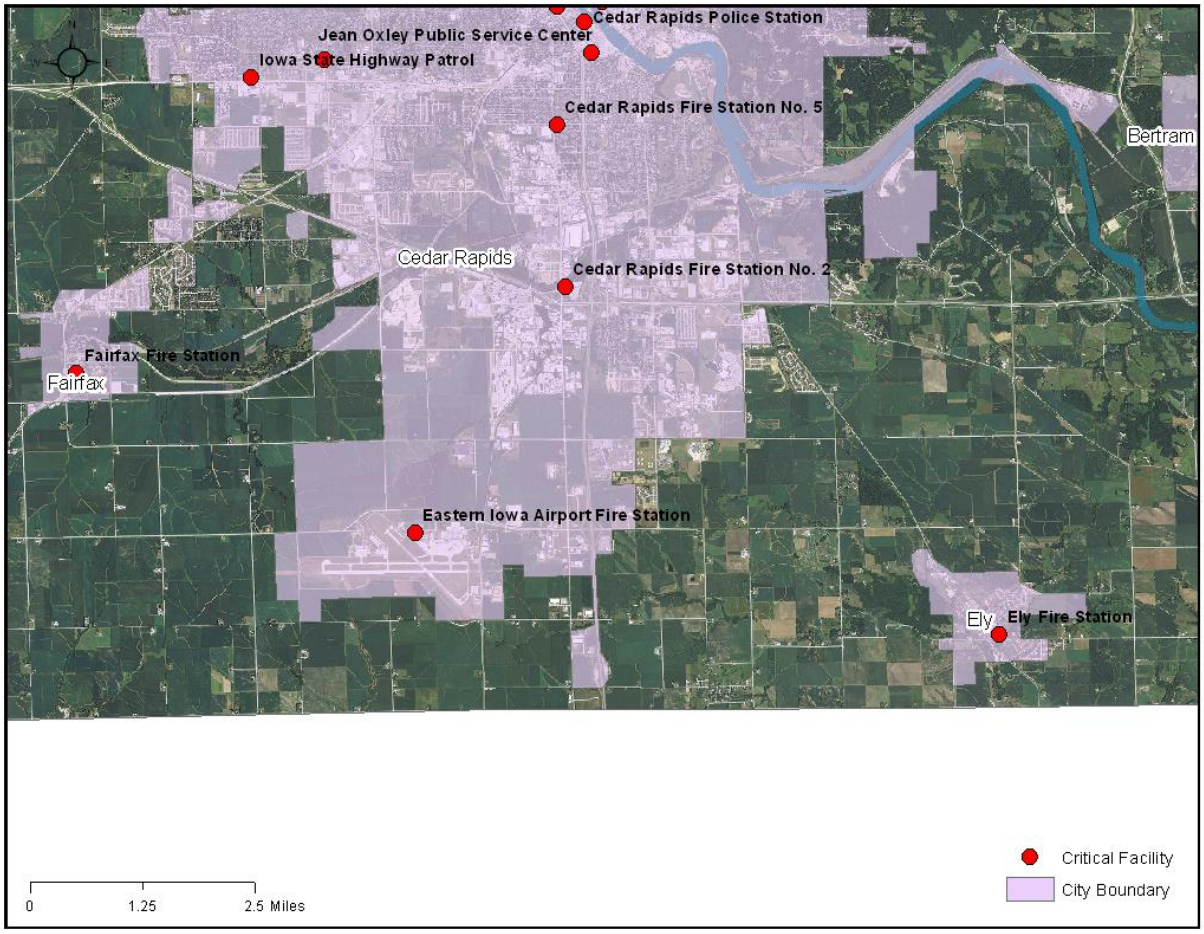


Figure 41: Specific Critical Facilities in Northwest Linn County

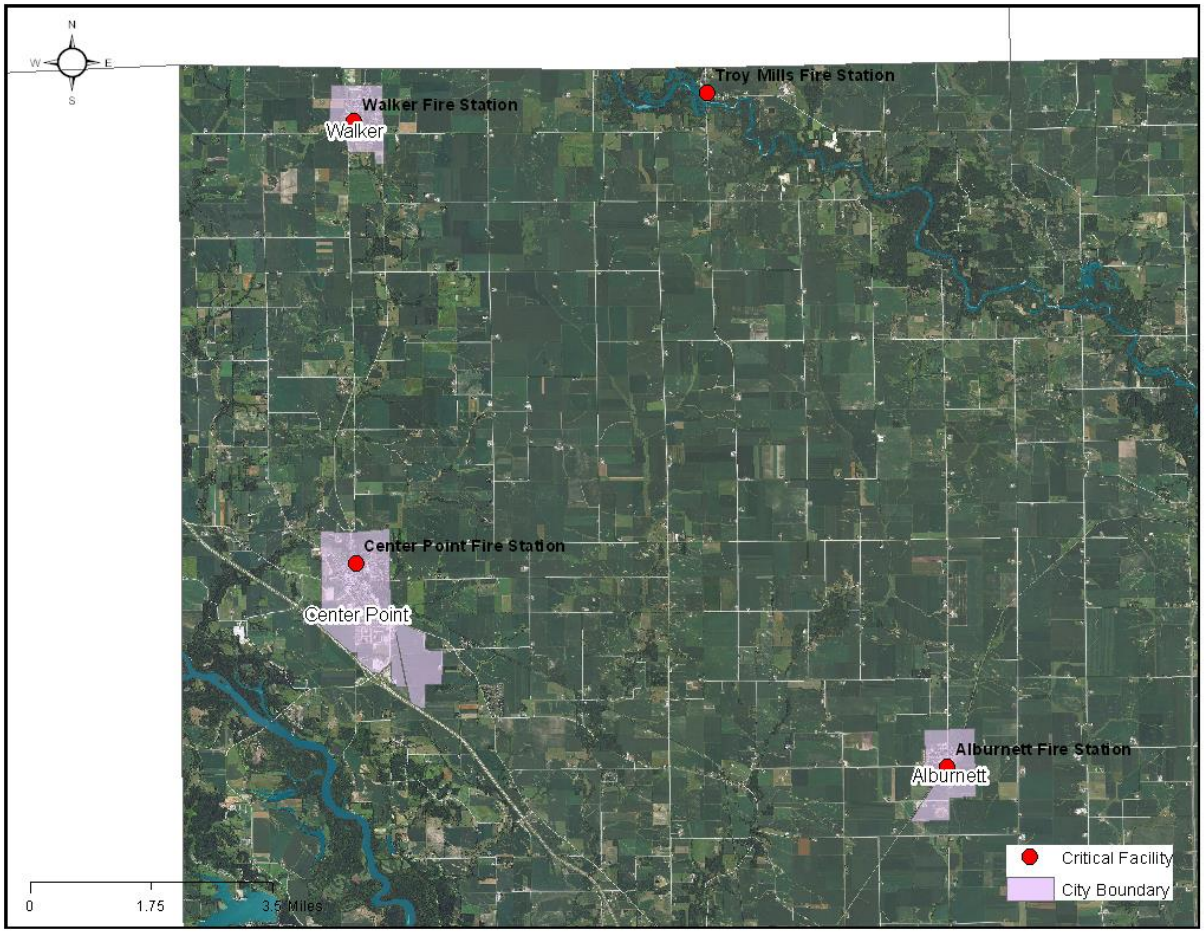


Figure 42: Specific Critical Facilities in Northeast Linn County

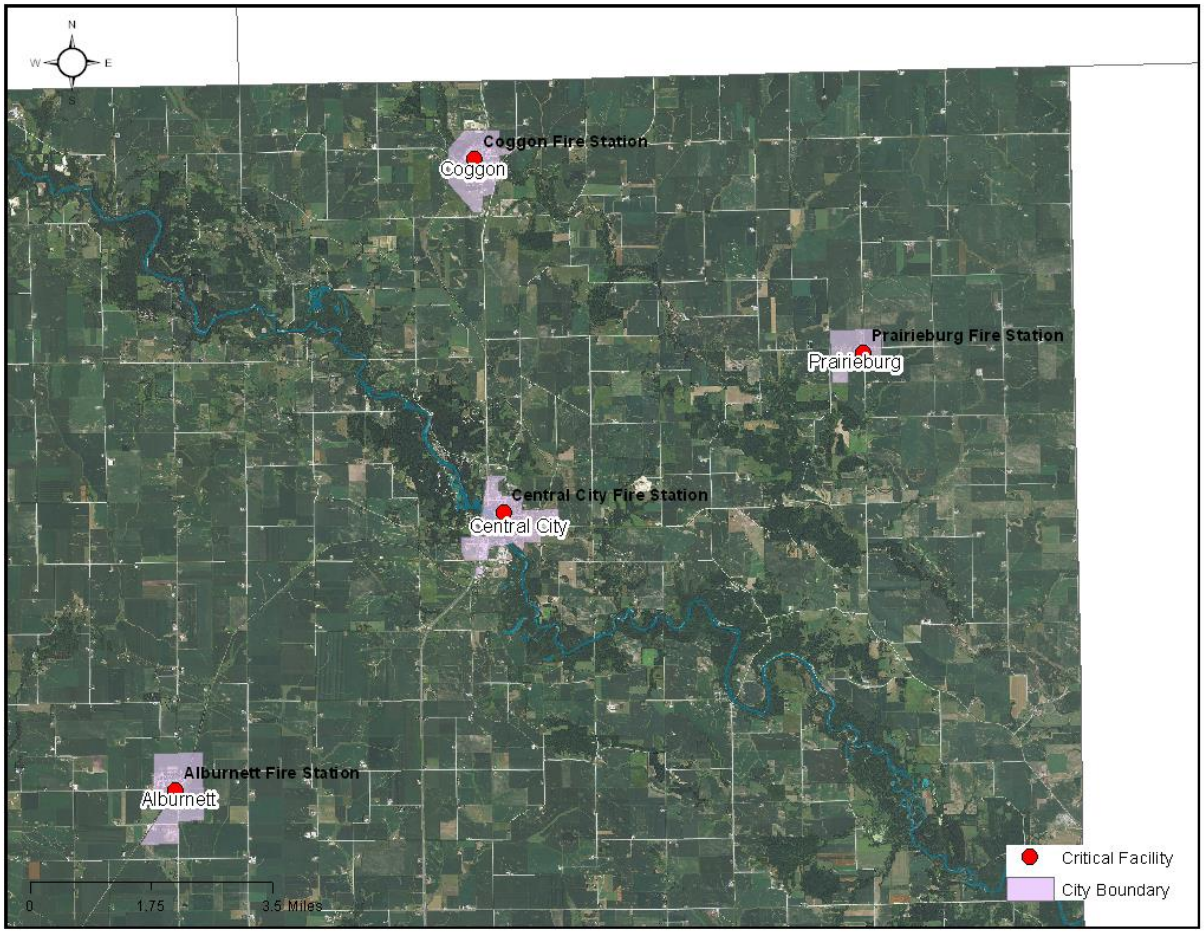
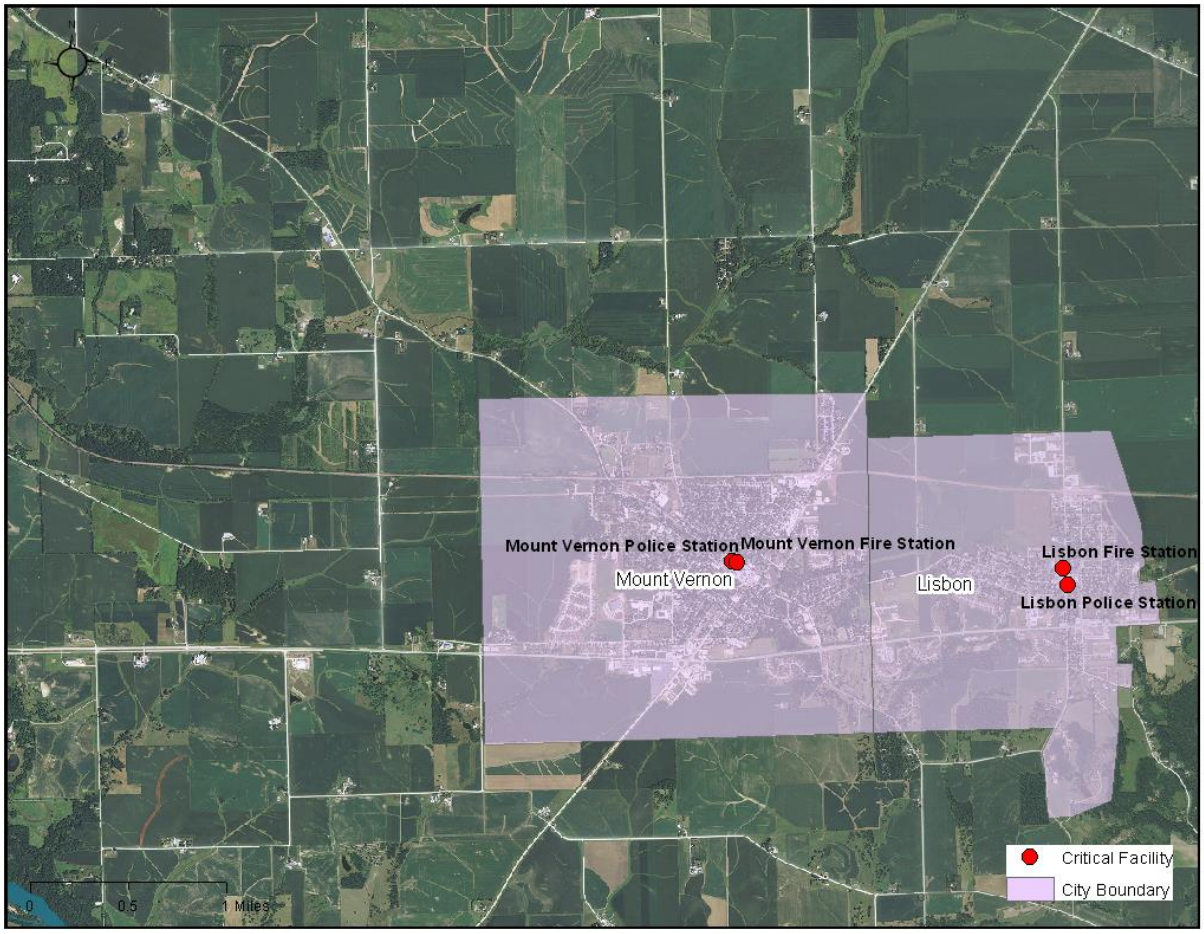


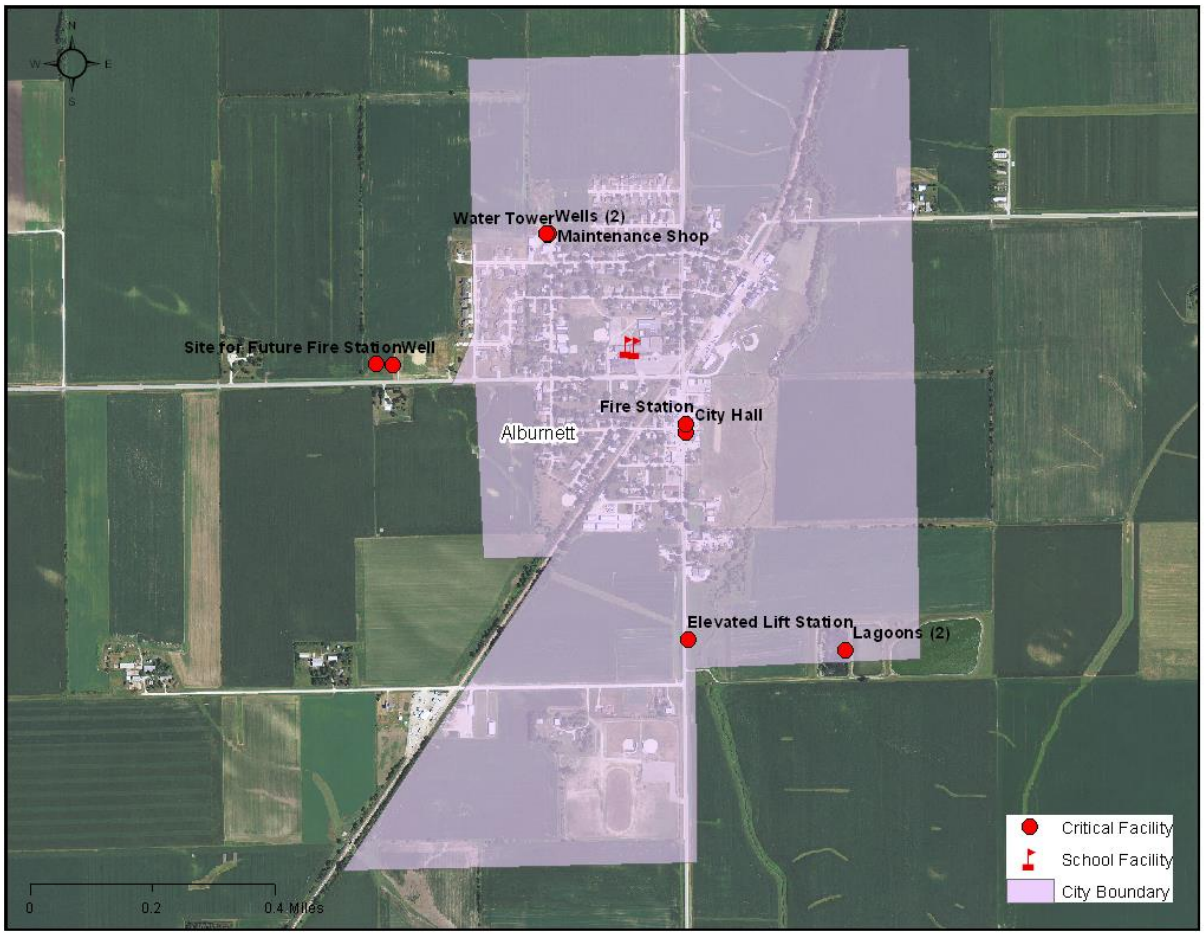
Figure 43: Specific Critical Facilities in Southeast Linn County



Alburnett Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Alburnett, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 44.

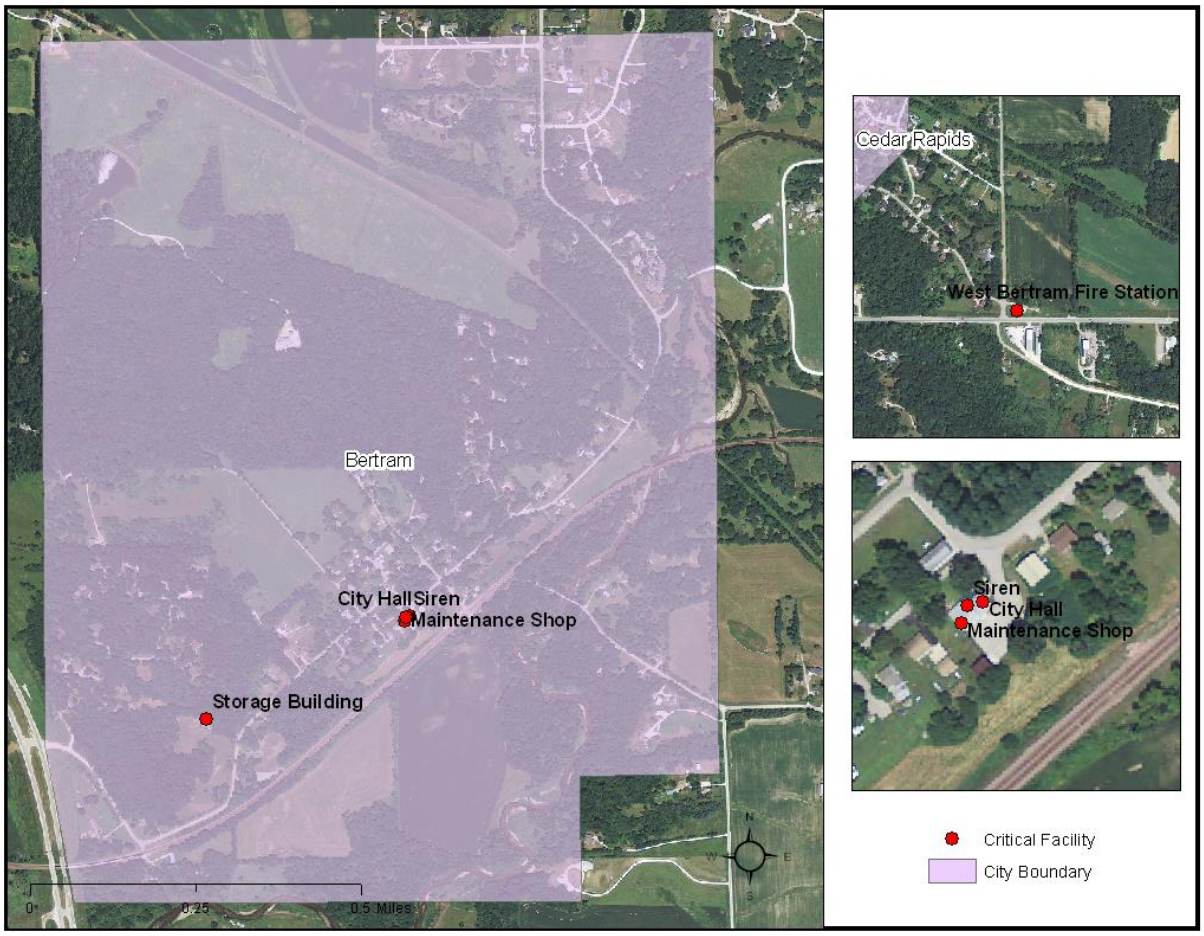
Figure 44: Specific Critical Facilities in Alburnett



Bertram Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Bertram, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 45.

Figure 45: Specific Critical Facilities in Bertram



Cedar Rapids Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Cedar Rapids, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 46 – 51.

Figure 46: Specific Critical Facilities in Cedar Rapids

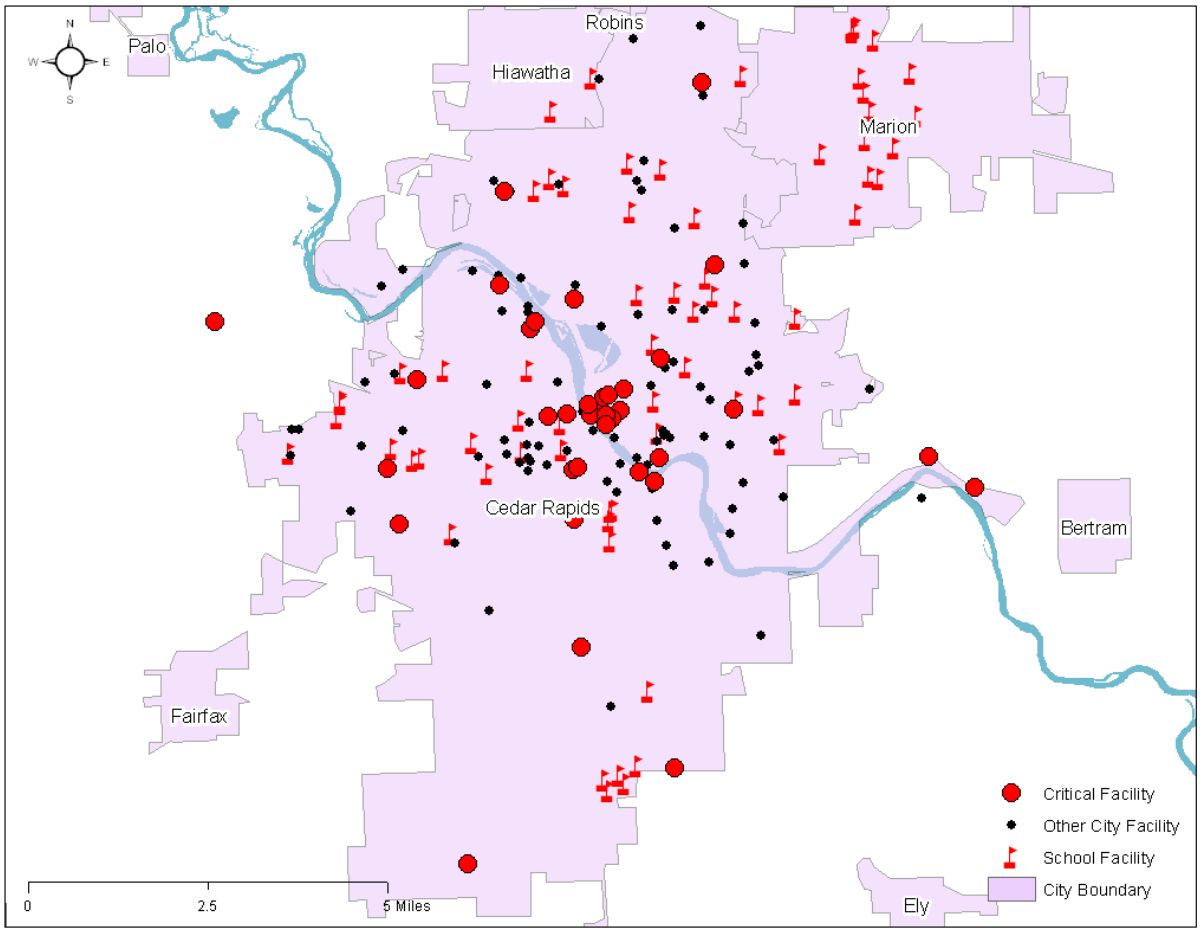


Figure 47: Specific Critical Facilities in North Cedar Rapids

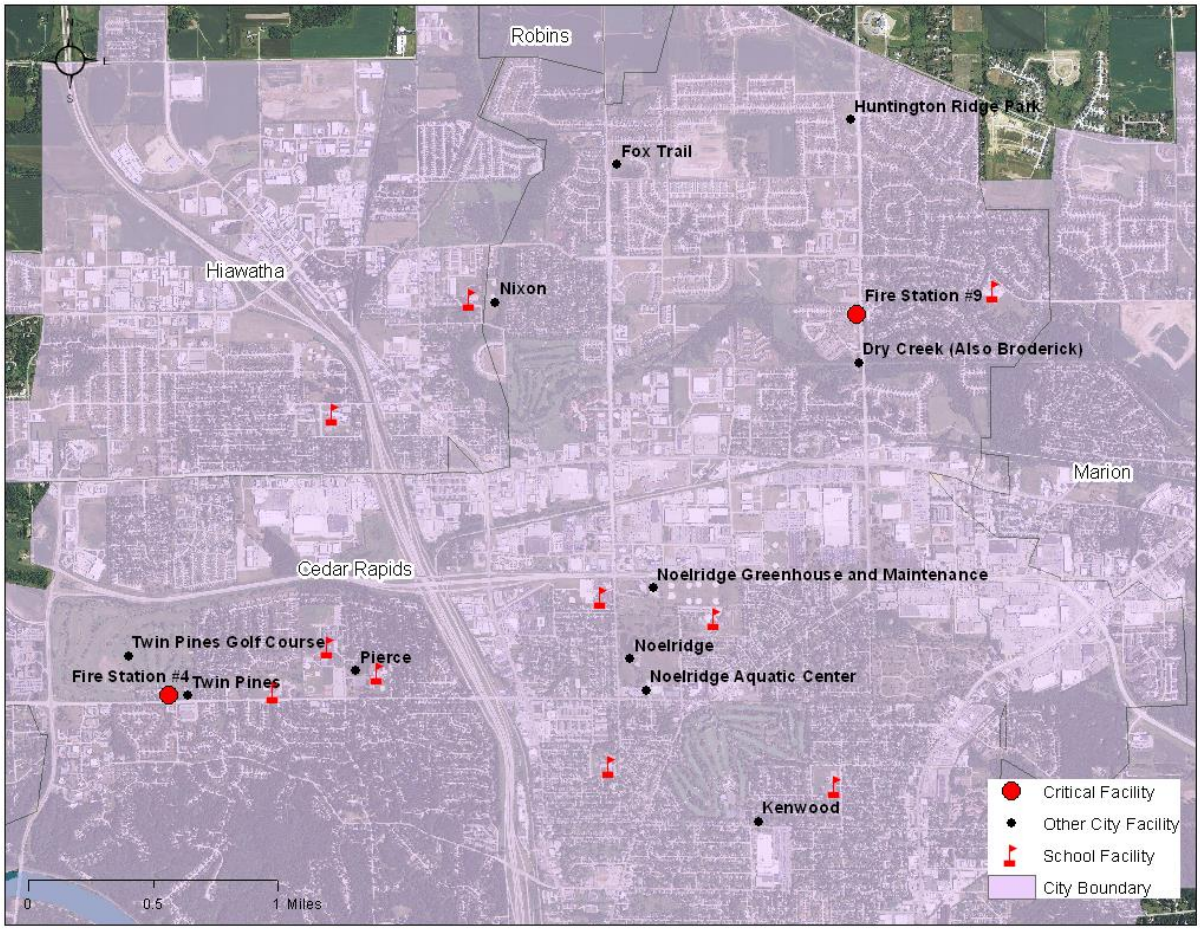


Figure 48: Specific Critical Facilities in Ellis Area and West Cedar Rapids

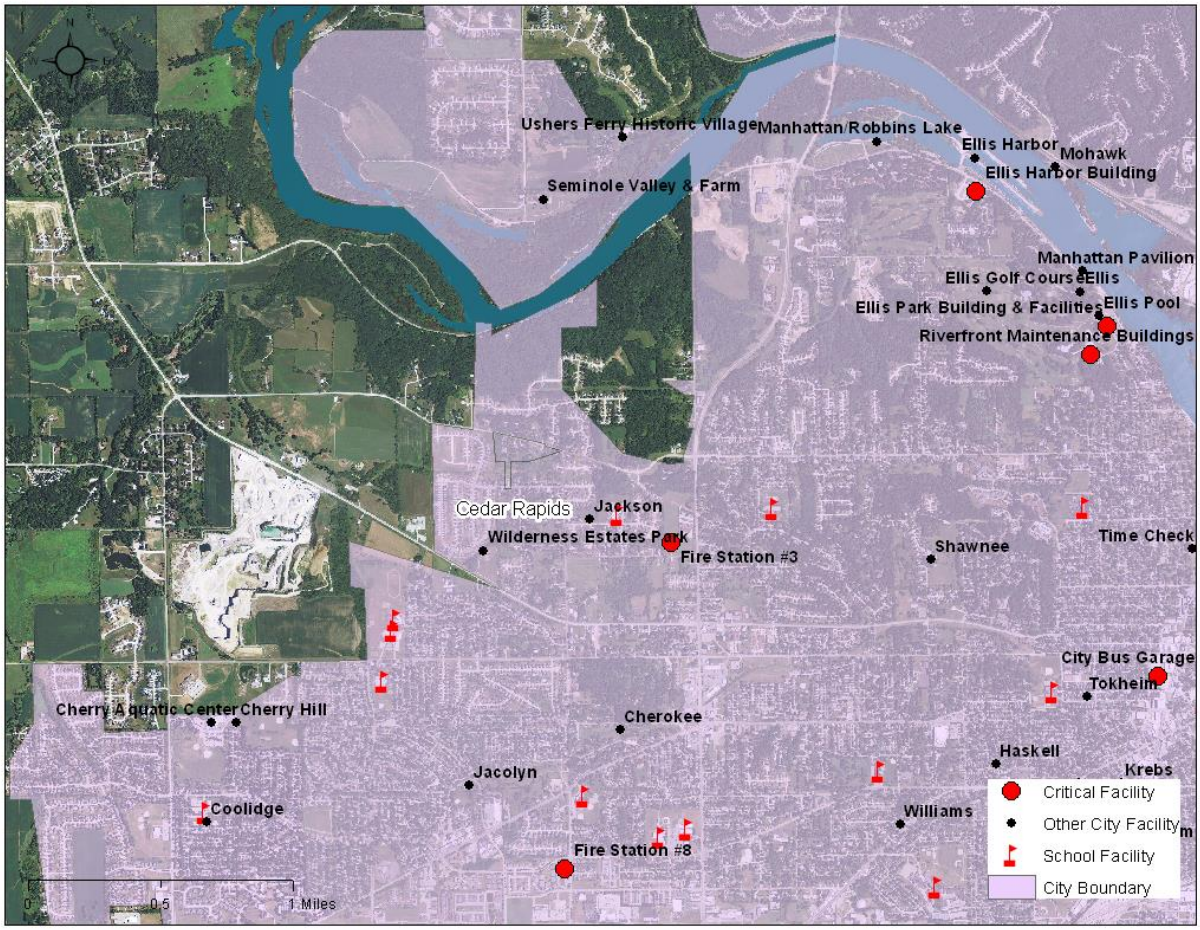


Figure 49: Specific Critical Facilities in Downtown and Central Cedar Rapids

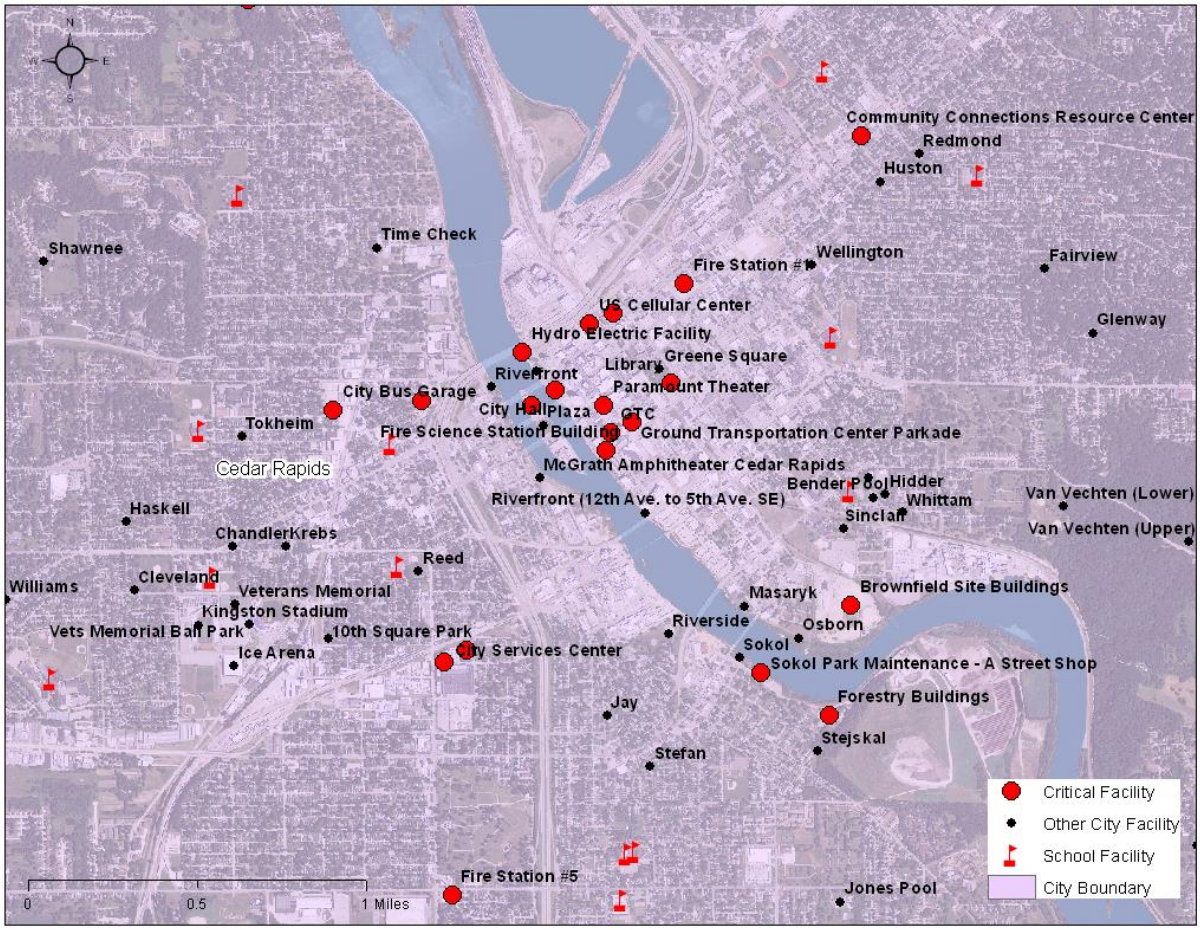


Figure 50: Specific Critical Facilities in East Cedar Rapids

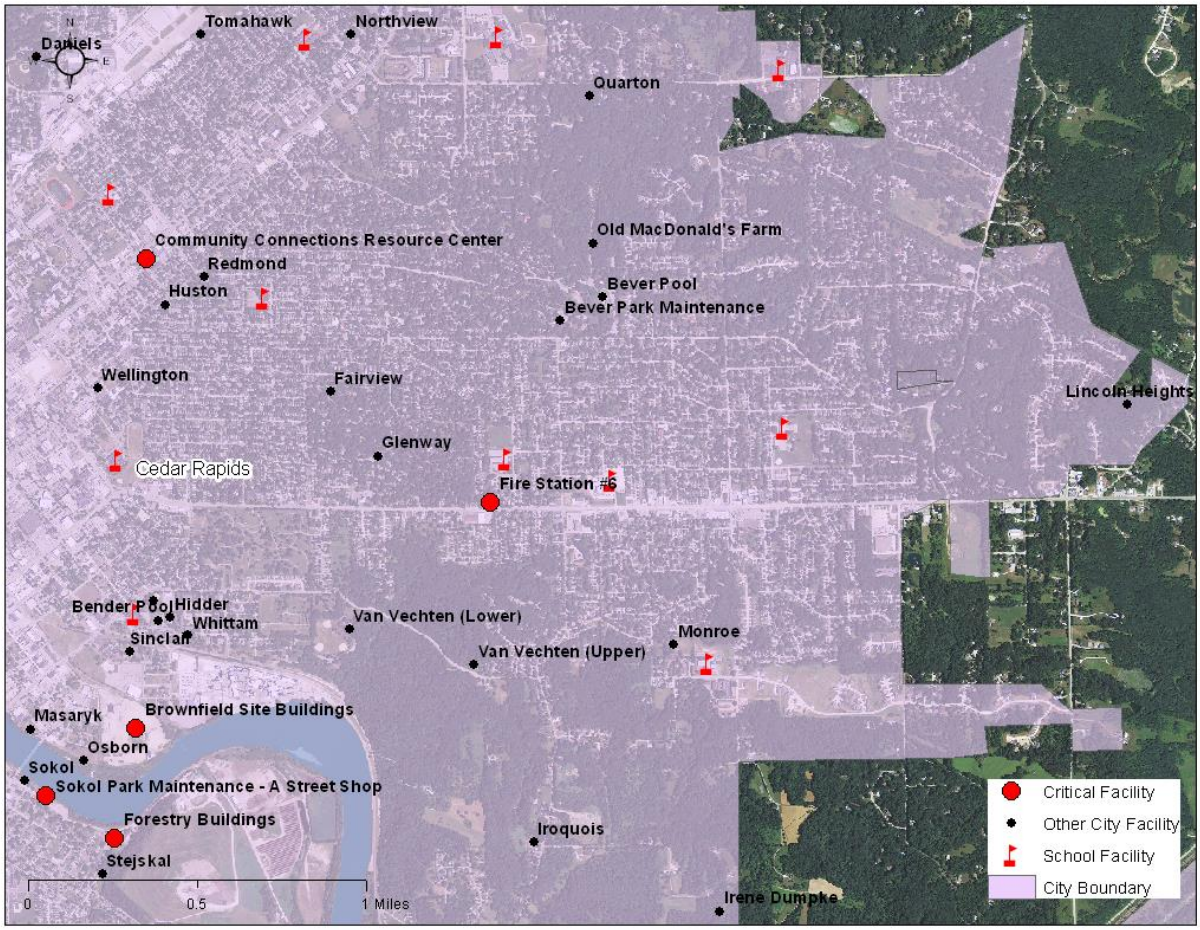
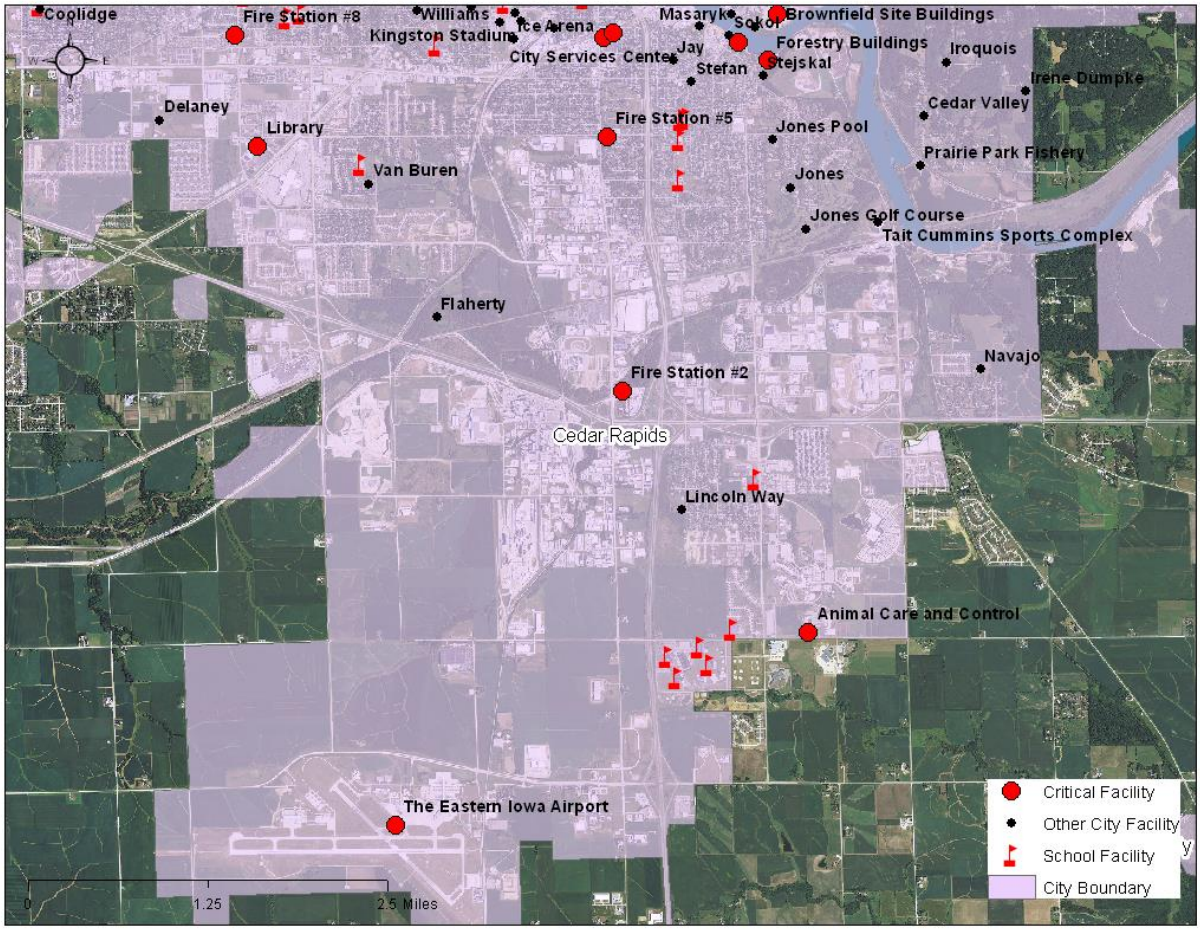


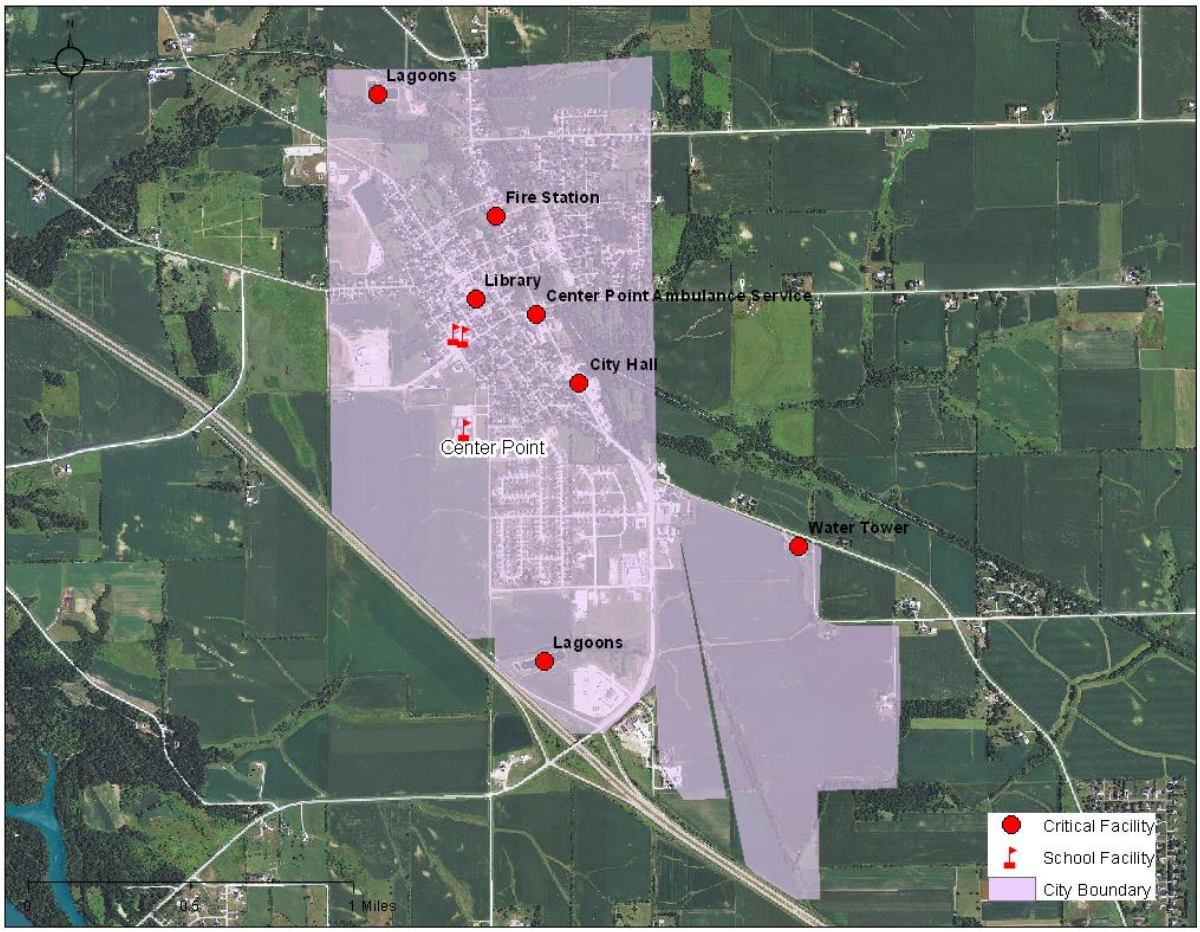
Figure 51: Specific Critical Facilities in South Cedar Rapids



Center Point Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Center Point, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 52.

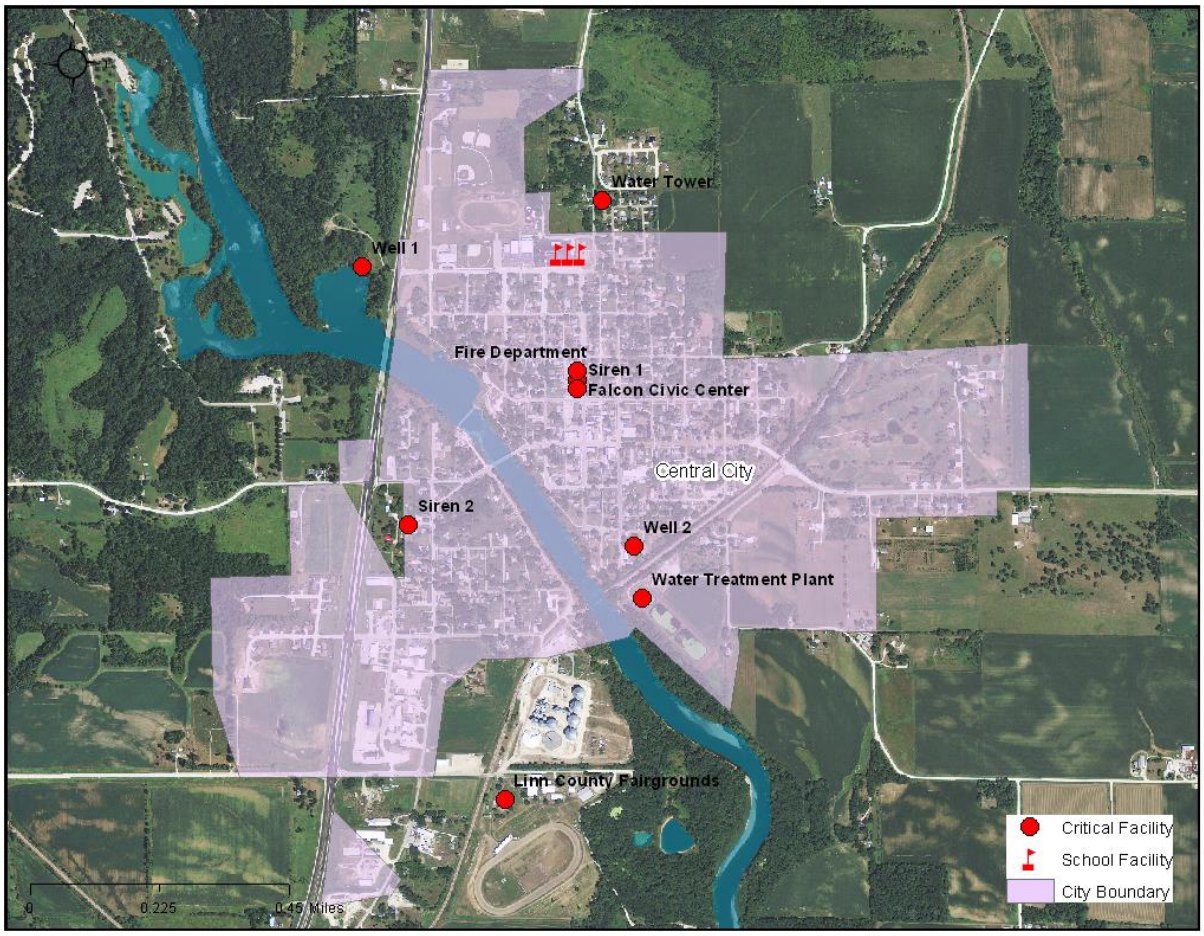
Figure 52: Specific Critical Facilities in Center Point



Central City Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Central City, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 53.

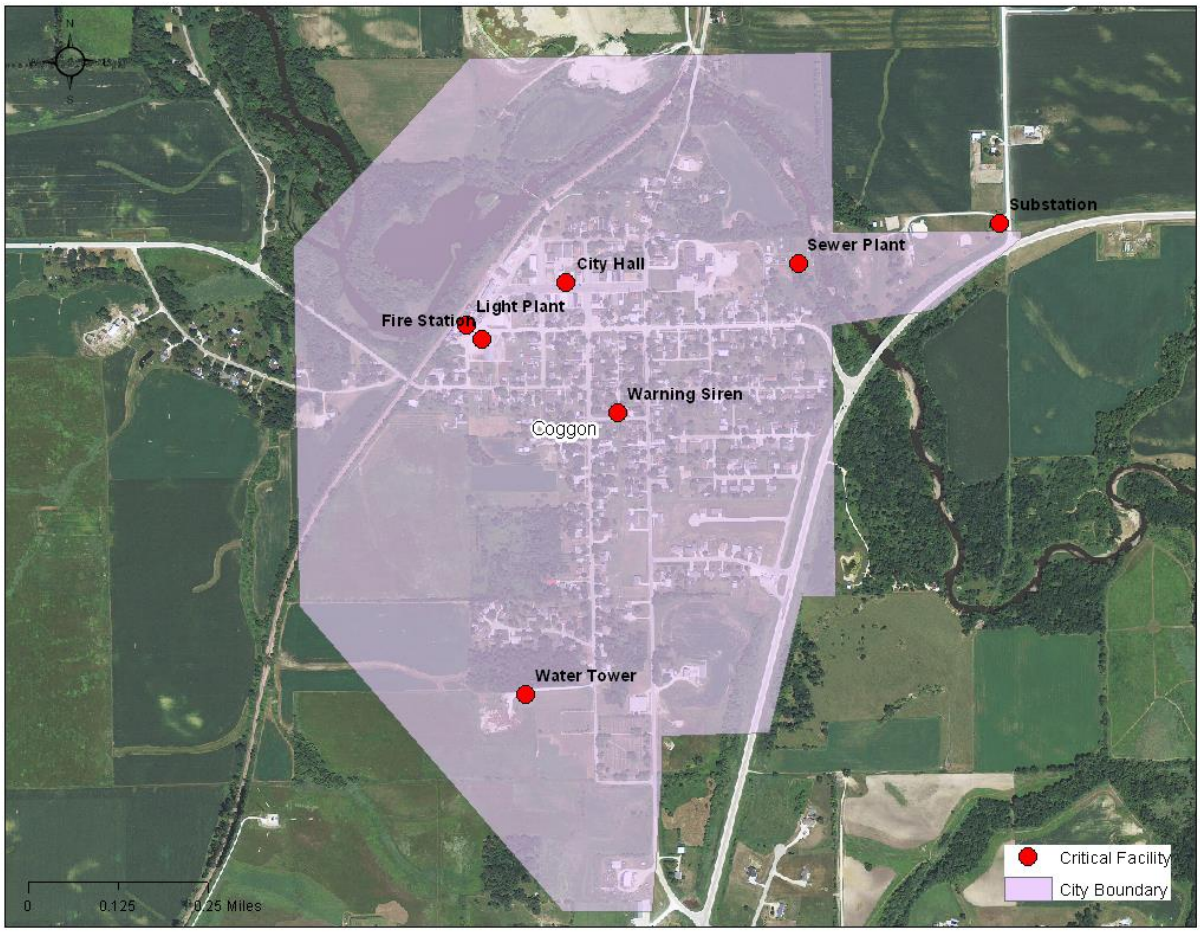
Figure 53: Specific Critical Facilities in Central City



Coggon Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Coggon, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 54.

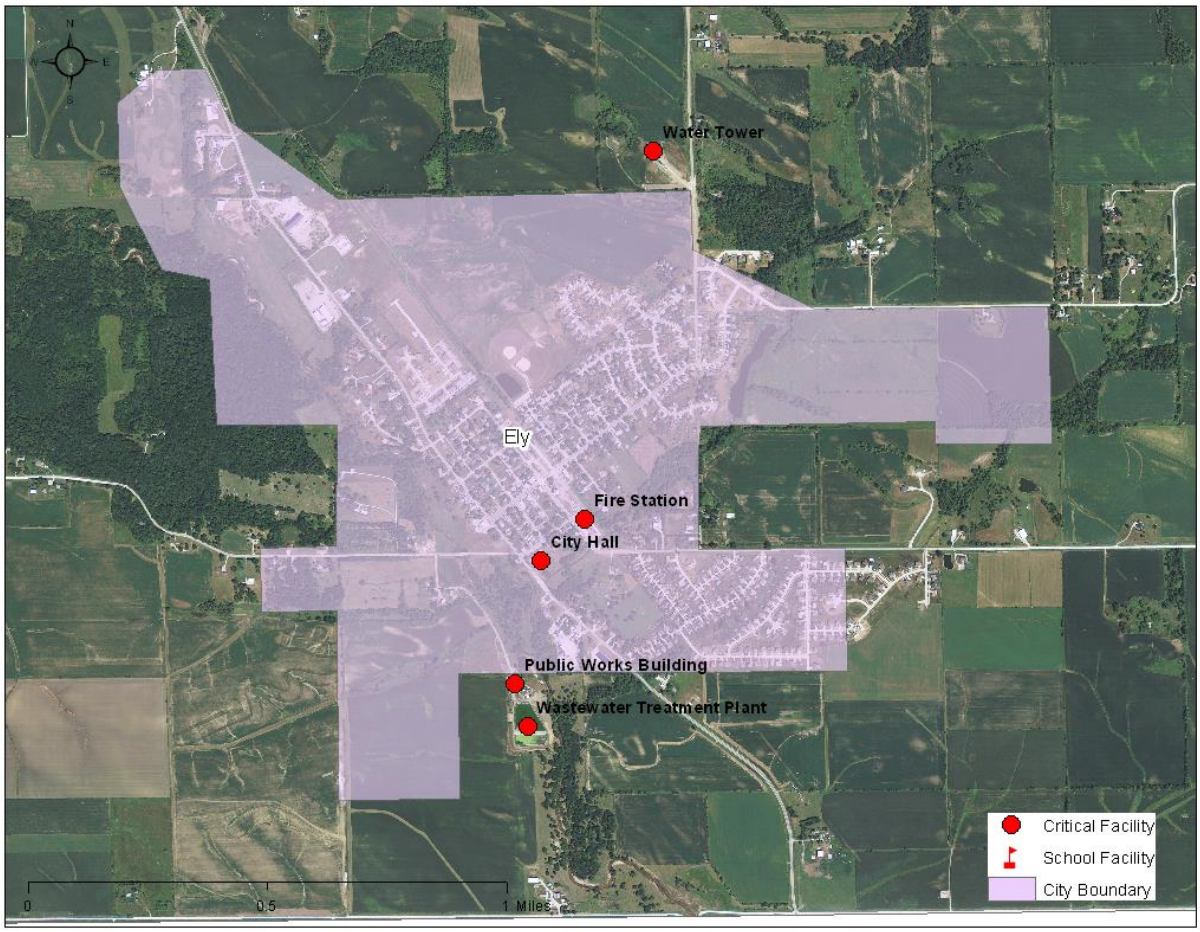
Figure 54: Specific Critical Facilities in Coggon



Ely Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Ely, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 55.

Figure 55: Specific Critical Facilities in Ely



Fairfax Critical Facilities

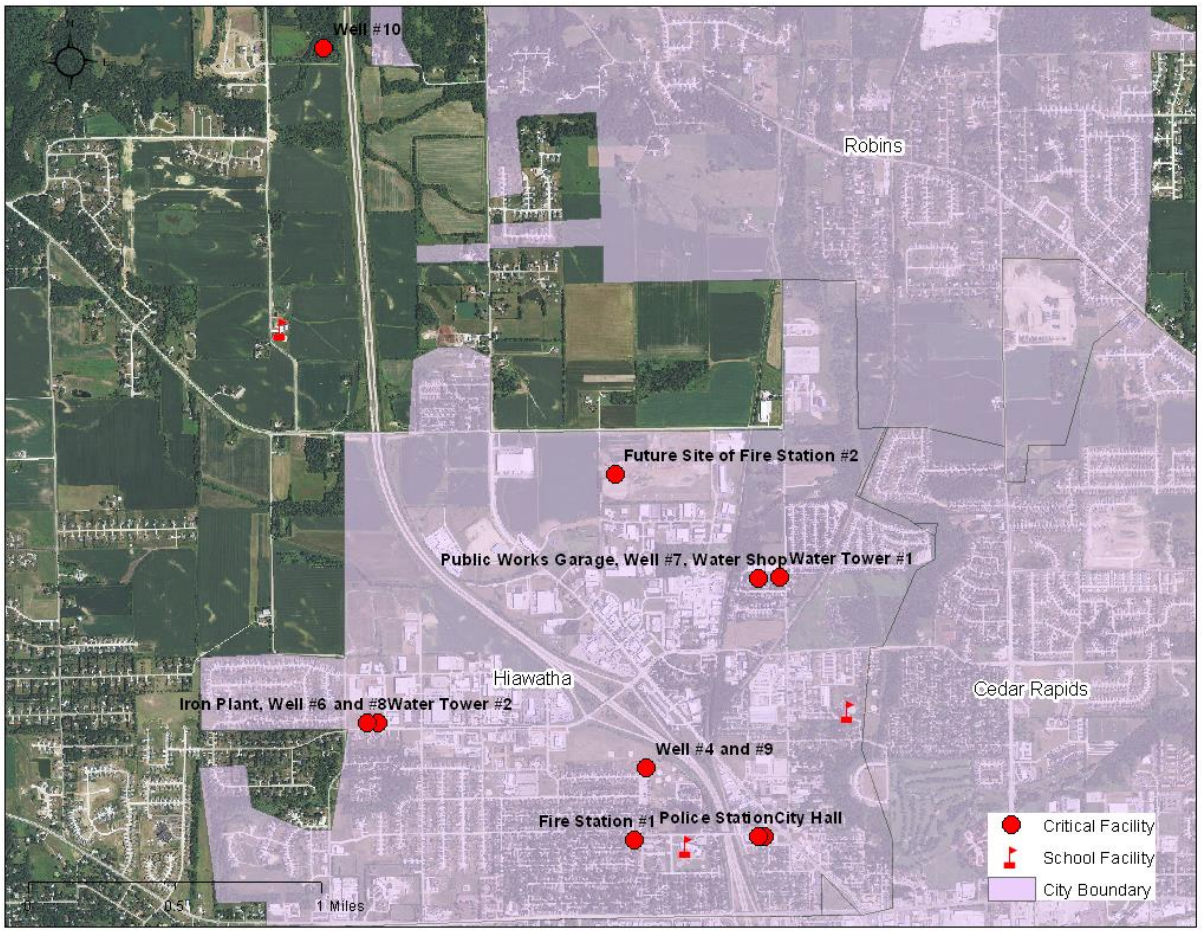
Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Fairfax, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 56.

Figure 56: Specific Critical Facilities in Fairfax

Hiawatha Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Hiawatha, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 57.

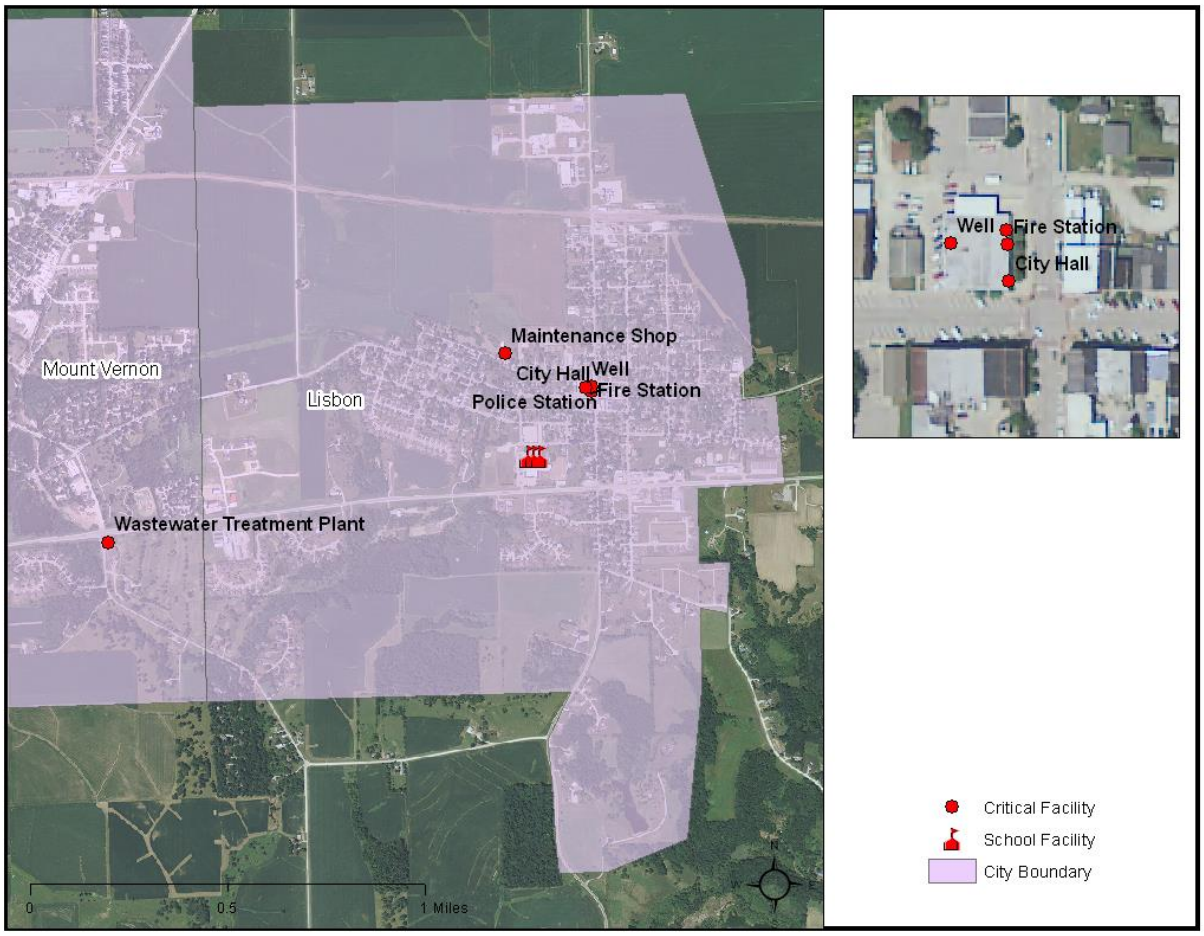
Figure 57: Specific Critical Facilities in Hiawatha



Lisbon Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Lisbon, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 58.

Figure 58: Specific Critical Facilities in Lisbon



Marion Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Marion, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 59 – 62.

Figure 59: Specific Critical Facilities in Marion

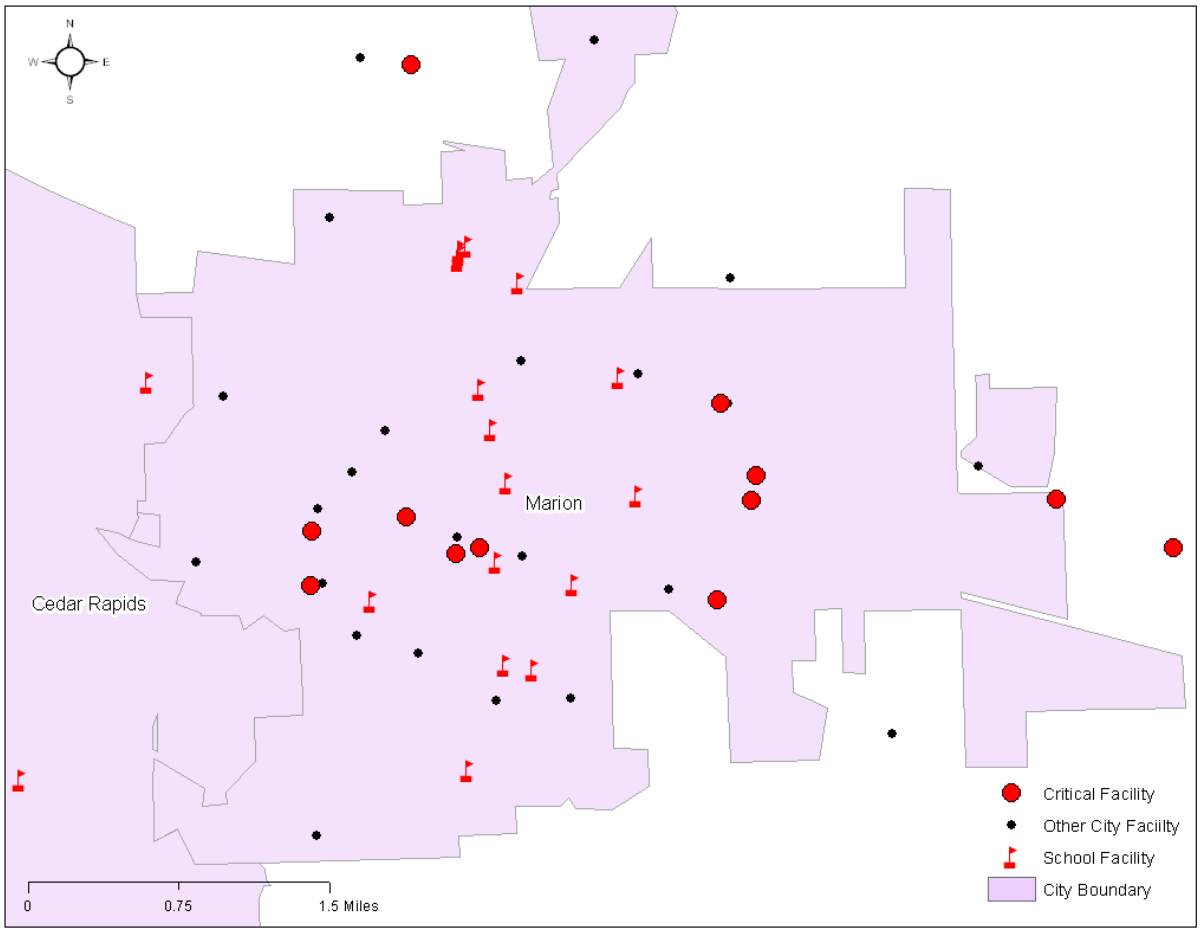


Figure 60: Specific Critical Facilities in North Marion

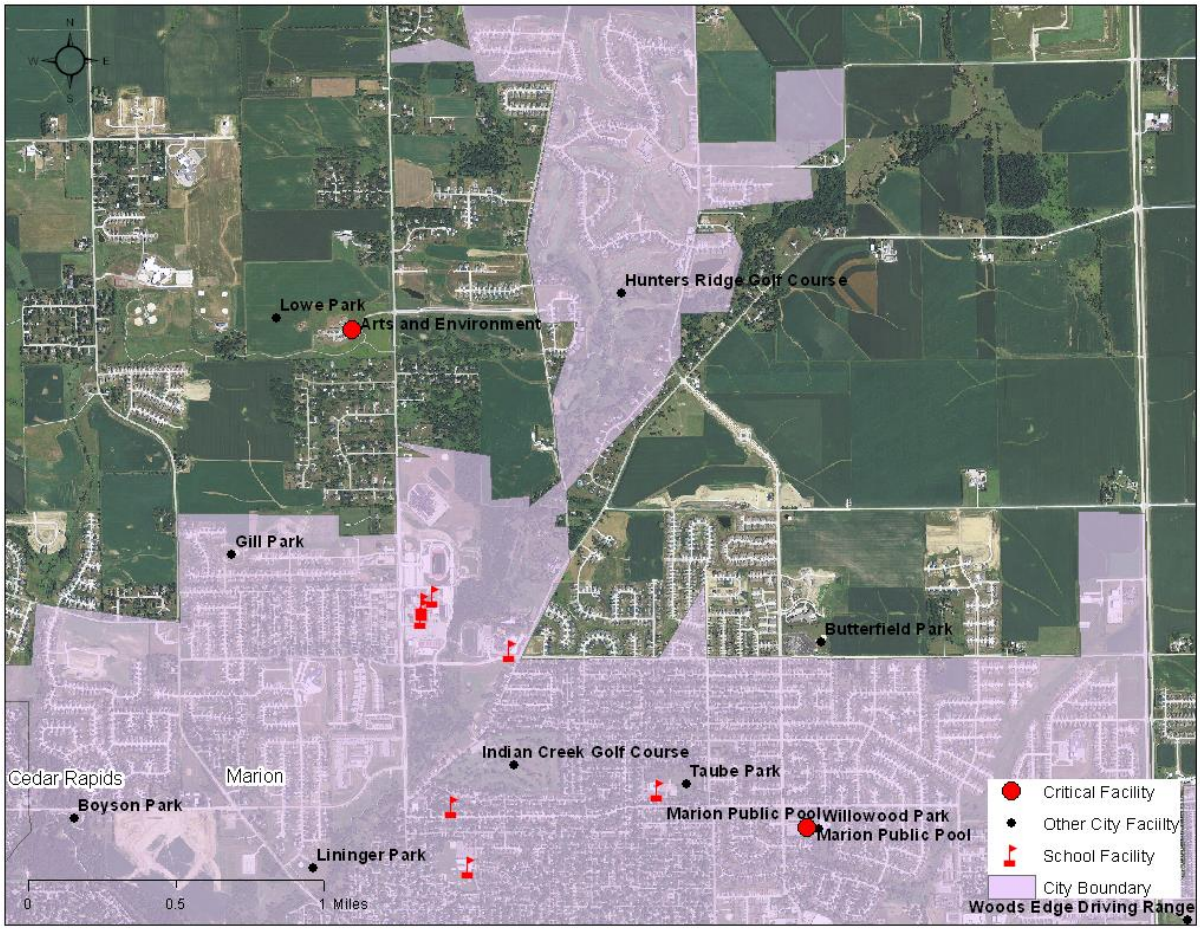


Figure 61: Specific Critical Facilities in Central and South Marion

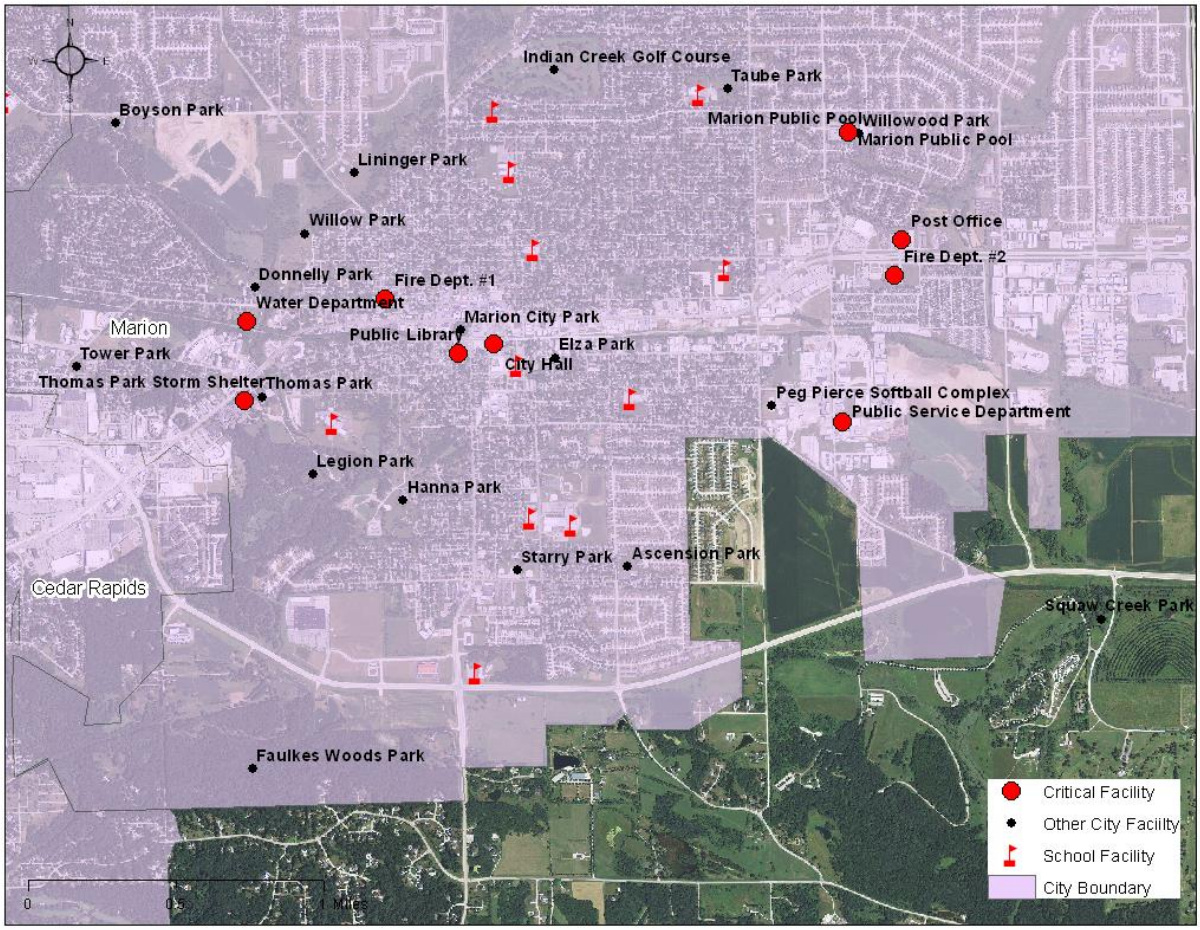
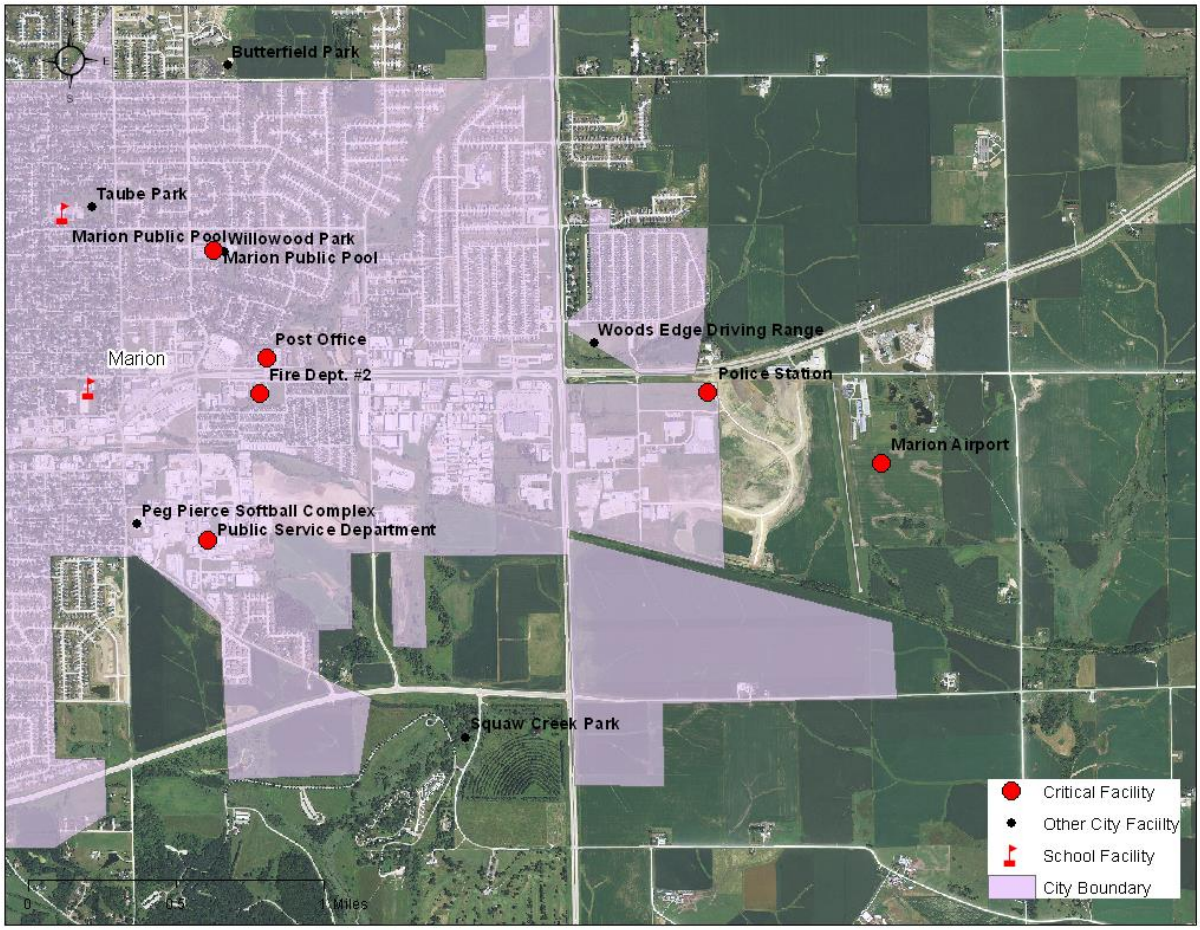


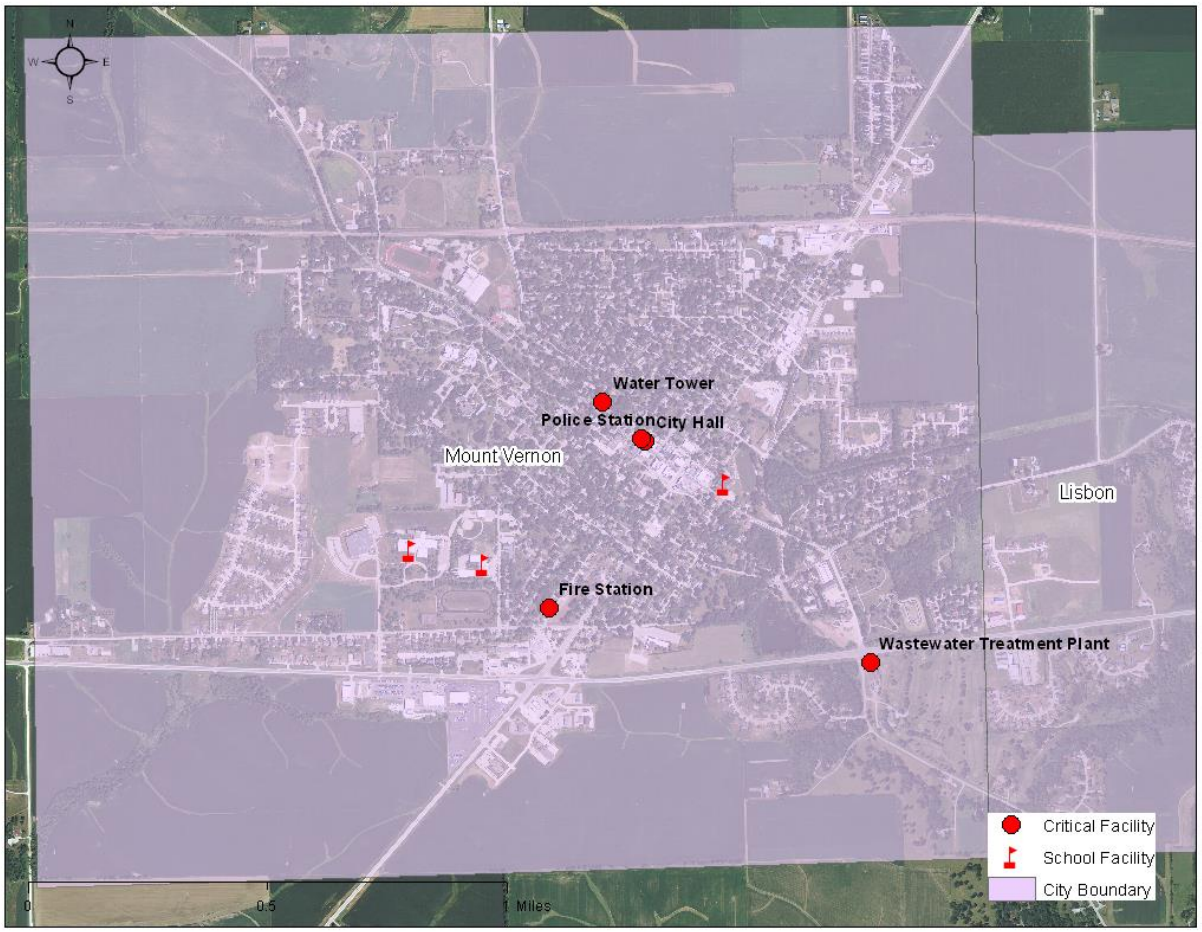
Figure 62: Specific Critical Facilities in East Marion



Mount Vernon Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Mount Vernon, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 63.

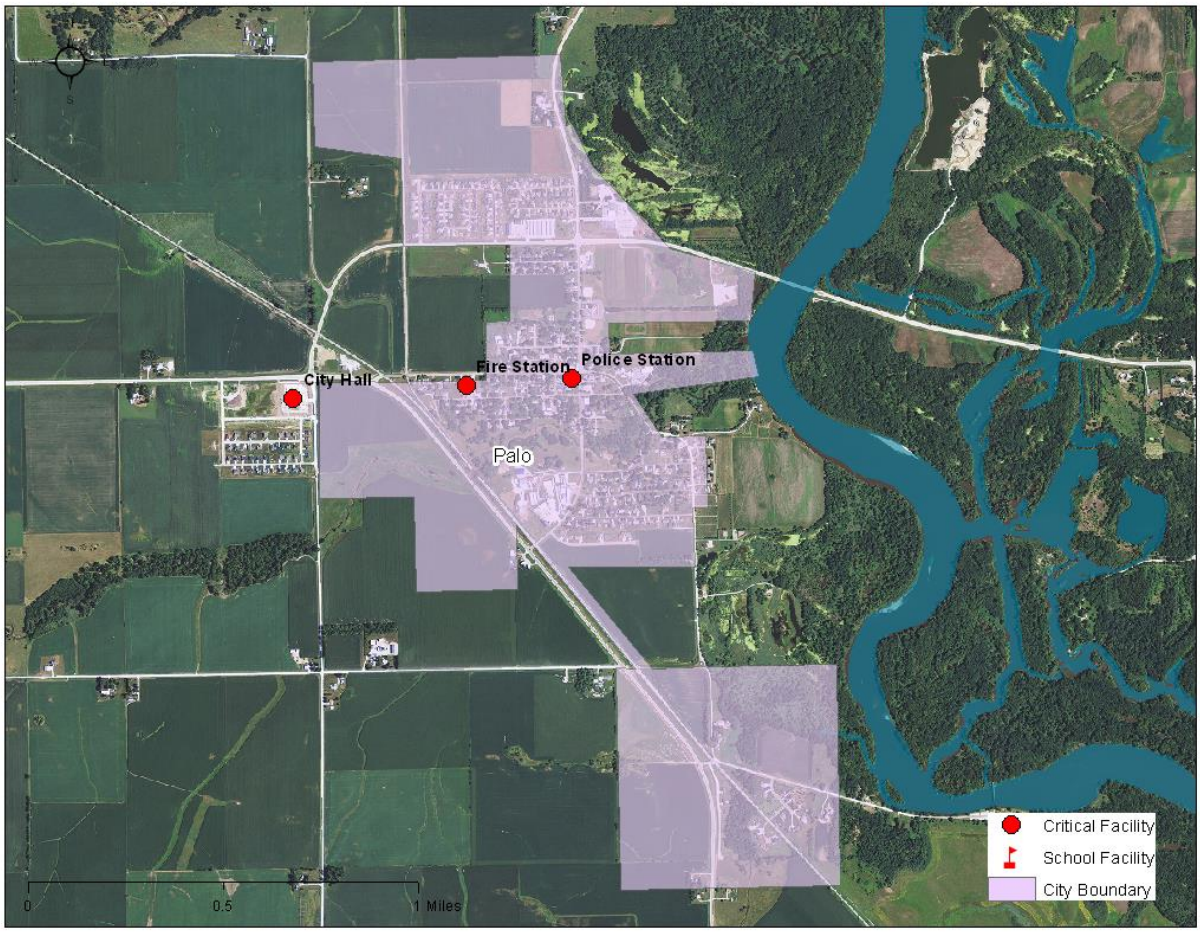
Figure 63: Specific Critical Facilities in Mount Vernon



Palo Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Palo, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 64.

Figure 64: Specific Critical Facilities in Palo



Prairieburg Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Prairieburg, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 65.

Figure 65: Specific Critical Facilities in Prairieburg

Robins Critical Facilities

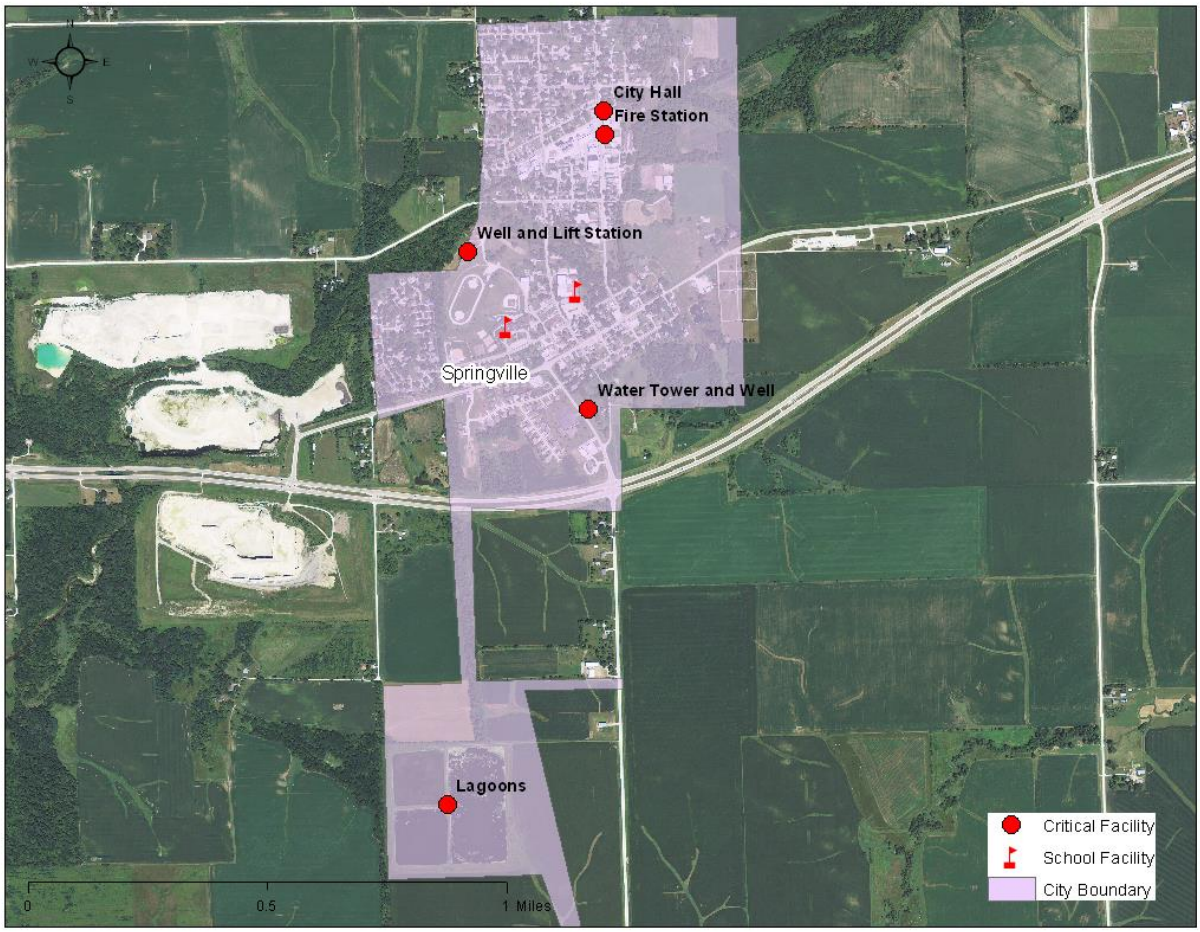
Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Robins, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 66.

Figure 66: Specific Critical Facilities in Robins

Springville Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Springville, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 67.

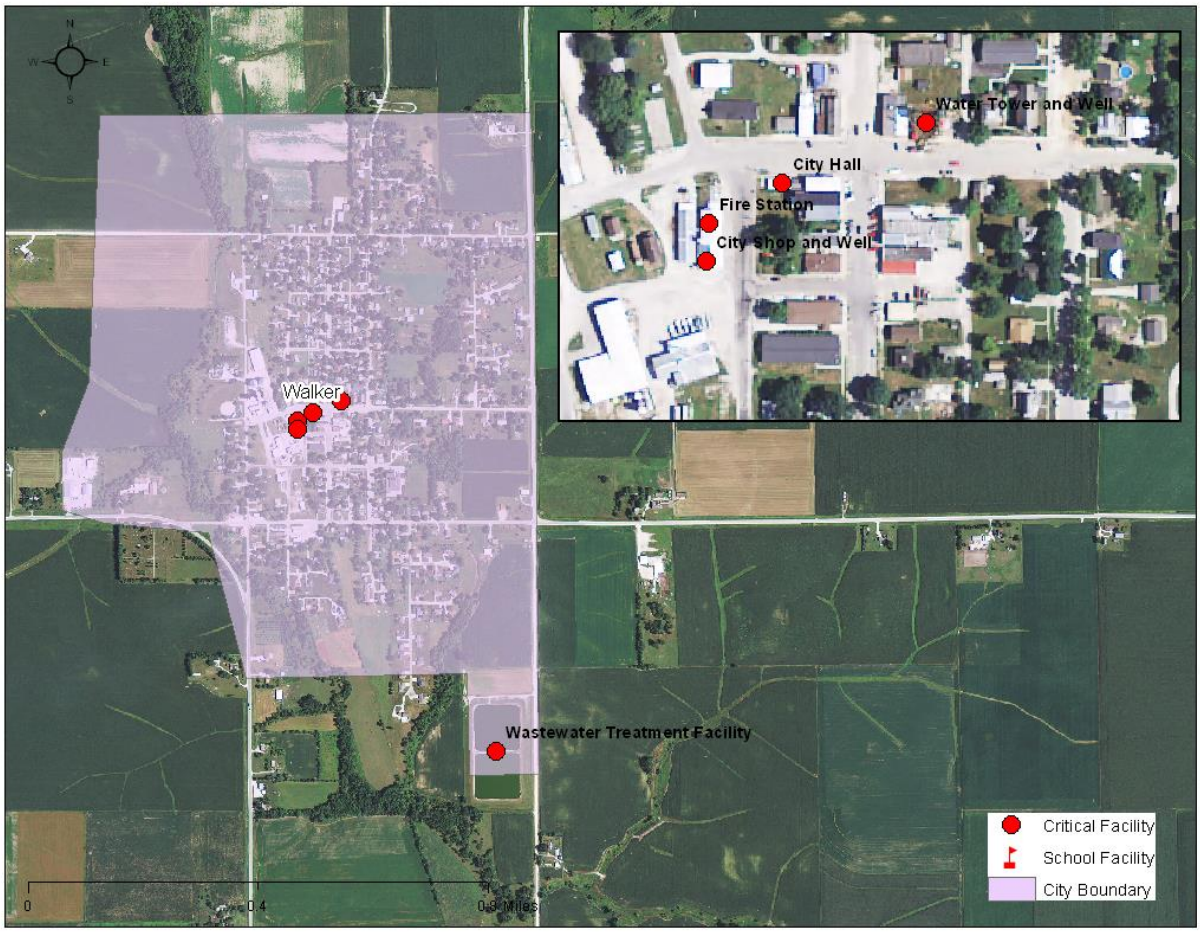
Figure 67: Specific Critical Facilities in Springville



Walker Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Walker, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 68.

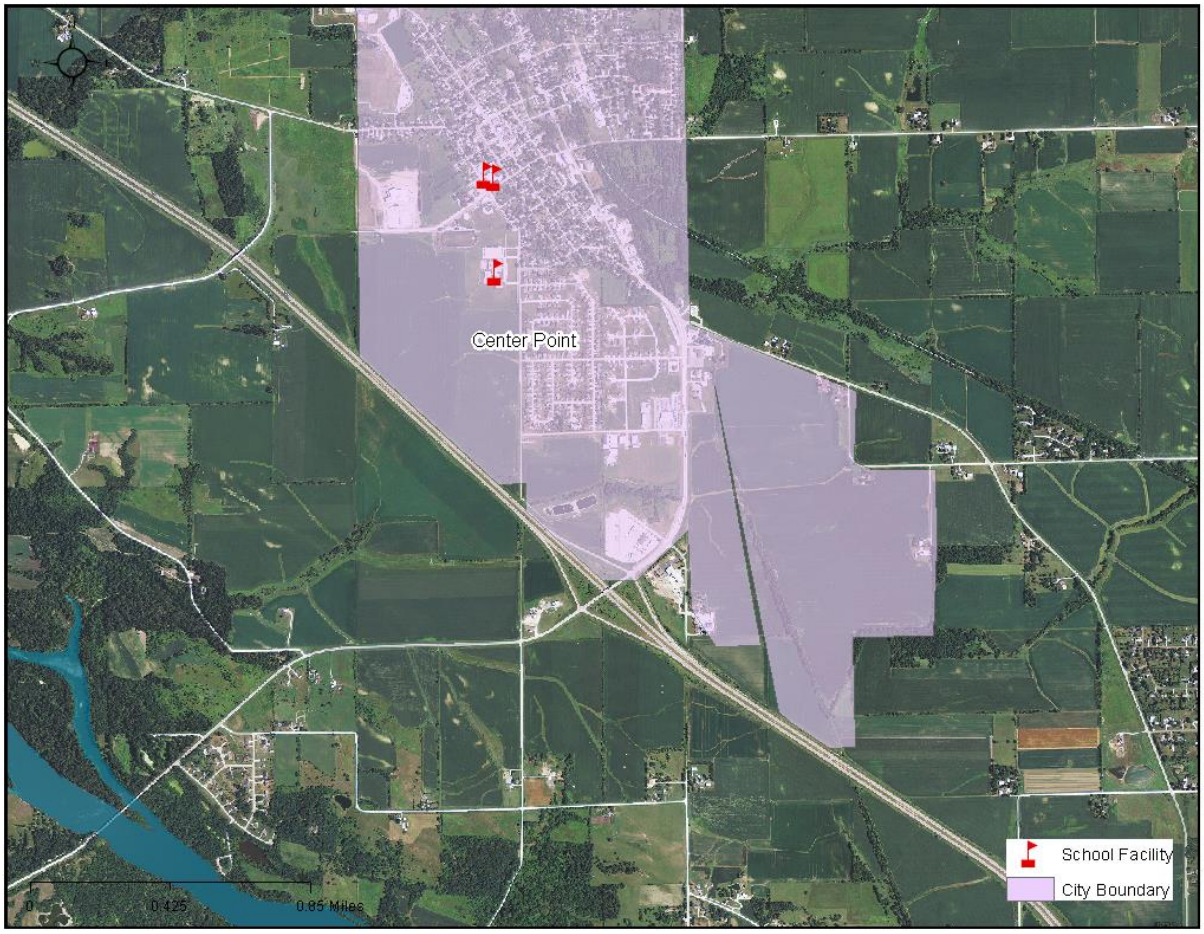
Figure 68: Specific Critical Facilities in Walker



Center Point – Urbana Community School District Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the students, staff, and visitors of school district facilities. In the district, all property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 69.

Figure 69: Specific Critical Facilities in Center Point – Urbana Community School District



College Community School District Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the students, staff, and visitors of school district facilities. In the district, all property and infrastructure are considered critical facilities. For specific critical facilities, refer to Figure 70.

Figure 70: Specific Critical Facilities in College Community School District

Progress Update

For jurisdictions with existing hazard mitigation plans, it is important to document the mitigation actions that have been completed since the plan was adopted. Refer to Table 77 for the jurisdictions with an existing plan. Completed mitigation actions demonstrate a jurisdiction's general commitment and progress toward mitigating or reducing the risk of hazards in the community.

Table 77: Existing Hazard Mitigation Plans in Linn County

Jurisdiction	Plan Type	Plan Approval Date
Linn County	Single Jurisdiction	3/23/2010
Cedar Rapids	Multi-Jurisdictional	6/10/2008
Coggon	Single Jurisdiction	12/17/2009
Ely	Multi-Jurisdictional	6/10/2008
Fairfax	Multi-Jurisdictional	6/10/2008
Hiawatha	Multi-Jurisdictional	6/10/2008
Lisbon	Multi-Jurisdictional	10/22/2013
Marion	Multi-Jurisdictional	6/10/2008
Mount Vernon	Multi-Jurisdictional	10/22/2013
Palo	Multi-Jurisdictional	3/19/2009

Most jurisdictions with an existing plan in Linn County completed mitigation actions that significantly reduce the risk of high priority hazards in the community. It should be noted, since Mount Vernon adopted their existing plan within a year of this plan, less progress is documented.

In the progress update for each jurisdiction with an existing plan, a table is included to provide information for each complete mitigation action. A general description of the mitigation action is included along with the hazard(s) and goal(s) the mitigation action addresses. In addition to the basic information, the table also indicates with an "X" that the mitigation action was included in the jurisdiction's existing plan. The absence of "X" indicates the mitigation action was not specifically referenced in the existing hazard mitigation plan. Generally in a jurisdiction's progress update, the mitigation actions that were included in the existing hazard mitigation plan show a commitment and documented progress toward completing mitigation actions.

It should be noted that although a mitigation action may be included in a jurisdiction's progress update as a complete mitigation, the mitigation action may not necessary be excluded from the jurisdiction's updated mitigation strategy in this plan. The majority of hazard mitigation actions are ongoing in nature as risk and vulnerability change throughout a jurisdiction. In addition, the majority of mitigation actions require multiple projects over a span of time that extends beyond the 5-year life of a hazard mitigation plan, which is often due to the cost of completing large or multi-stage mitigation actions.

Linn County Progress Update

Linn County has an existing hazard mitigation plan so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Linn County's general commitment and progress toward mitigating or reducing the risk of hazards in the county. Refer to Table 78.

Table 78: Linn County Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Six outdoor warning sirens have been added to the warning siren system	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 4, 5	X	Expanding the outdoor warning siren system was a mitigation action in the existing plan. Adding six sirens demonstrates significant progress.
The county's mass notification system, LinnAlerts, has been updated	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Flood	1, 4, 5	X	
Tornado safe rooms were constructed at Wikiup Hill and the Boy Scouts' Howard J. Cherry Camp	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 5	X	
Constructed and opened the Jean Oxley Public Service Center	Flood	2, 3, 5		The public service center replaced flooded county administration buildings.
The county acquired and demolished 14 residential structures in the floodplain since 2008.	Flood	1, 2, 5	X	One property is currently in the process of being acquired.
The county qualified for the Community Rating System	Flood	1, 2, 5	X	
Emergency response communications improvement	Infrastructure Failure, Terrorism	1, 3, 5	X	
Develop a new comprehensive plan	All hazards	2, 3, 4, 5		*2013 Linn County Comprehensive Plan: A Smarter Course* is effective July 19, 2013

As indicated by Linn County's completed actions, the county's major priorities and progress are focused on reducing outdoor vulnerability by constructing safe rooms and expanding outdoor warning siren coverage and preventing future flood damage by removing structures from the floodplain. In addition, Linn County has focused on recovering from the 2008 flood. New county facilities have been constructed, like the Jean Oxley Public Service Center, outside of the floodplain to avoid interruptions in service provided by county departments.

Cedar Rapids Progress Update

The city has an existing hazard mitigation plan so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Cedar Rapids' general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 79.

Table 79: Cedar Rapids Complete Mitigation Actions

Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Coordinate with the Army Corps of Engineers to complete the Flood Risk Management Feasibility Report and Environmental Assessment	Flood	1, 2, 3, 4	X	This mitigation action was included in the "Current Mitigation Activities" in the previous plan.
Complete planning process to determine a flood management system for the Cedar River	Flood	1, 2, 3, 4	X	This mitigation action encompasses several alternative mitigation actions in the previous plan.
Install gauges on Indian Creek	Flood	1, 2, 3	X	The previous plan included the alternative mitigation action "Consider the installation of flood warning devices."
The Central Fire Station was permanently relocated outside the floodplain	Flood	1, 2, 3, 4		
The Police Department's emergency generator, mechanical, and electrical systems were raised.	Flood	1, 2, 3, 4		
The Main Library was relocated and constructed above the 2008 flood level.	Flood	2, 3, 4		The facility includes a cistern to manage stormwater on the library site.
Animal Care and Control was relocated because the previous location had access points located in flood hazard areas.	Flood	2, 3, 4		
Manhattan Park Pavilion was converted to open air facility.	Flood	2, 3, 4		
Check valves were installed to reduce backflow.	Flood	2, 3, 4	X	The previous plan included the alternative mitigation action "Continually review and modify plans to reduce sewer backups."

Table 79 (cont.): Cedar Rapids Complete Mitigation Actions

Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Purchased HESCO barriers, tiger dams, and additional water pumps	Flood	1, 2, 3, 4		
Construction of the amphitheater and levee protection	Flood	1, 2, 3, 4		
Implement voluntary property acquisition program	Flood	1, 2, 3, 4	X	1,341 parcels were acquired, and 1,153 parcels were cleared of flood damaged structures.
Complete flood mitigation project at Morgan Creek and May's Island lift stations	Flood	2, 3, 4		
Raise water collector well above the 2008 flood level	Flood	2, 3, 4		
Create a backwater valve reimbursement program	Flood	2	X	The previous plan included the alternative mitigation action "Continually review and modify plans to reduce sewer backups."
Begin participation in the Community Rating System, update the city's Floodplain Management Ordinance, and adopt new insurance rate maps	Flood	1, 2, 3, 4	X	The city's floodplain management program was enhanced in 2010 to participate in the Community Rating System.
Install berm at Q Avenue and 8th Street NW for interim flood protection	Flood	2, 3 , 4	X	The previous plan included an alternative mitigation action to study the feasibility of constructing and maintaining flood protection structures.
Relocate the Sac and Fox Trail	Flood	2, 3, 4		
The greenhouse at Noelridge Park was retrofitted to withstand severe weather.	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 3, 4		
A lightning rod was installed on the City Services Building.	Thunderstorm, Lightning, and Hail	1, 2, 3, 4		
Added 3 wells to the water supply	Drought	3, 4		
Added flow channel in Mohawk Park to increase well field infiltration	Drought			
Secured offsite computer server storage facility	All hazards	2, 3, 4		
Fire Station #3 added on Crestview Drive	All hazards	1, 2, 3		

Cedar Rapids has made significant progress in reducing risk to high priority hazards since adopting its existing hazard mitigation plan. The city was significantly impacted by the 2008 flood, and the recovery process will be a well-planned, long-term process to reduce risk of death, injury, and property damage in future flood events. Over a thousand properties were removed from the floodplain, and the city plans to either leave the space open or redevelop in a manner that would not sustain significantly damage in a future flood. In addition, the city is working with the U.S Army Corps of Engineers to develop a comprehensive flood protection system that includes a combination of permanent and removable flood protection measures. Cedar Rapids is currently developing a new comprehensive plan, *EnvisionCR*, that will address future development and hazards identified in this plan will be a major component.

Coggon Progress Update

The city has an existing hazard mitigation plan so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Coggon's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 80.

Table 80: Complete Mitigation Actions

Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Replace outdoor warning siren to expand coverage	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 3, 5	X	The city replaced their existing warning siren with a new siren that has wider coverage.

In Coggon, the main priority since adopting their existing hazard mitigation plan is replacing the city's outdoor warning siren. The existing siren did not provide sufficient coverage. Moving forward, the city will focus on other hazard mitigation priorities like installing generators in critical facilities and developing public education and assistance programs for residents.

Ely Progress Update

The city has an existing hazard mitigation plan so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Ely's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 81.

Table 81: Ely Complete Mitigation Actions

Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Add two new outdoor warning sirens	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 3, 4, 5, 6	X	The sirens are remote access capable and were added in 2012.
Special registration program	All hazards	1, 4, 5, 6	X	Ely coordinates with the Linn County Emergency Management Agency, which maintains an emergency assistance registry.
Portable backup generator	Infrastructure Failure, Tornado and Windstorm, Severe Winter Storm, Thunderstorm, Lightning, and Hail	3, 5, 6	X	
Burning ban	Grass and Wildland Fire	1, 2, 5, 6	X	

In Ely, reducing outdoor severe weather vulnerability and maintaining services was the city's main priority since adopting its existing plan. Adding two new outdoor warning sirens ensures the added development in the city has sufficient coverage, and maintain a backup generator allows the city maintain to certain services.

Fairfax Progress Update

The city has an existing hazard mitigation plan so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Fairfax's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 82.

Table 82: Fairfax Complete Mitigation Actions

Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Purchase and install backup power generators in critical facilities	Infrastructure Failure, Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Severe Winter Storm	1, 3, 5	X	Previously "Stationary Generator," the city maintains generators in City Hall, the Fire Station, City Shop, one well, the water tower, the water treatment facility, and two portable generators
Special Needs Registration	All hazards	1, 3, 4, 5	X	Ely coordinates with the Linn County Emergency Management Agency, which maintains an emergency assistance registry.

Hiawatha Progress Update

The city has an existing hazard mitigation plan so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Hiawatha's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 83.

Table 83: Hiawatha Complete Mitigation Actions

Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Update floodplain maps	Flood	2, 4, 5	X	Current maps are effective on 4/5/2010
Promote the use of interoperability	Infrastructure Failure	1, 3, 5	X	The city completed a communications project that replaced equipment and protocol to improve communication between departments and agencies.

Lisbon Progress Update

The city has an existing hazard mitigation plan so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Lisbon's general commitment and progress toward mitigating or reducing the risk of hazards in the city. It should be noted, Lisbon adopted its existing plan within a year of this plan. Refer to Table 84.

Table 84: Lisbon Complete Mitigation Actions

Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Construct new City Hall with storm safe area	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 3, 5	X	
Update floodplain maps	Flood	1, 3, 5, 7	X	Current maps are effective on 4/5/2010

Marion Progress Update

The city has an existing hazard mitigation plan so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Marion's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 85.

Table 85: Marion Complete Mitigation Actions

Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Purchase and install generators in the city's main water plants	Infrastructure Failure	1, 2, 3, 5	X	
Installed solar power source on outdoor warning sirens	Infrastructure Failure	1, 3, 5		
Construct tornado safe room in Thomas Park	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 3, 5	X	The existing plan specified including tornado safe rooms in recreation facilities.
Construct new police station	Infrastructure Failure, Transportation Incident, Terrorism	1, 2, 3, 4, 5		
Partner with the Linn County Emergency Management Agency and Linn County Sheriff's Office to develop a replacement program for outdated or worn out communication equipment	Infrastructure Failure	1, 2, 3, 5	X	
New communications system has backup capabilities	Infrastructure Failure	1, 2, 3, 5	X	In the existing hazard mitigation plan, the mitigation action was "Contract with an outside vendor to provide non-emergency community backup"
Purchase two lightning trackers	Thunderstorm, Lightning, and Hail	1, 4, 5		

In Marion, reducing outdoor severe weather vulnerability was a major priority since adopting its existing hazard mitigation plan. The city added backup generators to critical facilities, installed new outdoor warning sirens, constructed a tornado safe room in a well-used park, and purchased lightning trackers. The city also improved its local emergency response capability by improving communication and constructing a new police station along a major highway.

Mount Vernon Progress Update

The city has an existing hazard mitigation plan so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Mount Vernon's general commitment and progress toward mitigating or reducing the risk of hazards in the city. It should be noted, Mount Vernon adopted its existing plan within a year of this plan. Refer to Table 86.

Table 86: Mount Vernon Complete Mitigation Actions

Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Update floodplain maps	Flood	1, 3, 5, 7	X	Current maps are effective on 4/5/2010

Palo Progress Update

The city has an existing hazard mitigation plan so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Palo's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 87.

Table 87: Palo Complete Mitigation Actions

Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Install river gauge on the Cedar River	Flood	1, 2, 3, 4, 5	X	
Create a drainage swale on the north side of the city	Flood	1, 2, 3, 5	X	
Create alternative water drainage route on the west side of the city	Flood	1, 2, 3 ,5	X	
Raise control panel for lift station	Flood	1, 2, 3, 5	X	
Clear trees along Dry Creek	Flood	1, 2, 3, 5	X	
Update flood maps	Flood	1, 2, 4, 5	X	Current maps are effective on 4/5/2010
Construct a multi-purpose tornado safe room in a new City Hall/Community Center	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 2, 3, 4, 5	X	
Construct a multi-purpose restroom/tornado safe room in Palo Memorial Park	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 2, 3, 4, 5	X	
Purchase and install a backup power generator in City Hall	Thunderstorm, Lightning, and Hail, Tornado and Windstorm, Severe Winter Storm, Infrastructure Failure	1, 3, 5	X	
Develop a municipal water distribution system	Drought, Infrastructure Failure, Human Disease	1, 3, 5	X	

In Palo, the city addressed both severe weather and flood-related hazards since adopting its existing hazard mitigation plan. Major projects completed are the construction of the new Community Center and restroom facility at Memorial Park, which have tornado safe rooms. Flooding is a major concern in Palo so the city completed several projects, but looking toward the future, the hazard will be the city's major priority.

Mitigation Strategy

A mitigation strategy is a set of mitigation actions meant to prevent or reduce the potential impacts of hazards. There are several types of mitigation actions with a different method of reducing vulnerability. Types of mitigation actions include prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects.

The planning committee in each participating jurisdiction identified sustained and proposed mitigation actions for each hazard that may affect the jurisdiction. In this plan, sustained mitigation actions are the established operations in a jurisdiction that consistently reduce the potential impacts of a hazard. Examples are a fire department reduces fire damage or a floodplain ordinance prevents flood damage.

For proposed mitigation actions, the planning committee in each jurisdiction considered each type of mitigation action before identifying final mitigation actions. To be included in the final mitigation strategy, a mitigation action must be within the jurisdiction's authority, technically feasible, and fulfill at least one goal.

In jurisdictions with existing plans, the existing mitigation strategy was used as a base for this plan. Refer to Table 88. Mitigation actions that were included in the existing plan and continue to be a priority are noted with an "X." The absence of an "X" indicates the mitigation action was not specifically referenced in the existing hazard plan. In the adjacent "Notes" column, if the jurisdiction's progress update is not referenced there is no significant progress to document for the specific mitigation action.

Table 88: Existing Hazard Mitigation Plans in Linn County

Jurisdiction	Plan Type	Plan Approval Date
Linn County	Single Jurisdiction	3/23/2010
Cedar Rapids	Multi-Jurisdictional	6/10/2008
Coggon	Single Jurisdiction	12/17/2009
Ely	Multi-Jurisdictional	6/10/2008
Fairfax	Multi-Jurisdictional	6/10/2008
Hiawatha	Multi-Jurisdictional	6/10/2008
Marion	Multi-Jurisdictional	6/10/2008
Mount Vernon	Multi-Jurisdictional	10/22/2013
Palo	Multi-Jurisdictional	3/19/2009

It should be noted, the mitigation strategy for Mount Vernon has not been modified because the plan has been approved within a year of developing this plan. Overall, local conditions and priorities have not changed significantly in most jurisdictions with existing plans.

Linn County Mitigation Strategy

For several identified hazards, county operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operations primarily address the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 89 for the hazards currently addressed by county operations.

Table 89: Hazards Addressed by Linn County Operations

Hazard	Justification
Infrastructure Failure	Engineering and Secondary Roads regularly inspects, maintains, and improves infrastructure. The county enforces buildings codes, and local fire departments and the Sheriff's Office are trained to respond to structural failure or fire. In addition, the majority of the county's critical facilities have backup power generation.
Hazardous Materials Incident	County employees are trained to properly handle hazardous materials, and the county maintains safety plans. Local fire departments and the Sheriff's Office are trained to immediately respond to hazard material incidents, and the Linn County Emergency Management Agency maintains the Linn County Regional HAZMAT Response Team. In addition, Tier II hazard material listings are maintained for the area.
Terrorism	Local fire departments and the Sheriff's Office are trained to respond to terrorist events and complete training at local institutions such as schools.
Levee and Dam Failure	Engineering and Secondary Roads regularly inspects, maintains, and improves infrastructure.
Human Disease	Linn County Public Health issues permits for wells and septic systems, and provides disease prevention and response services.
Animal, Plant, Crop Disease	The county maintains vegetation in public areas, and the county regulates small-scale animal husbandry in residential areas.
Earthquake	The risk of an earthquake severe enough to cause damage occurring in the area is minimal. Buildings codes are enforced and increase the likelihood structures can withstand a minor event.
Grass and Wildland Fire	The county maintains vegetation in public areas, and local fire departments and the Sheriff's Office are trained to respond to grass and wildland fire events.
Radiological Incident	The Linn County Sheriff, local fire departments, and Linn County Emergency Management Agency coordinate with the Duane Arnold Energy Center.
Sinkholes	Geological hazards are mitigated in the infrastructure design and construction process.
Landslide	Geological hazards are mitigated in the infrastructure design and construction process.
Expansive Soils	Geological hazards are mitigated in the infrastructure design and construction process.

All other identified hazards were addressed by at least one mitigation action in Linn County's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 90 for Linn County's mitigation strategy.

Table 90: Linn County Hazard Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Initiate continuity planning in all county departments	All hazards	1, 2, 3		Initiating continuity planning in all county departments was not specifically addressed in the existing hazard mitigation plan.
Participate in the Community Resilience Program and implement supporting projects	All hazards	1, 2, 3		Pilot program of the National Research Council and National Academy of Sciences Resilient America Roundtable
Expand outdoor and indoor notification systems	Tornado and Windstorm, Thunderstorm, Lightning and Hail	1, 2	X	This mitigation action was included in the existing hazard mitigation plan and remains a high priority. This mitigation action includes determining gaps in warning coverage. See Table 78 for a progress update.
Construct multi-purpose tornado safe rooms in critical facilities and determine areas in the county that would benefit from the addition of a multi-purpose tornado safe room	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1	X	Constructing tornado safe rooms was included in the existing hazard mitigation plan and continues to be a priority in the county. See Table 78 for a progress update.
Determine options and feasibility of stronger regulations to protect electricity distribution infrastructure from wind and ice damage	Tornado and Windstorm, Thunderstorm, Lightning and Hail, Severe Winter Storm	1	X	Protecting electricity distribution infrastructure was included in the existing hazard mitigation plan, but the related mitigation actions were combined and modified to consider common building practices. There is no significant progress to document.
Purchase and install generators in critical facilities	Tornado and Windstorm, Thunderstorm, Lightning and Hail, Severe Winter Storm, Infrastructure Failure	1, 2, 3	X	Installing generators in critical facilities was included in the existing hazard mitigation plan and remains a high priority. Although the county maintains generators, there is not significant plan-related progress to document.
Provide residential home rehabilitation and/or emergency repair program to prevent major damage to homes during hazard events	Tornado and Windstorm, Thunderstorm, Lightning and Hail, Severe Winter Storm	1	X	A housing assistance program was included in the existing plan as a low priority mitigation action. There is not significant progress to document.

Table 90 (cont.): Linn County Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Identify and complete flood mitigation projects to protect identified critical facilities and infrastructure	Flood	1, 2, 3		For areas outside of the Indian Creek Watershed, flood risk and potential solutions will be determined.
Acquire, relocate, elevate, and/or demolish structures in the floodplain	Flood	1, 2, 3	X	Mitigation actions addressing reducing damage risk to structures in the floodplain in the existing plan were combined. See Table 78 for a progress update.
Strengthen the Floodplain Ordinance to reduce development in the floodplain	Flood	2	X	This mitigation action is high priority in the existing plan, and the county is currently researching appropriate amendments to the existing ordinance.
Strengthen development-related ordinances to improve stormwater management in new development	Flood	1, 2	X	This mitigation action is high priority in the existing plan. This mitigation action in conjunction with the Indian Creek Watershed Management Plan participation addresses improving stormwater management. There is no significant progress to document.
Improve the county's rating in the Community Rating System	Flood	1, 3		The county entered the Community Rating System in 2008 and plans to continuously improve its rating.
Establish the use of the HAZUS and Iowa Flood Center flood modeling systems with the Linn County Emergency Management Agency	Flood	1, 2, 3	X	From the existing plan, this mitigation action was modified to include the Iowa Flood Center in order to reflect all resources currently available. There is no significant progress to document.
Participate in the development and implementation of the Indian Creek Watershed Management Plan to improve stormwater management, which may include regulatory or structural projects	Flood	1	X	The county is currently participating in the development of the Indian Creek Watershed Management Plan. This mitigation action in conjunction with the mitigation action addressing stormwater management regulations addresses improving stormwater management.
Provide hazard-related educational materials on the county website	All natural hazards	1, 2, 3		
Encourage the Linn County Food Systems Council to identify the scope and potential necessity for a food security plan addressing access to food during and after hazard events	All natural hazards	1, 2, 3		

Alburnett Mitigation Strategy

For several identified hazards, city operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 91 for the hazards currently addressed by city operations.

Table 91: Hazards Addressed by Alburnett Operations

Hazard	Justification
Transportation Incident	The city maintains local roads, coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency, and coordinates with the railroad company, as needed. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Drought	The city maintains three wells.
Hazardous Materials Incident	City employees are trained to properly handle hazardous materials, and the city maintains safety plans. The Fire Department is trained to immediately respond to hazard material incidents, and the department coordinates with the Linn County Sheriff, Linn County Emergency Management Agency, and the region's HAZMAT response team. In addition, Tier II hazard material listings are maintained for the area.
Animal, Plant, Crop Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance
Grass and Wildland Fire	The city maintains vegetation in public areas. The Fire Department completes relevant training and maintains proper equipment.
Terrorism	The city coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Human Disease	The city maintains a safe water supply and distribution system and coordinates with Linn County Public Health.
Radiological Incident	The city and Fire Department coordinate with the Duane Arnold Energy Center and the Linn County Emergency Management Agency to prepare for a potential radiological event.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.

All other identified hazards were addressed by at least one mitigation action in Alburnett's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 92 for Alburnett's mitigation strategy.

Table 92: Alburnett Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Notes
Public education project	Thunderstorm, Lightning, and Hail, Infrastructure Failure, Severe Winter Storm, Extreme Heat, Flood, and others to be determined	1, 4, 5	This project includes adding hazard-related information to the city website and sponsoring presentations for local organizations e.g. Lions Club and the Alburnett Historical Society
Determine emergency plans for the sports complex	Thunderstorm, Lightning, Hail, Tornado and Windstorm, and other hazards to be determined	1, 4, 5	
Construct a new fire station	Infrastructure Failure	1, 3, 5	
Construct a multi-purpose safe room in public facilities	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 2, 3, 5	A safe room could be included in the new fire station.
Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 2, 5	

Bertram Mitigation Strategy

For several identified hazards, city operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 93 for the hazards currently addressed by city operations.

Table 93: Hazards Addressed by Bertram Operations

Hazard	Justification
Drought	The city maintains sufficient water supply.
Transportation Incident	The city maintains local roads, coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency, and coordinates with the railroad company, as needed. The local departments coordinate with the Linn County Emergency Management Agency and complete necessary training.
Grass and Wild Land Fire	The city maintains vegetation in public areas. The local fire departments complete relevant training and maintain proper equipment.
Terrorism	The city coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency. The local fire departments coordinate with the Linn County Emergency Management Agency and complete necessary training.
Radiological Incident	The city, local fire departments, and the Linn County Sheriff coordinate with the Duane Arnold Energy Center and the Linn County Emergency Management Agency to prepare for a potential radiological event.
Human Disease	The city maintains a safe water supply and distribution system and coordinates with Linn County Public Health.
Sinkholes	Geological hazards are mitigated in the infrastructure design and construction process.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.
Landslide	Geological hazards are mitigated in the infrastructure design and construction process.
Expansive Soils	Geological hazards are mitigated in the infrastructure design and construction process.

All other identified hazards were addressed by at least one mitigation action in Bertram's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. See Table 94 for Bertram's mitigation strategy.

Table 94: Bertram Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Notes
Determine appropriate generator testing schedule and reporting procedure	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Infrastructure Failure, Severe Winter Storm	1, 2, 3, 4	
Construct a multi-purpose safe room	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 4, 5	The safe room will likely be a park restroom
Replace and repair bridges damaged by flash flooding	Flood, Infrastructure Failure	1, 2, 3, 5	The bridges will be elevated and/or extended to prevent future flood damage.
Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 2, 5	
Establish public cooling center policy	Extreme Heat	1, 4, 5	
Establish evacuation routes for hazardous materials incidents	Hazardous Materials Incident	1, 3, 5	
Establish communication procedure for hazard events	All hazards	1, 2, 3, 4, 5	
Establish plan to address Oak Wilt in public areas	Animal, Plant, Crop Disease	2, 5	
Identify and complete stormwater management improvements to reduce flood damage risk	Flood, Infrastructure Failure	1, 2, 3, 5	

Cedar Rapids Mitigation Strategy

For several hazards, sustained mitigation actions are considered sufficient in Cedar Rapids. See Table 95 for the hazards and justification. For all other hazards, a mitigation action was identified by the local planning committee.

Table 95: Hazards Addressed by Cedar Rapids Operations

Hazard	Justification
Infrastructure Failure	Public Works regularly inspects, maintains, and improves infrastructure. For submerged infrastructure like the 5 in 1 Dam, diver inspections are completed regularly. The city enforces buildings codes, and the fire and police departments are trained to respond to structural failure or fire. The Eastern Iowa Airport, which is owned by the city, has fire suppression equipment specific to aircraft and trained personnel. In addition, the majority of the city's critical facilities have backup power generation.
Hazardous Materials Incident	City employees are trained to properly handle hazardous materials, and the city maintains safety plans. The fire and police departments are trained to immediately respond to hazard material incidents, and the Cedar Rapids Fire Department includes the hazardous materials response team for the area. In addition, Tier II hazard material listings are maintained for the area.
Terrorism	The fire and police departments are trained to response to terrorist events and complete training at local institutions such as schools.
Levee and Dam Failure	Public Works regularly inspects, maintains, and improves infrastructure. For submerged infrastructure like the 5 in 1 Dam, diver inspections are completed regularly. Flood protection failure may become a higher priority after the city constructs a comprehensive flood protection system.
Human Disease	The city maintains a clean secure water supply, wastewater treatment, and coordinates with Linn County Public Health.
Animal, Plant, Crop Disease	The City maintains vegetation in public areas. Due to the urban nature of the city, the risk of animal and crop disease directly impacting the city is minimal.
Earthquake	The risk of an earthquake severe enough to cause damage occurring in the area is minimal. Buildings codes are enforced and increase the likelihood structures can withstand a minor event.
Grass and Wildland Fire	The city maintains vegetation in public areas, and the fire and police departments are trained to respond to grass and wildland fire events.
Sinkholes	Geological hazards are mitigated in the infrastructure design and construction process.
Landslide	Geological hazards are mitigated in the infrastructure design and construction process.
Expansive Soils	Geological hazards are mitigated in the infrastructure design and construction process.

All other identified hazards were addressed by at least one mitigation action in the city's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 96 for the city's mitigation strategy.

Table 96: Cedar Rapids Hazard Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Participate in the Community Resilience Program and implement supporting projects	All hazards	1, 2, 3, 4		Pilot program of the National Research Council and National Academy of Sciences Resilient America Roundtable
Install flood warning system on Indian Creek	Flood	1, 2, 3	X	Coordinating with the Army Corps of Engineers, adjacent cities, and the East Central Iowa Council of Governments was in the "Current Mitigation Activities" category in the previous plan. The Indian Creek Watershed Management Authority was created. The multi-jurisdictional and multi-disciplinary group is developing a watershed management plan and coordinating with the Silver Jackets to develop a warning system.
Develop and implement a response plan for Indian Creek flooding	Flood	1, 2, 3		Involves participating in the Indian Creek Watershed Management Authority planning process
Construct berm at Ellis Boulevard	Flood	1, 2, 3	X	The previous plan included an alternative mitigation action to study the feasibility of constructing and maintaining flood protection structures. The city has construction plans to complete this mitigation action.
Complete backflow protection project	Flood	1, 2, 3		
Add detention basins to increase stormwater management capability	Flood	1, 2, 3		This project may be a component of the Indian Creek Watershed Management Plan, which is currently in progress.
Install backup power sources for traffic lights	Flood	1, 2, 3		This project will increase public safety during a major power outage and during an evacuation.
Reconstruct Public Works facility above the 2008 flood level	Flood	2, 3, 4		This project is in progress.
Add additional sump pits and epoxy flooring at City Hall	Flood	2, 3, 4		This project is in progress.

Table 96 (cont.): Cedar Rapids Hazard Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Construct ring levee at the Water Pollution Control facility	Flood	2, 3, 4	X	The previous plan included an alternative mitigation action to study the feasibility of constructing and maintaining flood protection structures. This project is currently in progress.
Install berm at Q Avenue and 8th Street NW for interim flood protection	Flood	1, 2, 3, 4		The previous plan included an alternative mitigation action to study the feasibility of constructing and maintaining flood protection structures. This project is in the design phase.
Complete the city's Permanent Flood Protection Project which includes the following phases: • Cargill to I-380 • I-380 to 8th Avenue SW • I-380 to 8th Avenue SE • I-380 to Ellis Park • 8th Avenue SE to Alliant Substation • 8th Avenue to the Cedar/Rapids Linn County Solid Waste Agency Site 1 • Alliant Substation to Cargill • 21 gate closures and 11 pump stations • Edgewood bridge improvements	Flood	1, 2, 3, 4	X	The previous plan included an alternative mitigation action to study the feasibility of constructing and maintaining flood protection structures. This project is in the design phase.
Reroute sewer in the Sun Valley Neighborhood	Flood	2, 3, 4	X	The previous plan included an alternative mitigation action to continue the replacement of old sewer lines to prevent inflow and infiltration. This project is in progress.
Construct berm in the Sun Valley Neighborhood along Cottage Grove Parkway	Flood	1, 2, 3, 4	X	The previous plan included an alternative mitigation action to study the feasibility of constructing and maintaining flood protection structures. This project is in progress.

Table 96 (cont.): Cedar Rapids Hazard Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Install new pump and return sewer to protect wastewater infrastructure	Flood	2, 3, 4	X	The previous plan included an alternative mitigation action to continually review and modify plans to reduce sewer backups. This project is in progress.
Complete Cedar River Siphon Project	Flood	2, 3 ,4		This project is in progress.
Replace damaged sections of the sanitary sewer with flood resilient materials	Flood	2, 3, 4		The previous plan included an alternative mitigation action to continue the replacement of old sewer lines to prevent inflow and infiltration and to continually review and modify plans to reduce sewer backups. This project is in progress.
Mitigate Valley Brook Drive erosion	Flood	2, 3, 4		This project is in the design process.
Improve two major water detention basins	Flood	2, 3, 4	X	Maintaining detention basins was in the "Current Mitigation Activities" category in the previous plan. This project is in progress.
Complete Vinton ditch improvements	Flood	2, 3, 4	X	Maintaining drainage channels is an alternative mitigation action in the previous plan. This project is in progress.
Relocate the Sac and Fox Trail	Flood	2, 3, 4		
Acquire, relocate, elevate, and/or demolish structures in flood hazard areas or structures subject to repetitive damage	Flood	1, 2, 3, 4	X	The previous plan includes an alternative mitigation action to study the feasibility of the acquisition of properties that are vulnerable to flood damage. See Table 79 for progress update.
Expand the city's outdoor warning siren system	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 3		
Construct safe rooms in public facilities and recreation areas	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 3, 4		
Harden public facilities to withstand wind and other severe weather damage	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 3, 4		

Table 96 (cont.): Cedar Rapids Hazard Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Install lightning rods on large critical facilities	Thunderstorm, Lightning, and Hail	1, 2, 3, 4		
Add additional shallow water wells to the city's water supply	Drought	2, 3, 4		
Develop and implement a residential fan program	Extreme Heat	1, 3, 4		
Develop and implement a residential wellness check program	Extreme Heat and Severe Winter Storm	1, 3, 4		
Add additional signage for emergency routes and evacuation routes	Transportation Incident, Flood, Radiological Incident	1, 3, 4		

Center Point Mitigation Strategy

For several identified hazards, city operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 97 for the hazards currently addressed by city operations.

Table 97: Hazards Addressed by Center Point Operations

Hazard	Justification
Hazardous Material Incident	City employees are trained to properly handle hazardous materials, and the city maintains safety plans. The fire and police departments are trained to immediately respond to hazard material incidents, and the departments coordinate with the Linn County Emergency Management Agency and the region's HAZMAT response team. In addition, Tier II hazard material listings are maintained for the area.
Terrorism	The city coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Radiological Incident	The city and Fire Department coordinate with the Duane Arnold Energy Center and the Linn County Emergency Management Agency to prepare for a potential radiological event.
Extreme Heat	City Hall is open to the public during extreme heat events.
Expansive Soils	This geological hazard is mitigated in the infrastructure and design process.
Sinkholes	This geological hazard is mitigated in the infrastructure and design process.
Drought	The city maintains a sufficient water supply for the population.
Grass or Wildland Fire	The city maintains vegetation in public areas. The Fire Department completes relevant training and maintains proper equipment.
Transportation Incident	The city maintains local roads, coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency, and coordinates with the railroad company, as needed. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.
Animal, Plant, Crop Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance

All identified hazards were addressed by at least one mitigation action in Center Point's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 98 for Center Point's mitigation strategy.

Table 98: Center Point Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Notes
Improve communication capabilities with equipment update and developing a communication plan with local agencies	Infrastructure Failure, Hazardous Materials Incident, Terrorism, Radiological Incident, Transportation Incident	1, 2, 3, 4, 5	
Construct a multi-purpose safe room in conjunction with new public facilities	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 3, 5	Potential public facilities include a new City Hall, addition the public library, or new Fire Station
Retrofit existing City Hall or construct a new City Hall to withstand natural hazards including a dedicated generator	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Flood, Infrastructure Failure	1, 2, 3, 5	
Construct a new Fire Station with a dedicated generator	Tornado and Windstorm, Infrastructure Failure, Thunderstorm, Lightning, and Hail, Flood, Severe Winter Storm	1, 2, 3, 5	The current Fire Station does not fully protect equipment due to major water leaks
Digitize city and public records	Tornado and Windstorm, Infrastructure Failure, Thunderstorm, Lightning, and Hail, Flood	3, 5	
Upgrade waster infrastructure with 6" lines to provide system access for fire protection	Infrastructure Failure	1, 2, 3, 5	This mitigation action would be completed in conjunction with street improvement projects to increase cost effectiveness.
Complete the high priority phases of the city's comprehensive stormwater improvement plan	Infrastructure Failure, Flood	1, 2, 3, 5	
Education residents about the importance of disconnecting their sump pumps from the sanitary sewer	Infrastructure Failure, Food	2, 3, 4, 5	
Develop a stream debris cleaning program	Flood	2, 3, 5	
Acquire, relocate, elevate, and/or remove structures in flood hazard areas	Flood	2	

Central City Mitigation Strategy

For several identified hazards, city operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. An example of sufficient operation is dam failure, because Central City is not responsible for the maintenance of the structure. As for lack of feasible mitigation actions, an earthquake can occur but the magnitude and severity of the event will most likely be minimal so adding earthquake proof features to structures is not cost effective. Refer to Table 99 for the hazards currently addressed by city operations.

Table 99: Hazards Addressed by Central City Operations

Hazard	Justification
Hazardous Material Incident	City employees are trained to properly handle hazardous materials, and the city maintains safety plans. The fire and police departments are trained to immediately respond to hazard material incidents, and the departments coordinate with the Linn County Emergency Management Agency and the region's HAZMAT response team. In addition, Tier II hazard material listings are maintained for the area.
Transportation Incident	The city maintains local roads, coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency, and coordinates with the railroad company, as needed. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Human Disease	The city maintains a safe water supply and distribution system and coordinates with Linn County Public Health. Flu shots are offered to the public at the City's civic center.
Levee and Dam Failure	The city is not responsible for maintaining the dam on the Wapsipinicon River and coordinates with the Army Corps of Engineers, as necessary.
Radiological Incident	The city and Fire Department coordinate with the Duane Arnold Energy Center and the Linn County Emergency Management Agency to prepare for a potential radiological event.
Sinkholes	The risk of a sinkhole event is minimal so the Public Works staff monitors risk to infrastructure on an ongoing basis.
Terrorism	The city coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.

All other identified hazards were addressed by at least one mitigation action in Central City's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 100 for Central City's mitigation strategy.

Table 100: Central City Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Notes
Acquire, elevate, relocate, or demolish structures in flood hazard areas	River Flood	1, 2, 5	The city acquired and demolished 15 houses in the floodplain in 2000 – 2005 and approximately 20 structures are currently located in the floodplain.
Sanitary and storm sewer system improvements to prevent system backup in structures	River Flood and Flash Flood	1, 2, 3, 5	The city replaced manholes in 2012 and storm sewer projects in 2011 – 2012.
Identify and complete flood protection for the wastewater treatment facility	River Flood	1, 2, 3, 5	
Identify and/or construct a storage facility for maintenance equipment and flood protection supplies	River Flood and Flash Flood	3, 5	
Relocate water source(s) from the 100 year floodplain	River Flood	1, 3, 5	The city currently plans to relocate one well.
Complete bank stabilization along the river and bridges	River Flood, Flash Flood, and Landslide	1, 2, 3, 5	
Purchase portable generators for critical facilities	Severe Winter Storm, Tornado and Windstorm, and Infrastructure Failure	3,5	City maintains a generator at City Hall, the wastewater treatment facility, and a portable generator for one well.
Expand outdoor warning system coverage	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 4, 5	
Construct a multi-purpose community safe room	Tornado and Windstorm and Thunderstorm, Lightning, and Hail	1, 4, 5	
Add a new well to increase water supply	Infrastructure Failure and Drought	1, 2, 3, 5	
Replace the Fire Department's personal protective equipment	Infrastructure Failure and Grass and Wildland Fire	1, 5	
Develop a plan for the imminent emerald ash borer infestation	Animal, Plant, Crop Disease	3, 4	
Complete bank stabilization near the water tower	Landslide	1, 2, 3, 5	

Coggon Mitigation Strategy

For several identified hazards, city operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 101 for the hazards currently addressed by city operations.

Table 101: Hazards Addressed by Coggon Operations

Hazard	Justification
Extreme Heat	City Hall and the library are open to the public during extreme heat events.
Drought	The city maintains a sufficient water supply for the population.
Animal, Plant, Crop Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance.
Grass and Wildland Fire	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance
Radiological Incident	The city and Fire Department coordinate with the Duane Arnold Energy Center and the Linn County Emergency Management Agency to prepare for a potential radiological event.
Human Disease	The city maintains a safe water supply and distribution system and coordinates with Linn County Public Health.
Levee and Dam Failure	There are no flood protection structures , and the future of Buffalo Creek Dam is currently being determined by the Linn County Conservation Board, the U.S. Fish and Wildlife Service, and consulting companies. There is both safety and environmental concerns regarding this dam, which is a low-head dam used to enhance recreation opportunities.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.
Landslide	This geological hazard is mitigated in the infrastructure design and construction process.
Expansive Soils	This geological hazard is mitigated in the infrastructure design and construction process.

All other identified hazards were addressed by at least one mitigation action in Coggon's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 102 for Coggon's mitigation strategy.

Table 102: Coggon Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Update the emergency response plan	All hazards	1, 2, 3, 4, 5	X	Previously "Maintain Linn County Emergency Action Plan." There is no significant progress to document.
Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 2, 5	X	There is no significant progress to document.
Improve, structurally protect, or relocate water and wastewater facilities to maintain service	Flood	1, 2, 3, 5	X	There is no significant progress to document.
Purchase power generators for critical facilities, including water and sanitary sewer facilities	Infrastructure Failure, Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Severe Winter Storm	2, 3, 5	X	There is no significant progress to document.
Designate shelter for park and campground users, if needed, construct a tornado safe room	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 5	X	Previously "Create a community safe room to increase access to shelters." There is no significant progress to document.
Establish a communication plan for city officials, staff, and emergency response teams, and if needed, purchase communication equipment	Infrastructure Failure	3, 4, 5	X	Includes previous mitigation action "Increase contact with the Linn County Area Hazardous Materials Response Team." There is no significant progress to document.
Maintain a supply of sand for immediate containment of hazardous materials spills to reduce potential contamination	Hazardous Materials Incident	1, 2, 3, 5	X	Previously "Obtain better supplies for immediate containment of spills to reduce contamination." There is no significant progress to document.

Table 102 (cont.): Coggon Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Create a wellness check program for residents who want to be checked on during or after certain hazard events	All hazards	1, 4, 5	X	This action was previously "Implement an Emergency Assistance Registration to monitor people with special needs during or after events," but the Linn County Emergency Management Agency developed a program. The city sent postcards to citizens with information to register. A wellness check program would focus on residents' needs beyond evacuation or rescue assistance.
Purchase or secure access to an all-terrain vehicle for off-road emergencies	Infrastructure Failure, Transportation Incident, Terrorism		X	There is no significant progress to document.

Ely Mitigation Strategy

For several identified hazards, city operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 103 for the hazards currently addressed by city operations.

Table 103: Hazards Addressed by Ely Operations

Hazard	Justification
Grass and Wildland Fire	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance
Extreme Heat	The Community Center and the library are open to the public during extreme heat events.
Hazardous Materials Incident	City employees are trained to properly handle hazardous materials, and the city maintains safety plans. The fire and police departments are trained to immediately respond to hazard material incidents, and the departments coordinate with the Linn County Emergency Management Agency and the region's HAZMAT response team. In addition, Tier II hazard material listings are maintained for the area.
Radiological Incident	The city and Fire Department coordinate with the Duane Arnold Energy Center and the Linn County Emergency Management Agency to prepare for a potential radiological event.
Drought	The city maintains a sufficient water supply for residents.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.
Terrorism	The city coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Human Disease	The city maintains a clean secure water supply, wastewater treatment, and coordinates with Linn County Public Health.
Transportation Incident	The city maintains local roads, coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency, and coordinates with the railroad company, as needed. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Animal, Plant, Crop Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance.

All other identified hazards were addressed by at least one mitigation action in Ely's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 104 for Ely's mitigation strategy.

Table 104: Ely Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Construct a multi-purpose safe room in public facilities	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 3, 4, 5, 6		
Purchase backup power generators for critical facilities	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Severe Winter Storm, Infrastructure Failure	1, 3, 5, 6	X	Portable generators were specified in the existing plan. There is no significant progress to document.
Purchase space heaters for a public wellness program	Severe Winter Storm, Infrastructure Failure	1, 4, 5, 6	X	Previously "Space heaters for shelters and people without power." There is no significant progress to document.
Acquire, relocate, elevate, and/or demolish structures located in the floodplain	Flood	1, 2, 5, 6	X	Previously "Acquisition program." There is no significant progress to document.
Add water retention capacity for Banner Valley Creek	Flood	1, 2, 5, 6		
Complete Fuhrmeister Street stormwater improvements	Flood	1, 2, 3, 5, 6		
Add hazard-related information to the city website	All hazards	1, 4, 5, 6		
Dredge and stabilize Hoosier Creek	Flood	1, 2, 3, 5, 6		

Fairfax Mitigation Strategy

For several identified hazards, city operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 105 for the hazards currently addressed by city operations.

Table 105: Hazards Addressed by Fairfax Operations

Hazard	Justification
Hazardous Materials Incident	City employees are trained to properly handle hazardous materials, and the city maintains safety plans. The fire and police departments are trained to immediately respond to hazard material incidents, and the departments coordinate with the Linn County Emergency Management Agency and the region's HAZMAT response team. In addition, Tier II hazard material listings are maintained for the area.
Terrorism	The city coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Radiological Incident	The city and Fire Department coordinate with the Duane Arnold Energy Center and the Linn County Emergency Management Agency to prepare for a potential radiological event.
Animal, Plant, Crop Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance.
Extreme Heat	City buildings are open to the public during extreme heat events.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.
Human Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance.

All other identified hazards were addressed by at least one mitigation action in Fairfax's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 106 for the city's mitigation strategy.

Table 106: Fairfax Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Water main replacement project	Infrastructure Failure	1, 3, 5		Two phases of replacements are currently planned. The replacement includes upgrading the water mains to 8" size and new hydrants in developed areas.
Add additional well and water storage facility	Infrastructure Failure, Drought	1, 3, 5		The city currently has three wells that meet demand. The additional water supply and storage will be needed for a major population increase.
Purchase and install backup power generators for two wells	Infrastructure Failure, Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Severe Winter Storm	1, 3, 5	X	Previously "Stationary Generator." There is no significant progress to document.
Expand warning siren coverage	Tornado and Windstorm	1, 3, 4, 5		Full coverage may require two outdoor warning sirens
Purchase and install backup power generators for outdoor warning sirens	Tornado and Windstorm	1, 3, 5	X	Previously "Stationary Generator." There is no significant progress to update.
Purchase weather radios for city buildings	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Severe Winter Storm	1, 3, 4, 5	X	Previously "Weather Radios." There is no significant progress to document.
Construct a multi-purpose safe room	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 4, 5		
Determine the feasibility of a lightning warning system for outdoor recreation areas and purchase, if feasible	Thunderstorm, Lightning, and Hail	1, 4, 5		
Improve and expand the city's stormwater management system	Flood	1, 2, 3, 5, 7		
Purchase appropriate size water pumps	Flood	1, 2, 3, 5, 7		

Table 106 (cont.): Fairfax Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Acquire, relocate, elevate, and or demolish structures in flood hazard areas, if needed	Flood	1, 2, 5		
Coordinate with railroad operator and improve signals at crossings near the city's recreational facilities	Transportation Incident	1, 4, 5		
Structurally improve bridges on Highway 151	Transportation Incident	1, 2, 3, 5		Highway 151 is major travel route through Fairfax. Update: The bridge over Prairie Creek partially collapsed due to flash flooding in June 2014.
Develop a drought plan	Drought	3, 4, 5, 6, 7		
Purchase and grass and wildland fire gear	Grass and Wildland Fire	1, 2, 3, 5, 6	X	Previously "Bunker Gear" and modified to reflect current needs. There is no significant progress to document.

Hiawatha Mitigation Strategy

For several hazards, sustained mitigation actions are considered sufficient in Hiawatha. See Table 107 for the hazards and justification. For all other hazards, a mitigation action was identified by the local planning committee.

Table 107: Hazards Addressed by Hiawatha Operations

Hazard	Justification
Hazardous Materials Incident	City employees are trained to properly handle hazardous materials, and the city maintains safety plans. The fire and police departments are trained to immediately respond to hazard material incidents, and the departments coordinate with the Linn County Emergency Management Agency and the region's HAZMAT response team. In addition, Tier II hazard material listings are maintained for the area.
Transportation Incident	The city maintains local roads, maintains a local police department, coordinates with the Linn County Emergency Management Agency, and coordinates with the railroad company, as needed. The police and fire departments coordinate with the Linn County Emergency Management Agency and complete necessary training.
Extreme Heat	City facilities are open to the public during extreme heat events.
Radiological Incident	The city coordinates plans and training with the Duane Arnold Energy Center and the Linn County Emergency Management Agency.
Drought	The city maintains sufficient water supply for residents.
Animal, Plant, Crop Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance.
Human Disease	The city maintains a safe and secure water supply and coordinates with Linn County Public Health, if needed.
Terrorism	The fire and police departments are trained to response to terrorist events and complete training at local institutions such as schools.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.
Expansive Soils	Geological hazards are mitigated in the infrastructure design and construction process.
Landslide	Geological hazards are mitigated in the infrastructure design and construction process.

All other identified hazards were addressed by at least one mitigation action in Hiawatha's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 108 for the city's mitigation strategy.

Table 108: Hiawatha Hazard Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Construct new fire station	Infrastructure Failure	1, 2, 3, 5	X	The new fire station will improve response as the city's population increases and development expands. There is no significant progress to document.
Purchase and install backup power generators in critical facilities	Infrastructure Failure, Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Severe Winter Storm	3, 5		The library and one well does not currently have a generator.
Identify gaps in outdoor warning siren coverage and expand, if needed	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 4, 5	X	There is no significant progress to document.
Construct tornado safe rooms in public facilities	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 3, 4, 5	X	Previously "Encourage storm shelters to be designated in new public or private facilities." There is no significant progress to document.
Determine feasibility of requiring storm shelters in manufactured home or multi-family housing developments	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 5	X	Previously "Encourage storm shelters to be designated in new public or private facilities." There is no significant progress to document.
Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Flood	1, 2, 3, 4, 5	X	Previously "Develop watershed protection plans" and "Purchase land/easements in floodplains and along streams/drainage area and convert to wetlands or other natural features to detain and release runoff at a slower rate." There is no significant progress to document.

Table 108 (cont.): Hiawatha Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Complete water, sewer, and stormwater infrastructure improvements to reduce infiltration	Flood	1, 2, 3, 5	X	There is no significant progress to document.
Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 2, 6		
Determine feasibility of strengthening the city's floodplain ordinance	Flood	1, 2, 5		Potential improvement of the city's floodplain management program
Identify potential urban wildland interface improvements	Grass and Wildland Fire	1, 2, 3, 5		
Provide hazard-related information on the city website	All hazards	1, 2, 4, 5	X	Previously "Increase public readiness awareness." There is no significant progress to document.

Lisbon Mitigation Strategy

For several identified hazards, city operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 109 for the hazards currently addressed by city operations.

Table 109: Hazards Addressed by Lisbon Operations

Hazard	Justification
Transportation Incident	The city maintains local roads, maintains a local police department, coordinates with the Linn County Emergency Management Agency, and coordinates with the railroad company, as needed. The police and fire departments coordinate with the Linn County Emergency Management Agency and complete necessary training.
Extreme Heat	City facilities are open to the public during extreme heat events.
Radiological Incident	The city coordinates plans and training with the Duane Arnold Energy Center and the Linn County Emergency Management Agency.
Drought	The city maintains sufficient water supply for residents.
Terrorism	The fire and police departments are trained to response to terrorist events and complete training at local institutions such as schools.
Human Disease	The city maintains a safe and secure water supply and coordinates with Linn County Public Health, if needed.
Animal, Plant, Crop Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance.

All other identified hazards were addressed by at least one mitigation action in Lisbon's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. See Table 110 for Lisbon's mitigation strategy.

Table 110: Lisbon Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Educate residents about weather radios	Thunderstorm, Lightning, and Hail, Flood, Severe Winter Storm, Hazardous Materials Incident, Infrastructure Failure, Extreme Heat, Terrorism	1, 3, 5	X	There is no significant progress to document.
Expand warning siren coverage	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 3, 5	X	There is no significant progress to document.
Purchase and install generators in critical facilities	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Infrastructure Failure, Severe Winter Storm	1, 2, 3, 5		
Educate residents about flood, renters, and homeowners insurance	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Flood, Infrastructure Failure	1, 3, 5	X	There is no significant progress to document.
Enter the Community Rating System	Flood	1, 2, 3, 4, 5, 6, 7	X	There is no significant progress to document.
Develop education program for community safe rooms	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 3	X	There is no significant progress to document.
Develop and implement watershed protection plan	Flood	1, 2, 3, 5	X	There is no significant progress to document.
Develop map of past hazard materials incidents	Hazardous Materials Incident	1, 3	X	There is no significant progress to document.
Improve stormwater management system	Flood	1, 3		

Marion Mitigation Strategy

For several hazards, sustained mitigation actions are considered sufficient in Marion. See Table 111 for the hazards and justification. For all other hazards, a mitigation action was identified by the local planning committee.

Table 111: Hazards Addressed by Marion Operations

Hazard	Justification
Extreme Heat	City facilities are open to the public during extreme heat events.
Grass and Wildland Fire	The city maintains vegetation in public areas, and the fire and police departments are trained to respond to grass and wildland fire events.
Hazardous Materials Incident	City employees are trained to properly handle hazardous materials, and the city maintains safety plans. The fire and police departments are trained to immediately respond to hazard material incidents, and the departments coordinate with the Linn County Emergency Management Agency and the region's HAZMAT response team. In addition, Tier II hazard material listings are maintained for the area.
Transportation Incident	The city maintains local roads, maintains a local police department, coordinates with the Linn County Emergency Management Agency, and coordinates with the railroad company, as needed. The police and fire departments coordinate with the Linn County Emergency Management Agency and complete necessary training.
Radiological Incident	The city coordinates plans and training with the Duane Arnold Energy Center and the Linn County Emergency Management Agency.
Human Disease	The city maintains a safe and secure water supply and coordinates with Linn County Public Health, if needed.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.
Expansive Soils	Geological hazards are mitigated in the infrastructure design and construction process.
Landslide	Geological hazards are mitigated in the infrastructure design and construction process.
Animal, Plant, Crop Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance.

All other identified hazards were addressed by at least one mitigation action in Marion's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 112 for the city's mitigation strategy.

Table 112: Marion Hazard Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Construct tornado safe rooms in public facilities	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 3, 5	X	There is no significant progress to document.
Determine feasibility of requiring storm shelter or tornado safe rooms in new structures	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 3, 5	X	There is no significant progress to document.
Purchase and install backup power generators in critical facilities and/or replace obsolete generators	Severe Winter Storm, Infrastructure Failure, Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 3, 5	X	This mitigation action was generalized for future critical facilities to be constructed as the city expands. See Table 85 for progress update.
Construct new fire station with a tornado safe room	Infrastructure Failure, Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 3, 5	X	Previously "Assessment of new locations for fire stations in growth areas." There is no significant progress to document.
Develop and implement an information technology disaster recovery site at the police station	Infrastructure Failure, Terrorism	3, 5		
Assess outdoor warning siren coverage and expand coverage, if needed	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 3, 5		Expansion of coverage will be needed as the city grows east of Highway 13
Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Flood	1, 2, 3, 4, 5	X	Combines flood related mitigation actions in the existing plan because Indian Creek is the primary flood risk in the city. The city is currently participating in the plan process.
Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 2, 5	X	Previously "Buyout program." There is no significant progress to document.
Develop alternative source of drinking water	Drought	1, 3, 5		

Mount Vernon Mitigation Strategy

For several identified hazards, city operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 113 for the hazards currently addressed by city operations.

Table 113: Hazards Addressed by Mount Vernon Operations

Hazard	Justification
Transportation Incident	The city maintains local roads, coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency, and coordinates with the railroad company, as needed. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Radiological Incident	The city and Fire Department coordinate with the Duane Arnold Energy Center and the Linn County Emergency Management Agency to prepare for a potential radiological event.
Drought	The city maintain sufficient water supply for residents.
Terrorism	The police and fire department complete necessary training and coordinate with the Linn County Emergency Management Agency.
Human Disease	The city maintains a safe water supply and distribution system and coordinates with Linn County Public Health.
Extreme Heat	City facilities are open during extreme heat events.
Animal, Plant, Crop Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance.

All other identified hazards were addressed by at least one mitigation action in Mount Vernon's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. See Table 114 for Mount Vernon's mitigation strategy.

Table 114: Mount Vernon Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Develop public awareness campaign for local hazards	All hazards	1, 3, 5	X	There is no significant progress to document.
Develop process to notify special needs population	All hazards	1, 3, 5	X	There is no significant progress to document.
Develop program to educate the public about the need to expand emergency services as the community grows	All hazards	1, 3, 5	X	There is no significant progress to document.
Educate residents about weather radios	All hazards	1, 3, 5	X	There is no significant progress to document.
Purchase and install backup power generators in critical facilities	Thunderstorm, Lightning, and Hail, Flood, Tornado and Windstorm, Infrastructure Failure	1, 2, 3, 5, 6		
Adopt restrictive permit process for large events	Thunderstorm, Lighting, and Hail, Flood, Tornado and Windstorm, Hazardous Materials Incident, Sever Winter Storm, Radiological Incident, Terrorism, Extreme Heat	1, 3, 5	X	There is no significant progress to document.
Expand outdoor warning siren coverage	Thunderstorm, Lightning, and Hail, Tornado and Windstorm, Radiological Incident	1, 3, 5	X	There is no significant progress to document.
Develop an education program about tornado safe rooms to encourage developers and homeowners to incorporate storm shelters or tornado safe rooms into homes	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 3, 5	X	Combines multiple tornado safe room education mitigation actions. There is no significant progress to document.
Educate residents about the importance of flood, renters, and homeowners insurance	Thunderstorm, Lighting, and Hail, Flood, Tornado and Windstorm, Infrastructure Failure	1, 3, 5	X	The college student population that rents their residence is an important population to target. There is no significant progress to document.

Table 114 (cont.): Mount Vernon Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Require storm shelter space in new manufactured home developments and/or lobby the state to require storm shelters in manufactured home developments	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 2, 3, 4, 5	X	Combines storm shelter requirement hazards. There is no significant progress to document.
Construct a multi-purpose tornado safe room in public facilities and recreation areas	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 2, 3, 5	X	There is no significant progress to document.
Encourage the construction of storm shelters and structural hardening against high wind hazards in schools, daycares, adult care, and other facilities with vulnerable populations	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 3, 5	X	There is no significant progress to document.
Encourage developers and contractors to offer and market wind resistant building materials	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 3, 5	X	There is no significant progress to document.
Incorporate floodplain management and other hazard mitigation strategies into comprehensive planning	All hazards	1, 3, 5	X	Currently in progress with the update process for the city's comprehensive plan
Participate in the Community Rating System	Flood	1, 2, 3, 4, 5, 6, 7	X	Enhances the city's floodplain management program. There is no significant progress to document.
Participate in a watershed planning process, if available, and implement the plan	Flood	1, 2, 3, 5	X	There is no significant progress to document.
Educate owners about check valves	Flood	1, 3, 5	X	There is no significant progress to document.
Develop bypass and absorption field	Flood	1, 3, 5	X	There is no significant progress to document.
Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 3, 5		
Educate local businesses about hazardous material incident mitigation strategies	Hazardous Materials Incident	1, 3, 5	X	There is no significant progress to document.

Table 114 (cont.): Mount Vernon Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Develop map of historic hazardous material incidents	Hazardous Materials Incident	1, 3	X	There is no significant progress to document.
Lobby the state legislature to revise Iowa Code to allow local government to regulate agricultural fertilizer facilities in urban and residential areas	Hazardous Materials Incident	1, 2, 3, 4, 5	X	There is no significant progress to document.
Lobby the state legislature to revise Iowa Code to allow the assessment of fees from chemical facilities for hazardous materials programs	Hazardous Materials Incident	1, 2, 3, 4, 5	X	There is no significant progress to document.
Educate residents, businesses, and develops about the benefits of sprinkler systems and coordinate an incentive program for inclusion in new development	Infrastructure Failure	1, 3, 5	X	Combines sprinkler related mitigation actions. There is no significant progress to document.
Improve snow emergency route and evacuation plan	Severe Winter Storm	1, 2, 3, 5, 6	X	There is no significant progress to document.

Palo Mitigation Strategy

For several identified hazards, city operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 115 for the hazards currently addressed by city operations.

Table 115: Hazards Addressed by Palo Operations

Hazard	Justification
Radiological Incident	The city and Fire Department coordinate with the Duane Arnold Energy Center and the Linn County Emergency Management Agency to prepare for a potential radiological event.
Transportation Incident	The city maintains local roads, coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency, and coordinates with the railroad company, as needed. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Drought	The city maintains a sufficient water supply for the population.
Grass and Wildland Fire	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance
Landslide	This geological hazard is mitigated in the infrastructure design and construction process.
Extreme Heat	City Hall is open to the public during extreme heat events.
Terrorism	The city coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Animal/Plant/Crop Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance.
Hazardous Materials Incident	City employees are trained to properly handle hazardous materials, and the city maintains safety plans. The fire and police departments are trained to immediately respond to hazard material incidents, and the departments coordinate with the Linn County Emergency Management Agency and the region's HAZMAT response team. In addition, Tier II hazard material listings are maintained for the area.
Human Disease	The city maintains a safe water supply and distribution system and coordinates with Linn County Public Health.
Dam and Levee Failure	The dam at Pleasant Creek Lake is not within the city.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.

All other identified hazards were addressed by at least one mitigation action in Palo's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. See Table 116 for Palo's mitigation strategy.

Table 116: Palo Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Purchase weather radios for City Hall and the city's ball diamond	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 4, 5		
Construct a tornado safe room in new public facilities	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 2, 3, 5	X	See Table 87 for progress update.
Purchase and install backup power generators in critical facilities	Thunderstorm, Lightning, and Hail, Tornado and Windstorm, Severe Winter Storm, Infrastructure Failure	1, 2, 3, 5		The priority critical facilities are wells and new public facilities. See Table 87 for progress update.
Require storm shelters in new manufacturing home developments	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 2, 5	X	There is no significant progress to document.
Determine potential benefits of petitioning Linn and Benton County to make Dry Creek a designated waterway	Flood	3, 5	X	There is no significant progress to document.
Complete water, sewer, and stormwater system improvements	Flood, Infrastructure Failure	1, 2, 3, 5	X	Include replacing culverts in conjunction with street improvement projects and installing sealed manhole covers. There is no significant progress to document.
Participate in a watershed planning process, if available, and implement the plan	Flood	1, 2, 3, 4, 5	X	Previously "Develop and implement a watershed protection plan." There is no significant progress to document.
Participate in the Community Rating System	Flood	1, 2, 4, 5	X	Enhances current floodplain management program. There is no significant progress to document.
Acquire, relocate, elevate, and or demolish structures in flood hazard areas	Flood	1, 2, 4, 5	X	There is no significant progress to document.

Table 116 (cont.): Palo Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Notes
Recruit volunteers for the Fire Department	All hazards	1, 2, 3, 5	X	Previously "Develop program to educate the public of the need to expand emergency services as the community grows." There is no significant progress to document.
Add hazard related information to the city website	All hazards	1, 2, 3, 4, 5	X	Previously "Develop public awareness campaign on local hazards" and combines all education related mitigation actions in the existing plan. There is no significant progress to document.

Prairieburg Mitigation Strategy

For several identified hazards, city operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 117 for the hazards currently addressed by city operations.

Table 117: Hazards Addressed by Prairieburg Operations

Hazard	Justification
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.
Extreme Heat	City Hall is open during extreme heat events.
Drought	The city maintains sufficient water supply for residents.

All other identified hazards were addressed by at least one mitigation action in Prairieburg's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 118 for the city's mitigation strategy.

Table 118: Prairieburg Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Notes
Upgrade outdoor warning siren to increase coverage area, include remote activation capability, and backup power source	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Infrastructure Failure	1, 3, 5	The existing warning siren is manually controlled.
Modify the Fire Station backup power generator to be portable	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Infrastructure Failure, Severe Winter Storm	3, 5	
Develop and implement a fire safety campaign	Infrastructure Failure	1, 2, 4, 5	The focus of the program is changing smoke detector batteries and other topics.
Purchase new CPAP devices	Infrastructure Failure	1, 5	
Purchase hazardous materials containment boom	Hazardous Materials Incident	1, 2, 5	
Purchase fire swatters	Infrastructure Failure, Grass and Wildland Fire	1, 2, 5	
Purchase chainsaw for each fire truck	Infrastructure Failure, Grass and Wildland Fire	1, 2, 5	
Purchase a leaf blower	Grass and Wildland Fire	1, 2, 5	The blower will assist in controlling brush fires.
Periodically borrow an electronic speed sign and place on major city routes	Transportation Incident	1, 4, 5	
Develop an emergency assistance program	All hazards	1, 4, 5	
Develop an emergency operations plan for the city and conduct a practice drill	All hazards	1, 2, 3, 5	

Robins Mitigation Strategy

For several hazards, sustained mitigation actions are considered sufficient in Robins. See Table 119 for the hazards and justification. For all other hazards, a mitigation action was identified by the local planning committee.

Table 119: Hazards Addressed by Robins Operations

Hazard	Justification
Extreme Heat	There are public facilities in the area where residents can go during an extreme heat event.
Drought	The city's water supply is maintained by Cedar Rapids.
Animal, Plant, Crop Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance.
Human Disease	Cedar Rapids maintains a clean and secure water supply and proper wastewater treatment.
Radiological Incident	The Fire Department and Police Department coordinate with the Linn County Emergency Management Agency and the Duane Arnold Energy Center.
Sinkholes	Geological hazards are mitigated in the infrastructure design and construction process.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.
Landslide	Geological hazards are mitigated in the infrastructure design and construction process.

All other identified hazards were addressed by at least one mitigation action in Robins' final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 120 for Robins' mitigation strategy.

Table 120: Robins Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Notes
Construct a multi-purpose safe room	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 3, 4, 5	
Purchase and install stationary generators at lift stations and replace obsolete generators	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Severe Winter Storm, Infrastructure Failure	1, 2, 3, 5	
Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Flood	1, 2, 3, 4, 5	
Acquire, relocate, elevate, and or demolish structures in flood hazard areas	Flood	1, 2, 5	
Improve stormwater management system	Flood	1, 2, 3, 4, 5	The city's focus is the northwest quadrant
Expand warning siren coverage, as development expands	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 4, 5	
Establish ideal emergency travel routes when major travel routes are blocked	Transportation Incident, Infrastructure Failure	1, 2, 3, 4, 5	The city's focus is primarily routes for emergency responders
Purchase brush truck for the Fire Department	Grass and Wildland Fire	1, 2, 3, 5	
Establish property computer network security	Infrastructure Failure, Terrorism	1, 3, 5	

Springville Mitigation Strategy

For several hazards, sustained mitigation actions are considered sufficient in Springville. See Table 121 for the hazards and justification. For all other hazards, a mitigation action was identified by the local planning committee.

Table 121: Hazards Addressed by Springville Operations

Hazard	Justification
Transportation Incident	The city maintains local roads, coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency, and coordinates with the railroad company, as needed. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Drought	The city maintains sufficient water supply for residents.
Hazardous Materials Incident	The city and Fire Department coordinate with the Linn County Emergency Management Agency, local businesses, and complete necessary hazardous materials training on an ongoing basis.
Animal, Plant, Crop Disease	The city maintains vegetation, coordinates with the Iowa Department of Natural Resources when necessary, and enforces the city's animal control ordinance
Grass and Wildland Fire	The city maintains vegetation in public areas. The Fire Department completes relevant training and maintains proper equipment.
Terrorism	The city coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Human Disease	The city maintains a safe water supply and distribution system and coordinates with Linn County Public Health.
Radiological Incident	The city and Fire Department coordinate with the Duane Arnold Energy Center and the Linn County Emergency Management Agency to prepare for a potential radiological event.
Sinkholes	The risk of a sinkhole event is minimal so the Public Works staff monitors risk to infrastructure on an ongoing basis.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.
Landslide	The risk of a landslide event is minimal so the Public Works staff monitors risk to infrastructure on an ongoing basis.

All other identified hazards were addressed by at least one mitigation action in Springville's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 122 for Springville's mitigation strategy.

Table 122: Springville Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Notes
Purchase and install backup power generator in critical facilities	Thunderstorm, Lightning, and Hail, Infrastructure Failure, Tornado and Windstorm, Severe Winter Storm	1, 3, 5	Includes the city's well and public facilities
Assess warning siren coverage and expand or replace existing sirens, if needed	Tornado and Windstorm, Lightning, and hail	1, 3, 4, 5	Included established procedure for activating the city's sirens
Complete water and sewer infrastructure improvements	Infrastructure Failure, Flood	1, 2, 3, 5	The city does not have stormwater infrastructure. The water and sewer rate were increased to fund future system improvements.
Acquire, relocate, elevate, and/or demolish structures in the floodplain	Flood	1, 2, 3, 5	
Add hazard related information the city's website	All hazards	1, 2, 3, 4, 5	
Update the city's all-hazard emergency response plan	All hazards	1, 2, 3, 4, 5	

Walker Mitigation Strategy

For several identified hazards, city operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 123 for the hazards currently addressed by city operations.

Table 123: Hazards Addressed by Walker Operations

Hazard	Justification
Extreme Heat	Public facilities are open to the public during extreme heat events.
Transportation Incident	The city maintains local roads, coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency, and coordinates with the railroad company, as needed. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Hazardous Materials Incident	City employees are trained to properly handle hazardous materials, and the city maintains safety plans. The fire and police departments are trained to immediately respond to hazard material incidents, and the departments coordinate with the Linn County Emergency Management Agency and the region's HAZMAT response team. In addition, Tier II hazard material listings are maintained for the area.
Grass and Wildland Fire	The city maintains vegetation in public areas. The Fire Department completes relevant training and maintains proper equipment.
Terrorism	The city coordinates with the Linn County Sheriff and the Linn County Emergency Management Agency. The Fire Department coordinates with the Linn County Emergency Management Agency and completes necessary training.
Human Disease	The city maintains a safe water supply and distribution system and coordinates with Linn County Public Health.
Radiological Incident	The city and Fire Department coordinate with the Duane Arnold Energy Center and the Linn County Emergency Management Agency to prepare for a potential radiological event.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.

All other identified hazards were addressed by at least one mitigation action in Walker's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for hazards like flood-related or severe weather are often similar. See Table 124 for the city's mitigation strategy.

Table 124: Walker Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Notes
Purchase weather radios for the City Shop and ball diamond	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 4, 5	
Purchase and install backup power generators in critical facilities	Thunderstorm, Lightning, and Hail, Infrastructure Failure, Severe Winter Storm, Tornado and Windstorm	1, 3, 5	Facilities with generators include the Fire Station, well, and wastewater treatment plant
Construct tornado safe rooms in public facilities and recreation areas	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 2, 3, 5	
Complete water, sewer, and stormwater infrastructure improvements	Infrastructure Failure, Flood	1, 2, 3, 5	One phase of the improvement project was completed in 2012, which involved replacing 3,500 feet of the water main system. The improvement project may involve increasing the size of the water mains. Sewer and stormwater infrastructure improvements will address infiltration issues.
Remove debris from creeks	Flood	1, 2, 5	
Acquire, relocate, elevate, and/or demolish structures in the floodplain	Flood	1, 2, 5	
Identify and implement flood mitigation solutions on Karens Court road	Flood	1, 2, 3, 5	
Construct a tornado safe room in public facilities	Tornado and Windstorm	1, 2, 3, 5	
Improve drainage along transportation infrastructure to prevent frost boils	Infrastructure Failure, Expansive Soils	2, 3, 5	Improvements may include adding ditches
Add a new well	Drought	1, 3, 5	
Develop plan to deal with an emerald ash borer infestation	Animal, Plant, Crop Disease	2, 3, 4, 5	
Add hazard-related information to the city's website	All hazards	1, 2, 3, 4, 5	

Center Point – Urbana Community School District Mitigation Summary

For several identified hazards, district operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 125 for the hazards currently addressed by district operations.

Table 125: Hazards Addressed by Center Point-Urbana Community School District Operations

Hazard	Justification
Transportation Incident	The district regularly maintains its bus and vehicle fleet, provides safety training, maintains emergency plans, and completes practice drills.
Hazardous Materials Incident	District employees are trained to properly handle hazardous materials, and the district maintains safety plans. Local fire departments and the Linn County Sheriff's Office are trained to immediately respond to hazard material incidents, and these agencies coordinate with the Linn County Emergency Management Agency. In addition, Tier II hazard material listings are maintained for the area.
Terrorism	The district maintains emergency plans, practice drills, and coordinates with the Linn County Sheriff's Office and Linn County Emergency Management Agency.
Human Disease	The district has medical staff, provides health education to students, and coordinates with Linn County Public Health.
Radiological Incident	As needed, the district coordinates with the Duane Arnold Energy Center, the Linn County Emergency Management Agency, the Linn County's Sheriff's Office, local fire departments and emergency medical response.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.

All other identified hazards were addressed by at least one mitigation action in the Center Point – Urbana Community School District's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for severe weather hazards are often similar. See Table 126 for the district's mitigation strategy.

Table 126: Center Point – Urbana Community School District Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Notes
Construct a tornado safe room as a multi-purpose addition to district facilities	Thunderstorm, Lighting, and Hail, Tornado and Windstorm	1, 2, 3, 5	
Retrofit facilities for high wind hazard events	Thunderstorm, Lighting, and Hail, Tornado and Windstorm	1, 2, 3, 5	
Purchase and install generators in critical facilities	Thunderstorm, Lighting, and Hail, Infrastructure Failure, Tornado and Windstorm, Severe Winter Storm	1, 2, 3, 5	
Add air conditioning to all district facilities	Extreme Heat	1, 3, 5	Not all district facilities currently have air conditioning
Identify and implement stormwater management solutions on district property	Flash Flood, Infrastructure Failure	1, 2, 3, 5	

College Community School District

For several identified hazards, district operations are considered sustained mitigation actions that are sufficient for reducing risk in the community. Either current operation addresses the hazard or effective mitigation actions are not feasible due to minimal historical occurrences. Refer to Table 127 for the hazards currently addressed by district operations.

Table 127: Hazards Addressed by College Community School District Operations

Hazard	Justification
River Flood	Current there is minimal risk to district facilities from Prairie Creek, which flows through the south side of the district's campus.
Flash Flood	Current there is minimal risk to district facilities from Prairie Creek, which flows through the south side of the district's campus. There is also minimal risk of stormwater related flash flooding due to recent infrastructure improvements in the area.
Transportation Incident	The district regularly maintains its bus and vehicle fleet, provides safety training, maintains emergency plans, and completes practice drills.
Hazardous Materials Incident	District employees are trained to properly handle hazardous materials, and the district maintains safety plans. The Cedar Rapids fire and police departments are trained to immediately respond to hazard material incidents and the department coordinate with the Linn County Emergency Management Agency. In addition, Tier II hazard material listings are maintained for the area.
Grass and Wildland Fire	The district maintains its grounds so potential grass or wildland fires would not directly impact a district facility.
Human Disease	The district has medical staff, provides health education to students, and coordinates with Linn County Public Health.
Radiological Incident	As needed, the district coordinates with the Duane Arnold Energy Center, the Linn County Emergency Management Agency, and the Cedar Rapids fire, police, and emergency medical response departments in Cedar Rapids.
Earthquake	The potential magnitude and severity of an earthquake event is minimal so there are currently no cost effective mitigation actions.

All other identified hazards were addressed by at least one mitigation action in the College Community School District's final mitigation strategy. Several mitigation actions address several hazards due to the similar impacts. Mitigations actions for severe weather hazards are often similar. See Table 128 for the district's mitigation strategy.

Table 128: College Community School District Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Notes
Purchase and install generators for critical facilities	Thunderstorm, Lightning, and Hail, Infrastructure Failure, Tornado and Windstorm, Severe Winter Storm	1, 3, 5	The district offices are high priority because the district needs to maintain communication capabilities during a hazard event. Maintaining backup power generators for wastewater infrastructure is also a high priority.
Construct a tornado safe room in new district facilities	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 2, 3, 5	
Install cameras and intruder locks in all school facilities	Terrorism	1, 5	

Action Plan

To determine how a mitigation strategy should be completed, an action plan and timeline for mitigation actions was determined through a prioritization process that considered local priorities identified in the Key Considerations section of this plan, local capabilities identified in the Operations and Resources section of the plan, potential benefit, and estimated cost. Ultimately, mitigation actions were assigned a priority level, which determines the potential timeline for completion. Refer to Tables 129 – 130.

Table 129: Benefit vs. Cost Criteria

Type	Benefit	Cost
High	Results are likely immediate and/or widespread reduction of risk from hazard(s) addressed; generally supported by the community; lead agency has capabilities	Existing funding is not adequate to complete the project; funding may only be available through grants/assistance; anticipated to cost greater than $100,000
Medium	Results are likely a long-term reduction of risk from hazard(s) addressed and/or results are not widespread; potential community opposition; lead agency has capabilities	Requires amending the budget and/or requires a bond to complete the project; anticipated to cost between $10,000 and $100,000
Low	Results are difficult to determine and/or may not result in long-term reduction of risk from hazard(s) addressed; definite community opposition; lead agency may encounter capability issues	Existing funding is adequate or the project can be completed through volunteer and/or staff time; anticipated to cost less than $10,000

Table 130: Mitigation Action Priority Level Criteria

Priority Level	Potential Project Timeline
1	1 – 5 years
2	5 – 10 years
3	10 – 15 years

For most jurisdictions, not all mitigation actions considered in the prioritization process met exact criteria. The planning team in each jurisdiction developed the final action plan to ensure priority levels reflect local priorities and capabilities. It should be noted, not all jurisdictions identified all three priority levels for mitigation actions. Some jurisdictions have adopted a shorter term focus for completing mitigation actions.

In addition to the potential benefit, cost, and priority level of a mitigation action, the action plan also identifies who in the jurisdiction is the mitigation action lead, potential partners, and funding sources. In the action plan for each jurisdiction, some of the identified potential partners and funding sources are abbreviated. Table 131 is reference for the abbreviations. All other partners and funding sources are explanatory.

Table 131: Potential Partner and Funding Abbreviations

Potential Partner or Funding	Abbreviation
Iowa Homeland Security and Emergency Management Division	IHSEMD
Iowa Department of Natural Resources	Iowa DNR
Iowa Department of Transportation	IDOT
Linn County Emergency Management Agency	Linn County EMA
East Central Iowa Council of Governments	ECICOG
Cedar Rapids/Linn County Solid Waste Agency	Cedar Rapids/Linn County SWA
Community School District	CSD
Pre-Disaster Mitigation	PDM
Hazard Mitigation Grant Program	HMGP
Flood Mitigation Assistance	FMA
Community Development Block Grant	CDBG

Linn County Action Plan

The Linn County planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 132 for the county's action plan.

Table 132: Linn County Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Initiate continuity planning in all county departments	All department directors	Linn County EMA	Medium	Medium – Low	County
1	Participate in the Community Resilience Program and implement supporting projects	Planning and Development Director	Cedar Rapids, Linn County EMA, Greater Cedar Rapids Community Foundation, ECICOG, United Way, and faith-based community	High	Low – High	County, partners, Resilient America, and others to be identified
1	Expand outdoor and indoor notification systems	Linn County EMA	IHSEMD	High	Medium – High	County, PDM, HMGP
1	Construct multi-purpose tornado safe rooms in critical facilities and determine areas in the county that would benefit from the addition of a multi-purpose tornado safe room	Planning and Development Director	County Engineer, Linn County EMA, IHSEMD	High	High	County, PDM, HMGP
1	Determine options and feasibility of stronger regulations to protect electricity distribution infrastructure from wind and ice damage	Planning and Development Director	Power providers	Medium	Low	County
1	Purchase and install generators in critical facilities	County Engineer	IHSEMD	High	Medium - High	County, PDM, HMGP
1	Identify and complete flood mitigation projects to protect identified critical facilities and infrastructure	County Engineer	Planning and Development	High	Medium – High	County, PDM, HMGP, FMA
1	Acquire, relocate, elevate, and/or demolish structures in the floodplain	Planning and Development Director	IHSEMD	High	High	County, PDM, HMGP, FMA

Table 132 (cont.): Linn County Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Strengthen the Floodplain Ordinance to reduce development in the floodplain	Planning and Development Director	IDNR	High	Low	County
1	Strengthen development-related ordinances to improve stormwater management in new development	Planning and Development Director	County Engineer, IDNR	High	Low	County
1	Improve the county's rating in the Community Rating System	Floodplain Manager	Planning and Development	High	Low	County
1	Establish the use of the HAZUS and Iowa Flood Center flood inundation modeling systems with the Linn County Emergency Management Agency	Planning and Development Director and County Engineer	Iowa Flood Center, Linn County EMA	Medium	Low	County
1	Participate in the development and implementation of the Indian Creek Watershed Management Plan to improve water management, which may include regulatory or structural projects	Planning and Development Director	County Engineer and Secondary Roads	High	Medium - High	County, PDM, HMGP, FMA, others to be identified
1	Provide hazard-related educational materials on the county website	Planning and Development Director	Information Technology, Linn County EMA	Medium	Low	County
1	Encourage the Linn County Food Systems Council to identify the scope and potential necessity for a food security plan addressing access to food during and after hazard events	Planning and Development Director	Linn County Food Systems Council	Low	Low	To be identified
2	Provide residential home rehabilitation and/or emergency repair program to prevent major damage to homes during hazard events	Planning and Development Director	ECICOG	Medium	Medium – High	County, others to be identified

Alburnett Action Plan

The Alburnett planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 133 for the city's action plan.

Table 133: Alburnett Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Public education project	City Clerk	Fire Department	High	Low	City
1	Determine emergency plans for the sports complex	City Clerk	Fire Department	High	Low	City
1	Construct a new fire station	Fire Chief	City	Medium	High	City
3	Construct a multi-purpose safe room in public facilities	City Clerk	Fire Department, IHSEMD	High	High	City, PDM, HMGP, others to be identified
3	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	City Clerk	IHSEMD	High	High	City, PDM, HMGP, FMA

Bertram Action Plan

The Bertram planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 134 for the city's action plan.

Table 134: Bertram Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Determine appropriate generator testing schedule and reporting procedure	Mayor	Consultant that maintains the city's well	High	Low	City
1	Replace and repair bridges damaged by flash flooding	Mayor	FEMA, IDOT, engineering consultant	High	High	City, FEMA
1	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Mayor	FEMA	High	Medium – High	City, PDM, FMA, HMGP
1	Establish public cooling center policy	Mayor	Linn County EMA	Medium	Low	City
1	Establish evacuation routes for hazardous materials incidents	Mayor	Linn County EMA, Linn County Sheriff's Office	Medium	Low	City
1	Establish communication procedure for hazard events	Mayor	Linn County EMA	Medium	Low	City
1	Establish plan to address Oak Wilt in public areas	Mayor	IDNR	Medium	Low – Medium	City
1	Identify and complete stormwater management improvements to reduce flood damage risk	Mayor	Engineering consultant	High	Low – High	City, PDM, HMGP, others to be identified
2	Construct a multi-purpose safe room	Mayor	Linn County EMA, IHSEMD, consulting architect	High	Medium – High	City, PDM, HMGP

Cedar Rapids Action Plan

The Cedar Rapids planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 135 for the city's action plan.

Table 135: Cedar Rapids Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Participate in the Community Resilience Program and implement supporting projects	City Manager	Linn County	High	High	City, partners, Resilient America, and others to be identified
1	Complete the city's Permanent Flood Protection Project phase from Cargill to I-380 and includes the existing Quaker Oats flood protection	Army Corps of Engineers and Public Works Director	---	High	High	City, Army Corps of Engineers, CDBG, Iowa Flood Mitigation Award
1	Complete the city's Permanent Flood Protection Project phase from I-380 to 8th Avenue SW	Public Works Director	---	High	High	City, Iowa Flood Mitigation Award
1	Complete the city's Permanent Flood Protection Project phase from I-380 to 8th Avenue SE	Army Corps of Engineers and Public Works Director	---	High	High	City, Army Corps of Engineers, Iowa Flood Mitigation Award
1	Design and begin the construction of the city's Permanent Flood Protection Project phase from I-380 to Ellis Park	Public Works Director	---	High	High	City, Iowa Flood Mitigation Award
1	Design and begin the construction of the city's Permanent Flood Protection Project phase from 8th Avenue SE to Alliant Substation	Army Corps of Engineers and Public Works Director	---	High	High	City, Army Corps of Engineers, Iowa Flood Mitigation Award
1	Design and begin the city's Permanent Flood Protection Project phase from 8th Avenue to the Cedar/Rapids Linn County Solid Waste Agency Site 1	Public Works Director	---	High	High	City, Iowa Flood Mitigation Award

Table 135 (cont.): Cedar Rapids Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Complete the addition of 21 gate closures and 11 pump stations	Army Corps of Engineers and Public Works Director	---	High	High	City, Army Corps of Engineers, Iowa Flood Mitigation Award
1	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas or structures subject to repetitive damage	Public Works Director	IHSEMD, Army Corps of Engineers	High	High	City, Army Corps of Engineers, Iowa Flood Mitigation Award
1	Complete Levee/Floodwall construction at the Water Pollution Control facility	Utilities Director	IHSEMD, IDNR	High	High	City, HMGP, PDM
1	Install new pump and return sewer to protect wastewater infrastructure	Utilities Director	FEMA	High	High	FEMA
1	Install flood warning system on Indian Creek	Army Corps of Engineers	IDNR, Indian Creek Watershed Management Authority	High	Medium	Army Corps of Engineers
1	Develop and implement a response plan for Indian Creek flooding	Public Works Director	Indian Creek Watershed Management Authority	High	High	Stormwater Utility Enterprise Fund, HMGP, PDM
1	Complete backflow protection project	Public Works Director	---	High	Medium	City Sewer Utility
1	Add detention basins to increase stormwater management capability	Public Works Director	---	Medium	Medium – High	Stormwater Utility Enterprise Fund
1	Complete reconstruction of City Services Center facility above the 2008 flood level	Public Works Director	---	High	High	FEMA, I JOBS, Local Options Sales Tax, Sewer Utility, Solid Waste Utility
1	Add additional sump pits and epoxy flooring at City Hall	Facilities Maintenance	---	High	Medium	City
1	Construct berm at Ellis Boulevard	Public Works Director	---	High	Medium	Local Option Sales Tax
1	Reroute storm sewer in the Sun Valley Neighborhood	Public Works Director	---	High	High	Local Option Sales Tax
1	Construct berm in the Sun Valley Neighborhood along Cottage Grove Parkway	Public Works Director	---	High	High	Local Option Sales Tax
1	Complete Vinton ditch improvements	Public Works Director	---	High	High	CDBG, Local Option Sales Tax

Table 135 (cont.): Cedar Rapids Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Complete Cedar River Siphon Project	Army Corps of Engineers and Public Works Director	---	High	High	City, CDBG, Army Corps of Engineers
1	Replace damaged sections of the sanitary sewer with flood resilient materials	Public Works Director	---	High	High	FEMA, IHSEMD, City
1	Mitigate Valley Brook Drive erosion	Public Works	---	High	High	City, CDBG
1	Improve two major water detention basins	Public Works Director	---	High	High	City, CDBG
1	Install backup power sources for traffic lights	Public Works Director	IDOT	High	Low – High	City, others to be identified
1	Expand the city's outdoor warning siren system	City Manager	Linn County EMA	High	Medium	City, HMGP, PDM
1	Construct safe rooms in public facilities and recreation areas	City Manager and Parks and Recreation	Linn County EMA	High	High	City, HMGP, PDM
1	Harden public facilities to withstand wind and other severe weather damage	City Manager and Public Works Director	---	High	Medium – High	City, HMGP, PDM
1	Develop and implement a residential fan program	Fire Chief and Building Services	Hawkeye Area Community Action Program and other organizations that provide assistance	High	Low – Medium	City, others to be identified
1	Develop and implement a residential wellness check program	Fire Chief and Police Chief	Hawkeye Area Community Action Program and other organizations that provide assistance	High	Low – Medium	City, others to be identified
2	Add additional signage for emergency routes and evacuation routes	Public Works Director	IDOT, adjacent cities, Linn County, and Linn County EMA	Medium	Medium	City, others to be identified
2	Install lightning rods on large critical facilities	Public Works Director	---	Medium	Low	City, others to be identified
2	Add salt storage facility in the northwest area of the city	Public Works Director	IDOT	Low	Medium	City, others to be identified

Table 135 (cont.): Cedar Rapids Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
3	Design and construct ring levee at Water Plant	Utilities Director	--			City, Iowa Flood Mitigation Award
3	Edgewood bridge improvements	Public Works Director	---	High	Medium – High	City, Iowa Flood Mitigation Award

Center Point Action Plan

The Center Point planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 136 for the city's action plan.

Table 136: Center Point Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Improve communication capabilities with equipment update and developing a communication plan with local agencies	City Administrator	Fire Agency, Linn County EMA	Medium	Medium	City, Fire Agency, others to be identified
1	Construct a multi-purpose safe room in conjunction with new public facilities	City Administrator	Public Library Board, Fire Agency	High	High	City, HMGP, PDM
1	Construct a new Fire Station with a dedicated generator	Fire Chief	City, IHSEMD	High	High	Fire Agency, City, HMGP, PDM
1	Digitize city and public records	City Clerk	---	Medium	Low	City
1	Complete the high priority phases of the city's comprehensive stormwater improvement plan	City Administrator	Public Works	High	High	City, CDBG, and others to be identified
1	Education residents about the importance of disconnecting their sump pumps from the sanitary sewer	City Administrator	Public Works	Medium	Low	City
1	Develop a stream debris cleaning program	City Administrator	Public Works, IDNR	High	Low	City, Iowa DNR, and others to be identified
1	Acquire, relocate, elevate, and/or remove structures in flood hazard areas	City Administrator	ECICOG	High	Medium - High	City, PDM, HMGP, FMA
2	Retrofit existing City Hall or construct a new City Hall to withstand natural hazards including a dedicated generator	City Administrator	IHSEMD	High	Medium - High	City, HMGP, PDM
3	Upgrade water infrastructure with 6" lines to provide system access for fire protection	City Administrator	Public Works	High	High	City, others to be identified

Central City Action Plan

The Central City planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 137 for the city's action plan.

Table 137: Central City Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Acquire, relocate, and/or demolish structures in flood hazard areas	City Administrator	IHSEMD	High	High	City, HMGP, PDM, FMA
1	Sanitary and storm sewer system improvements to prevent system backup	City Administrator	IDNR	High	High	City, HMGP, PDM, FMA, CDBG
1	Identify and/or construct a storage facility for maintenance equipment and flood protection supplies	City Administrator	---	Medium	Medium	City
1	Expand warning system coverage	City Administrator	Linn County EMA	High	Medium	City and HMGP
1	Relocate water source(s) from the 100 year floodplain	City Administrator	IDNR	High	Medium	City
1	Complete bank stabilization along the river and bridges	City Administrator	IDNR	High	High	City, HMGP, PDM, FMA
1	Purchase and install portable generators for critical facilities	City Administrator	Linn County EMA, IHSEMD	High	Low/ Medium	City, PDM, HMGP
1	Replace the Fire Department's personal protective equipment	Fire Chief	None	High	Medium	Fire Department
1	Develop a plan for the imminent emerald ash borer infestation	City Administrator	Iowa DNR, Cedar Rapids/Linn County SWA	Medium	Low	City
2	Identify and complete flood protection for the wastewater treatment facility	City Administrator	IDNR	High	High	City, HMGP, PDM, FMA
2	Complete bank stabilization near the water tower	City Administrator	IDNR	Medium	High	City, HMGP, PDM, FMA
3	Expand the storm sewer system to increase capacity	City Administrator	IDNR	High	High	City, CDBG, others to be identified
3	Construct a multi-purpose community safe room	City Administrator	IHSEMD, Linn County EMA	Medium	High	City, HMGP, PDM

Coggon Action Plan

The Coggon planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 138 for the city's action plan.

Table 138: Coggon Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Update the emergency response plan	City Clerk	Fire Department, Linn County EMA	High	Low	City
1	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	City Clerk	IHSEMD	High	High	City, PDM, HMGP
1	Improve, structurally protect, or relocate water and wastewater facilities to maintain service	City Clerk	IHSEMD, IDNR	High	High	City, PDM, HMGP, CDBG, others to be identified
1	Purchase power generators for critical facilities, including water and sanitary sewer facilities	City Clerk	IHSEMD	High	Medium	City, PDM, HMGP
1	Designate shelter for park and campground users, if needed, construct a tornado safe room	City Clerk	Linn County EMA	High	Low - High	City, PDM, HMGP
2	Establish a communication plan for city officials, staff, and emergency response teams, and if needed, purchase communication equipment	City Clerk	Fire Department	Medium	Low - Medium	City, others to identified
2	Maintain a supply of sand for immediate containment of hazardous materials spills to reduce potential contamination	Fire Chief	City Public Works	Medium	Medium	City
2	Create a wellness check program for residents who want to be checked on during or after certain hazard events	City Clerk	Fire Department, Linn County EMA	Medium	Low	City
3	Purchase or secure access to an all-terrain vehicle for off-road emergencies	Fire Chief	Linn County EMA	Low	Low - Medium	City

Ely Action Plan

The Ely planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 139 for the city's action plan.

Table 139: Ely Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Construct a multi-purpose safe room in public facilities	City Administrator	Linn County EMA, IHSEMD	High	High	City, PDM, HMGP
1	Purchase backup power generators for critical facilities	City Administrator	Public Works, IHSEMD	High	Medium	City, PDM, HMGP
1	Purchase space heaters for a public winter wellness program	City Administrator	Fire Department	Medium	Low	City
1	Acquire, relocate, elevate, and/or demolish structures located in the floodplain	City Administrator	IHSEMD	High	High	City, PDM, HMGP, FMA
1	Complete Fuhrmeister Street stormwater improvements	City Administrator	Public Works	High	High	City, PDM, HMGP, CDBG, others to be identified
1	Add hazard-related information to the city website	City Administrator	Fire Department	Medium	Low	City
2	Add water retention capacity for Banner Valley Creek	City Administrator	Public Works	High	High	City, PDM, HMGP, FMA
3	Dredge and stabilize Hoosier Creek	City Administrator	Linn County, Army Corps of Engineers	High	High	City, PDM, HMGP

Fairfax Action Plan

The Fairfax planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 140 for the city's action plan.

Table 140: Fairfax Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Water main replacement project	City Clerk	Public Works, IDNR	High	High	City
1	Purchase and install backup power generators for two wells	City Clerk	Public Works	High	Medium	City, PDM, HMGP
1	Expand warning siren coverage	City Clerk	Linn County EMA, IHSEMD	High	Medium – High	City, PDM, HMGP
1	Purchase and install backup power generators for outdoor warning sirens	City Clerk	IHSEMD	High	Medium	City, PDM, HMGP
1	Purchase weather radios for city buildings	City Clerk	---	Medium	Low	City
1	Construct a multi-purpose safe room	City Clerk	Linn County EMA, IHSEMD	High	High	City, PDM, HMGP
1	Determine the feasibility of a lightning warning system for outdoor recreation areas and purchase, if feasible	City Clerk	Public Works	Medium	Low	City
1	Improve and expand the city's stormwater management system	City Clerk	Public Works	High	High	City, PDM, HMGP, FMA, others to be identified
1	Purchase appropriate size water pumps	City Clerk	Public Works			
1	Acquire, relocate, elevate, and or demolish structures in flood hazard areas, if needed	City Clerk	IHSEMD	High	High	City, PDM, HMGP, FMA
1	Coordinate with railroad companies and improve signals at crossings near the city's recreational facilities	City Clerk	Union Pacific Railroad and CRANDIC Railroad	Medium	Low – Medium	City, railroad companies
1	Structurally improve bridges on Highway 151	City Clerk	IDOT, Public Works	High	High	Transportation funds
1	Develop a drought plan	City Clerk	IDNR	High	Low	City
1	Purchase and grass and wildland fire gear	Fire Chief	---	Medium	Medium	Fire Department
2	Add additional well and water storage	City Clerk	Public Works, IDNR	High	High	City

Hiawatha Action Plan

The Hiawatha planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 141 for the city's action plan.

Table 141: Hiawatha Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Construct new fire station	Fire Chief	Policy and Administration	High	High	City, others to be identified
1	Purchase and install backup power generators in critical facilities	City Administrator	Public Works	High	Medium – High	City, PDM, HMGP
1	Construct tornado safe rooms in public facilities	City Administrator	Public Works	High	High	City, PDM, HMGP
1	Determine feasibility of requiring storm shelters in manufactured home or multi-family housing developments	Community Development Director	Policy and Administration	High	Low	City
1	Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Community Development Director	Public Works and Policy and Administration	Medium	Low – High	City, PDM, HMGP, FMA, others to be identified
1	Complete water, sewer, and stormwater infrastructure improvements to reduce infiltration	City Engineer	Public Works, Water, and Policy and Administration	High	High	City, PDM, HMGP, FMA, others to be identified
1	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Community Development Director	Policy and Administration	High	High	City, PDM, HMGP, FMA
1	Determine feasibility of strengthening the city's floodplain ordinance	Community Development Director	Policy and Administration	High	Low	City
1	Identify potential urban wildland interface improvements	Community Development Director	Fire and Rescue Department	Medium	Low	City
1	Provide hazard-related information on the city website	City Administrator	Linn County EMA	Medium	Low	City
2	Identify gaps in outdoor warning siren coverage and expand, if needed	City Administrator	Linn County EMA	High	Medium	City, PDM, HMGP

Lisbon Action Plan

The Lisbon planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 142 for the city's action plan.

Table 142: Lisbon Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Educate residents about weather radios	City Administrator	Police and Fire Department, Linn County EMA	Medium	Low	City
1	Purchase and install generators in critical facilities	City Administrator	Public Works, Linn County EMA, IHSEMD	High	Medium	City, PDM, HMGP
1	Educate residents about flood, renters, and homeowners insurance	City Administrator	---	Medium	Low	City
1	Enter the Community Rating System	City Administrator	IDNR, FEMA	Medium	Low - Medium	City
1	Develop education program for community safe rooms	City Administrator	Police and Fire Department, Linn County EMA	Medium	Low	City
1	Develop and implement watershed protection plan	City Administrator	Mount Vernon, IDNR, others to be identified	High	Low - High	City, PDM, FMA, HMGP, others to be identified
1	Develop map of past hazard materials incidents	City Administrator	Linn County EMA	Low	Low	City
1	Improve stormwater management system	City Administrator	Consulting engineer	High	Low – High	City, PDM, FMA, HMGP, others to be identified
2	Expand warning siren coverage	City Administrator	Linn County EMA	High	Medium	City, PDM, HMGP

Marion Action Plan

The Marion planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 143 for the city's action plan.

Table 143: Marion Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Construct tornado safe rooms in public facilities	City Engineer	IHSEMD	High	High	City, PDM, HMGP
1	Determine feasibility of requiring storm shelter or tornado safe rooms in new structures	Planning and Development Director	---	High	Low	City
1	Purchase and install backup power generators in critical facilities and/or replace obsolete generators	City Engineer	IHSEMD	High	Medium – High	City, PDM, HMGP
1	Construct new fire station with a tornado safe room	City Engineer	Fire Department, IHSEMD	High	High	City, PDM, HMGP
1	Develop and implement an information technology disaster recovery site at the police station	Police Chief	Linn County EMA	High	Medium – High	City
1	Assess outdoor warning siren coverage and expand coverage, if needed	City Engineer	Linn County EMA, IHSEMD	High	Medium	City, PDM, HMGP
1	Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	City Engineer	Indian Creek Watershed Management Authority, IHSEMD	High	High	City, PDM, HMGP, FMA, others to be identified
1	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Planning and Development Director	IHSEMD	High	High	City, PDM, HMGP, FMA
2	Develop alternative source of drinking water	City Engineer	IDNR	Medium	Medium – High	City, others to be identified

Mount Vernon Action Plan

The Mount Vernon planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 144 for the city's action plan.

Table 144: Mount Vernon Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Develop public awareness campaign for local hazards	Emergency Management Coordinator	City Administrator, Police and Fire Department, Linn County EMA	Medium	Low	City
1	Develop process to notify special needs population	Emergency Management Coordinator	City Administrator, Police and Fire Department, Linn County EMA	Medium	Low	City
1	Develop program to educate the public about the need to expand emergency services as the community grows	Emergency Management Coordinator	City Administrator, Police and Fire Department, Linn County EMA	Low	Low	City
1	Educate residents about weather radios	Emergency Management Coordinator	Fire Department, Linn County EMA	Medium	Low	City
1	Purchase and install backup power generators in critical facilities	City Engineer	City Administrator, Public Works	High	Low – High	City, PDM, HMGP
1	Adopt restrictive permit process for large events	Emergency Management Coordinator	City Administrator, Zoning, Linn County EMA	Medium	Low	City
1	Develop an education program about tornado safe rooms to encourage developers and homeowners to incorporate storm shelters or tornado safe rooms into homes	Emergency Management Coordinator	City Administrator, Zoning, Linn County EMA	Medium	Low	City
1	Educate residents about the importance of flood, renters, and homeowners insurance	Emergency Management Coordinator	City Administrator	Low	Low	City
1	Require storm shelter space in new manufactured home developments and/or lobby the state to require storm shelters in manufactured home developments	Emergency Management Coordinator	City Administrator, Zoning, Linn County EMA	Medium – High	Low	City

Table 144 (cont.): Mount Vernon Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Construct a multi-purpose tornado safe room in public facilities and recreation areas	City Administrator	City Engineer, Emergency Management Coordinator, IHSEMD	High	High	City, PDM, HMGP
1	Encourage the construction of storm shelters and structural hardening against high wind hazards in schools, daycares, adult care, and other facilities with vulnerable populations	Emergency Management Coordinator	City Administrator, Zoning, Linn County EMA	Low	Low	City
1	Encourage developers and contractors to offer and market wind resistant building materials	Emergency Management Coordinator	City Administrator, Zoning, Linn County EMA	Low	Low	City
1	Incorporate floodplain management and other hazard mitigation strategies into comprehensive planning	Emergency Management Coordinator	ECICOG	Medium	Low	City
1	Participate in the Community Rating System	Floodplain Manager	Zoning, IDNR	High	Low	City
1	Educate owners about check valves	Emergency Management Coordinator	Public Works	Medium	Low	City
1	Develop bypass and absorption field	City Engineer	Public Works, IDNR	High	Medium – High	City
1	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	City Administrator	Zoning, IHSEMD	High	High	City, PDM, HMGP, FMA
1	Educate local businesses about hazardous material incident mitigation strategies	Emergency Management Coordinator	Fire Department	Medium	Low	Fire Department
1	Develop map of historic hazardous material incidents	Emergency Management Coordinator	Fire Department, Linn County EMA, IDNR	Low	Low	City
1	Lobby the state legislature to revise Iowa Code to allow local government to regulate agricultural fertilizer facilities in urban and residential areas	City Administrator	---	Low	Low	City

Table 144 (cont.): Mount Vernon Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Lobby the state legislature to revise Iowa Code to allow the assessment of fees from chemical facilities for hazardous materials programs	City Administrator	Fire Department	Medium	Low	City
1	Educate residents, businesses, and develops about the benefits of sprinkler systems and coordinate an incentive program for inclusion in new development	Emergency Management Coordinator	Fire Department	Low	Low	City
1	Improve snow emergency route and evacuation plan	Public Works Lead Operator	Police and Fire Department, Emergency Management Coordinator, Linn County EMA, IDOT	Medium	Low	City
2	Expand outdoor warning siren coverage	City Administrator	City Administrator, City Engineer, Zoning, Linn County EMA	High	Medium - High	City, PDM, HMGP
2	Participate in a watershed planning process, if available, and implement the plan	City Administrator	City Engineer, Zoning, IDNR	High	Low - High	City

Palo Action Plan

The Palo planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 145 for the city's action plan.

Table 145: Palo Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Purchase weather radios for City Hall and the city's ball diamond	City Clerk	Parks and Recreation Board	High	Low	City
1	Construct a tornado safe room in new public facilities	City Clerk	Public Works, Linn County EMA, IHSEMD	High	High	City, PDM, HMGP
1	Purchase and install backup power generators in critical facilities	City Clerk	Public Works	High	Low – Medium	City, PDM, HMGP
1	Require storm shelters in new manufacturing home developments	City Clerk	City Council	Medium	Low	City
1	Determine potential benefits of petitioning Linn and Benton County to make Dry Creek a designated waterway	City Clerk	Public Works, Linn County Conservation	Low	Low	City
1	Complete water, sewer, and stormwater system improvements	Maintenance Superintendent	IDNR	High	High	City, PDM, HMGP, CDBG, others to be identified
1	Participate in a watershed planning process, if available, and implement the plan	City Clerk	---	High	Low – High	City, PDM, HMGP, others to be identified
1	Acquire, relocate, elevate, and or demolish structures in the floodplain	City Clerk	IHSEMD	High	High	City, PDM, HMGP
1	Recruit volunteers to the Fire Department	Fire Chief	City Clerk	Medium	Low	Fire Department
2	Add hazard related information to the city website	City Clerk	Fire Department, Linn County EMA	Medium	Low	City
2	Participate in the Community Rating System	City Clerk	IDNR	High	Low	City

Prairieburg Action Plan

The Prairieburg planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 146 for the city's action plan.

Table 146: Prairieburg Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Upgrade outdoor warning siren to increase coverage area, include remote activation capability, and backup power source	City Clerk	IHSEMD	High	Medium	City, PDM, HMGP
1	Modify the Fire Station backup power generator to be portable	Fire Chief	Public Works	Medium	Low	City
1	Develop and implement a fire safety campaign	Fire Chief	Linn County EMA	Medium	Low	City
1	Purchase new CPAP devices	Fire Chief	---	Medium	Low	Fire Department
1	Purchase hazardous materials containment boom	Fire Chief	---	Medium	Low	Fire Department
1	Purchase fire swatters	Fire Chief	---	Medium	Low	Fire Department
1	Purchase chainsaw for each fire truck	Fire Chief	---	Medium	Low	Fire Department
1	Purchase a leaf blower	Fire Chief	---	Medium	Low	Fire Department
1	Periodically borrow an electronic speed sign and place on major city routes	City Clerk	Linn County Sheriff's Office	Medium	Low	City
1	Develop an emergency assistance program	City Clerk	Linn County EMA	High	Low	City
1	Develop an emergency operations plan for the city and conduct a practice drill	City Clerk	Fire Department, Linn County EMA	Medium	Low	City

Robins Action Plan

The Robins planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 147 for the city's action plan.

Table 147: Robins Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Purchase and install stationary generators at lift stations and replace obsolete generators	City Clerk	Linn County EMA, IHSEMD	High	Medium	City, PDM, HMGP
1	Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Mayor	Indian Creek Watershed Management Authority	High	Low - High	City, PDM, FMA, HMGP, others to be identified
1	Acquire, relocate, elevate, and or demolish structures in flood hazard areas	City Clerk	IHSEMD, FEMA	High	Medium – High	City, PDM, FMA, HMGP
1	Improve stormwater management system	City Clerk	Indian Creek Watershed Management Authority, consulting engineer	High	Low – High	City, PDM, FMA, HMGP, others to be identified
1	Establish ideal emergency travel routes when major travel routes are blocked	Fire Chief and Police Chief	Linn County EMA, IDOT	High	Low	City
1	Establish property computer network security	City Clerk	IT consultant, Linn County EMA	Medium	Low	City
2	Construct a multi-purpose safe room	City Clerk	IHSEMD, consulting architect	High	High	City, PDM, HMGP
2	Expand warning siren coverage, as development expands	City Clerk	Linn County EMA, IHSEMD	High	Medium	City, PDM, HMGP
3	Purchase brush truck for the Fire Department	Fire Chief	---	Medium	High	City, Assistance to Firefighter Grant, others to be identified

Springville Action Plan

The Springville planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 148 for the city's action plan.

Table 148: Springville Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Purchase and install backup power generator in critical facilities	Public Works Director	IHSEMD	High	Medium	City, PDM, HMGP
1	Assess warning siren coverage and expand or replace existing sirens, if needed	City Clerk	Linn County EMA, IHSEMD	Medium	Medium	City, PDM, HMGP
1	Complete water and sewer infrastructure improvements	Public Works Director	IDNR	High	High	City, CDBG, others to be identified
1	Acquire, relocate, elevate, and/or demolish structures in the floodplain	City Clerk	IHSEMD	High	High	City, PDM, HMGP, FMA
1	Add hazard related information the city's website	City Clerk	Linn County EMA	Medium	Low	City
1	Update the city's all-hazard emergency response plan	City Clerk	Public Works, Linn County EMA	Medium	Low	City

Walker Action Plan

The Walker planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 149 for the city's action plan.

Table 149: Walker Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Purchase weather radios for the City Shop and ball diamond	City Clerk	Public Works	High	Low	City
1	Purchase and install backup power generators in critical facilities	Public Works Technician	IHSEMD	High	Medium	City, PDM, HMGP
1	Construct tornado safe rooms in public facilities and recreation areas	City Clerk	Public Works Technician, IHSEMD	High	High	City, PDM, HMGP
1	Complete water, sewer, and stormwater infrastructure improvements	Public Works Technician	IDNR	High	High	City, CDBG, others to be identified
1	Remove debris from creeks	City Clerk	IDNR	Medium	Low	City, others to be identified
1	Acquire, relocate, elevate, and/or demolish structures in the floodplain	City Clerk	IHSEMD	High	High	City, PDM, HMGP, FMA
1	Identify and implement flood mitigation solutions on Karens Court road	Public Works Technician	Engineering consultant	High	Medium – High	City, PDM, HMGP
1	Construct a tornado safe room in public facilities	City Clerk	Public Works Technician, IHSEMD	High	High	City, PDM, HMGP
1	Improve drainage along transportation infrastructure to prevent frost boils	Public Works Technician	Engineering consultant	High	Medium – High	City, others to be identified
1	Develop plan to deal with an emerald ash borer infestation	Public Works Technician	IDNR, Cedar Rapids/Linn County SWA	Medium	Low	City, others to be identified
1	Add hazard-related information to the city's website	City Clerk	Linn County EMA	Medium	Low	City
3	Add a new well	Public Works Technician	IDNR	Medium	High	City, others to be identified

Center Point – Urbana Community School District Action Plan

The Center Point – Urbana Community School District planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 150 for the district's action plan.

Table 150: Center Point – Urbana Community School District Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Construct a tornado safe room as a multi-purpose addition to district facilities	Superintendent	Linn County EMA, IHSEMD	High	High	District, PDM, HMGP
1	Retrofit facilities for high wind hazard events	Superintendent	IHSEMD	Medium	Medium – High	District, PDM, HMGP
1	Purchase and install generators in critical facilities	Superintendent	IHSEMD	High	Medium – High	District, PDM, HMGP
1	Identify and implement stormwater management solutions on district property	Superintendent	Engineering consultant, IHSEMD	High	Medium – High	District, PDM, HMGP, FMA
2	Add air conditioning to all district facilities	Superintendent	---	High	High	District

College Community School District Action Plan

The College Community School District planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 151 for the district's action plan.

Table 151: College Community School District Action Plan

Priority Level	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Funding Source
1	Purchase and install generators for critical facilities	Superintendent	Director of Building and Grounds, IHSEMD, Linn County EMA	High	High	District, PDM, HMGP
1	Construct a tornado safe room in new district facilities	Superintendent	Director of Building and Grounds, IHSEMD, Linn County EMA	High	High	District, PDM, HMGP
1	Install cameras and intruder locks school facilities	Superintendent	Cedar Rapids Police Department, Linn County EMA	Medium	Medium - High	District, others to be identified

Plan Incorporation

In order for a multi-jurisdictional hazard mitigation plan to be effective and ultimately a worthwhile use of resources in each participating jurisdiction, there must be an established procedure to incorporate into existing mechanisms, monitor, evaluate, and update the plan. As indicated throughout this plan, jurisdictions in Linn County vary in type and size so plan incorporation and maintenance procedures will also vary. For example, larger jurisdictions may establish formal requirements while others may complete a periodic, informal plan review. Overall, local preferences determine plan incorporation and maintenance.

In each jurisdiction, a particular staff member is responsible for remaining aware of the jurisdiction's mitigation strategy and encouraging the completion of mitigation actions. In addition, this staff member will also be responsible for completing a periodic review, formal or informal. If an update for a specific jurisdiction is needed during the five year life of this plan, the staff member will initiate an amendment process with the planning consultant, which is the East Central Iowa Council of Governments.

In addition, the planning consultant will be involved in periodic plan reviews by providing information about funding opportunities and a reminder of the established maintenance procedure. The planning consultant will either attend review meetings, or the jurisdiction will provide relevant information to the planning consultant. As the regional planning agency, the planning consultant works with each participating jurisdiction on a regular basis.

Since the plan is multi-jurisdictional and the county initiated this particular plan, a complete plan update will be initiated by Linn County approximately three years from plan approval. Linn County Planning and Development is responsible for complete plan updates. Future plan updates will likely be funded with Hazard Mitigation Assistance funding and prepared by a planning consultant that coordinates with Linn County. For the plan maintenance procedure in each participating jurisdiction, refer to Table 152.

Evaluation of the plan will occur during the plan update process. Whether or not mitigation actions are completed will determine the overall effectiveness of the plan. The impacts of hazard events during the life of the plan and results of mitigation actions will determine whether or not an effective mitigation strategy was established for each jurisdiction.

Through plan monitoring and review, jurisdictions will continue to seek public input. Each jurisdiction will make the plan available to the public for review at any time. Grant applications or reallocation of funding to complete mitigation actions must be approved by local officials, which will occur at public meetings where the public is able to provide input. In addition, a complete plan update will involve at least one hazard mitigation planning meeting that is open to the public in each participating jurisdiction.

Table 152: Linn County Plan Incorporation Process

Jurisdiction	Staff Member	Incorporation	Monitor and Review	Evaluation and Update
Linn County	Planning and Development Director	Formal adoption and the monitor and review process	August annually	To begin approximately three years after approval
Alburnett	City Clerk	Formal adoption and the monitor and review process	June annually	
Bertram	City Clerk	Formal adoption and the monitor and review process	December annually	
Cedar Rapids	Planning Department Director and Fire Chief	Formal adoption and the monitor and review process	April annually	
Center Point	City Administrator	Formal adoption and the monitor and review process	Ad-hoc annually	
Central City	City Administrator	Formal adoption and the monitor and review process	January annually	
Coggon	City Clerk	Formal adoption and the monitor and review process	Ad-hoc as funding is available	
Ely	City Administrator	Formal adoption and the monitor and review process	November annually	
Fairfax	City Clerk	Formal adoption and the monitor and review process	April annually	
Hiawatha	City Administrator	Formal adoption and the monitor and review process	September annually	
Lisbon	City Administrator	Formal adoption and the monitor and review process	October annually	
Marion	Planning Department Director	Formal adoption and the monitor and review process	February annually	
Mount Vernon	Emergency Management Coordinator	Formal adoption and the monitor and review process	October annually	
Palo	City Clerk	Formal adoption and the monitor and review process	June annually	
Prairieburg	City Clerk	Formal adoption and the monitor and review process	Ad-hoc as funding is available	
Robins	City Clerk	Formal adoption and the monitor and review process	November annually	
Springville	City Clerk	Formal adoption and the monitor and review process	November annually	
Walker	City Clerk	Formal adoption and the monitor and review process	November annually	
Center Point – Urbana CSD	Superintendent	Formal adoption and the monitor and review process	Summer annually	
College CSD	Superintendent	Formal adoption and the monitor and review process	Ad-hoc as funding is available	

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