

2016-2021

Lucas County Multi-Jurisdictional Hazard Mitigation Plan

Unincorporated Lucas County

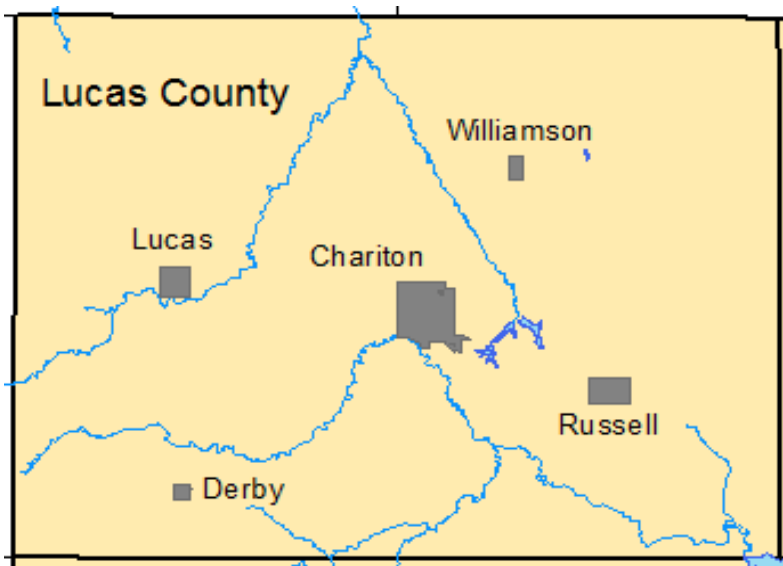
Chariton

Derby

Lucas

Russell

Williamson



FEMA Approved on:

July 8, 2016



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A. Introduction & Planning

This chapter addresses the background and purpose of this plan, who was involved, and how it was developed. Combined, these elements are expected to provide an overview of the decision making process on disaster mitigation issues. This document is officially a Multi-Jurisdictional Hazard Mitigation Plan, but for simplicity, it will be referred to as the Lucas Disaster Mitigation Plan in this document.

1. Adoption

The Lucas County Multi-Jurisdictional Hazard Mitigation Plan was adopted at the federal level on 01/05/2012 and the new plan update was adopted by the following jurisdictions on the dates listed. See *Appendix 1: Resolutions Adopting Lucas Disaster Mitigation Plan*. Adoption is important for the communities to receive the benefits of the plan; if the plan is not adopted by a particular jurisdiction, that jurisdiction is not eligible for certain disaster recovery and disaster prevention programs and funds.

Adoption of plan by respective jurisdictions is pending FEMA and State conditional approval.

Jurisdiction	Adoption date
Unincorporated Lucas County	
Chariton	
Derby	
Lucas	
Russell	
Williamson	

2. Purpose and Participation

The purpose of the Hazard Mitigation Plan is to identify steps to prevent or reduce the impact of disasters on the residents and property in Lucas County. This is accomplished through compliance with the Federal Emergency Management Agency's (FEMA) Mitigation Planning Regulations under Code of Federal Regulations (CFR), Title 44, Part 201 (Standard 44 CFR 201.4, 44CFR 201.5) Administrative Code 29C 605-7.3(4)(d)(1)(2).

The development of the Lucas County Hazard Mitigation Plan is the result of the input from elected officials, emergency management and other governmental personnel, agency representatives, business people, interested citizens, and the State of Iowa Hazard Mitigation Plan.

As the cost of disasters continue to rise, it became evident that more pre-disaster steps are necessary if we expected to reduce the damage that can affect the communities we live in. Hazard mitigation plans are intended to break the cycle of losses from various disasters. ADLM (emergency management service to Appanoose (A), Davis (D), Lucas (L), and Lucas (M) counties) secured grant funds from FEMA for the development of a multi-jurisdictional plan for Lucas County. The county then contracted with Chariton Valley Planning and Development Council of Governments to write and aid in the development of their Hazard Mitigation Plan. This plan identifies all of the natural hazards that affect and risks that pose a threat to the county. A hazard analysis, which is a part of this Plan, provides a better understanding of each hazard, knowledge of the impacts the hazard could have on the county, and a prioritized list of actions for each hazard identified as a possible threat to the county. By assessing the current mitigation actions already in effect, evaluating alternatives, prioritizing and outlining a strategy for implementation the hazard mitigation plan has been developed and written.

Planning Committee Members

The following chart contains the Lucas Hazard Mitigation Planning Committee members. The committee was not established until after the orientation meeting.

<i>Lucas County Hazard Mitigation Planning Committee</i>	
<i>NAME</i>	<i>ORGANIZATION/JURISDICTION</i>
Steve Laing	Lucas County Board of Supervisors
Mike Lamb	ADLM Emergency Management
Mark McCurdy	Lucas County – Disaster Planner/City of Russell
Earl Comstock	GESAC – IA National Guard
Richard Warren	GESAC – IA National Guard
Steve Davis	City of Chariton
Mary Grismore	Lucas Co Public Health
Jayma Davis	Lucas County Health Center
Kathy Egbert	City of Lucas, City Clerk
Nancy Stansberry	City of Williamson, City Council
Chris Chapman	City of Derby, mayor

Participation

Rosters and summaries of each meeting can be found in *Appendix 18: Lucas County Multi-Jurisdictional Hazard Mitigation Plan Summaries* or a specific attendance list is provided in *Appendix 18: Attendance/Participation*. If jurisdictions were met with on an individual basis, name of the person and the date(s) that meetings were held are supplied in the community profile.

It was determined that the most active representation of community members occurs at the Lucas County Local Emergency Planning Committee. The participants provided information to develop this Disaster Mitigation Plan in conjunction with professional services from Chariton Valley Planning and Development Council of Governments. It was acknowledged that participation from rural jurisdictions could occur in the LEPC meetings or at other locations. The meetings are held during the day and not all community representatives can attend the meeting times. It was accepted that CVPD could meet with community members when it was convenient for them. Information regarding the purpose of the Hazard Mitigation Plan would be shared and specific community information would be gathered at that time to be included in the plan.

3. What is a Hazard Mitigation Plan?

Generally the first question asked when communities begin the process of preparing a Hazard Mitigation Plan is very simply “What is a Hazard Mitigation Plan and what is its intended purpose?” First, it is imperative to define what precisely the term mitigation entails. One definition of the term is stated perhaps most effectively by the Federal Emergency Management Agency (FEMA) and is as follows:

“Mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event. Mitigation, also known as prevention (when done before a disaster), encourages long-term reduction of hazard vulnerability. The goal of mitigation is to decrease the need for response as opposed to simply increasing the response capability.” (www.fema.gov).

A mitigation plan is a document that is intended to accomplish several things. First, through the planning process the hazards that pose a risk to the community are identified. Second, an assessment of the hazards is made that takes into account historic occurrence, the number of people impacted, the area of the jurisdictions affected, potential costs that the jurisdictions,

individuals, and organization may incur, the likelihood of future occurrence, and the amount of warning time before an event occurs.

Once the assessment is completed, a list of current and historic mitigation efforts are evaluated. Through this discussion, areas that can be improved upon are identified and developed into “action steps”. Early in the planning process meeting attendees identify broad goals that briefly state what the plan should attempt to accomplish. Every action step should, if implemented, work toward one or more of the goals of the plan. An action step may suggest continuing a current mitigation effort or propose a new project altogether.

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

When implemented appropriately, mitigation projects can save lives, reduce property damage, save public monies, and protect the environment. Mitigation can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities, reduce exposure to liability, and minimize community disruption.

4. The Planning Process

The Lucas County Local Emergency Planning Committee developed this Disaster Mitigation Plan in conjunction with professional services from Chariton Valley Planning and Development Council of Governments.

The committee met 7 times from August 2014 and March 2016. All meetings complied with the Iowa Open Meetings Law; this simply means all sessions are open to the public and appropriate notifications were present. The initial orientation disaster planning meeting took place September 9, 2014 in Chariton. The attendees discussed what a Hazard Mitigation Plan contains, some reasons for having one, the basic process for updating the plan, and some initial brainstorming of information for the plan and people that should be involved. A brief survey was utilized to help spark conversation about the various types of hazards that might impact Lucas County. At the end of the orientation meeting, information was distributed to attendees with the request that they share them with others in their respective communities.

The second open meeting took place on October 21, 2014 the committee reviewed the existing mission statement and goals. Committee members proposed and approved keeping the same as the already approved plan. Members discussed the changes in the hazards in this update and voted to evaluate and assigned a score to all 23 hazards. During the scoring process, members held discussion as to some hazards that have no effect on communities (I.E. river flooding if there were no rivers in the city limits). CVPD guided discussion to determine which could be eliminated for every jurisdiction (See Appendix 18: for meeting minute details).

A regional meeting was held October 29, 2014 for all jurisdictions and residents in Appanoose, Lucas, and Lucas Counties in Iowa. The purpose for this meeting was to education the region on the importance of Hazard Mitigation Planning. Chariton Valley Planning & Development (CVPD) Council of Governments has been contracted by the counties to develop this document. This meeting was an opportunity for CVPD & ADLM Emergency Management to share information about the planning process and for the community representatives to have a chance to express needs/desires of a jurisdiction.

In November, the planning committee reviewed the hazard scoring and rankings by each jurisdiction. The committee approved the rankings as presented. Committee members also spent time reviewing the list of “Critical Facilities” for each jurisdiction

and noted additions/deletions. Each participant was provided with the list of mitigation strategies selected in the approved plan. They were to review and be prepared for discussion of accomplishments, recommended changes, etc. CVPD staff will begin to assemble the draft document by updating statistical information and inputting data from meetings held up to this point. This would take several months and CVPD will soon provide a draft copy of the updated Lucas County Multi-Jurisdictional Hazard Mitigation Plan.

September 22, 2015 the Lucas County LEPC convened to continue progress of the HMP document. CVPD presented individual draft plans for each jurisdiction that will be included as an appendix for the comprehensive plan. The county hopes this strategy will produce a document that is more “user-friendly” for the smaller communities. Committee members worked to create a comprehensive county hazard ranking for the County. The second half of the meeting was spent evaluating mitigation strategies and what is currently available.

The last working session for the Lucas County committee occurred on October 13, 2015. Participating members again reviewed the existing mitigation strategies for each jurisdiction and the mitigations strategies that were previously selected for identified hazards. Recommendations were made to update that generators are now available at the fire department, Public Health, Lucas County Health Center and the Chariton’s sewer system. The City of Chariton also has added two early storm warning sirens to the north and south edges of the city. The mitigation strategies previously chosen in the approved plan were primarily still accurate for all the ranked hazards. Committee members elected to add the strategy to incorporate “Active Shooter” trainings for any public facility interested (especially schools and industries). There were minor terminology changes to three strategies to clarify the intent of the committee.

Chariton Valley Planning & Development presented the draft HMP document to the committee on March 15, 2016. There are a few small items clarified and corrected in the document. The committee approved the re-wording in the Goals & Objectives portion. It will be identified as the community’s priority hazards but not affected the overall ranking of the counties ranked hazards completed by the committee.

A complete draft of the plan will be completed and submitted to committee members. The Lucas County Multi-Jurisdictional Hazard Mitigation Plan will be sent to FEMA and the State for conditional approval prior to being subjected to the adoption process by each incorporated community and the Lucas County Board of Supervisors.

To insure the opportunity for participation public flyers were posted at Chariton Valley Planning & Development in Centerville, Lucas County courthouse, and Lucas County Health Center. A joint informational meeting was held at the central location of ADLM Emergency Management office for residents in Appanoose, Lucas and Lucas Counties because all three are updating plans during this time. Invitations to the orientation meeting were also sent to numerous individuals ranging from elected officials, local businesses, non-profit organizations, neighboring communities (Centerville, Albia, & Moravia) and jurisdictions and educational institution of Chariton Public Schools.

5. Materials Reviewed

In the preparation of the Lucas County Multi-Jurisdictional Hazard Mitigation Plan Update, various materials were reviewed that provided which informed the development of this plan. Important documents among these include the previously approved Lucas County HMP, various FEMA 386 “How to” guidebooks, Iowa’s *Hazard Analysis and Risk Assessment: Local Guide*, and *Iowa Hazard Mitigation Plan: Iowa Comprehensive Emergency Plan September 2013* Other sources of information include: Iowa Department of Natural Resources, Iowa Department of Transportation, the U.S Census Bureau, the Environmental Protection Agency, United States Geological Survey, Federal Emergency Management Agency, ADLM Emergency Management Agency, National Weather Service, National Climatic Data Center (NCDC), Iowa Homeland Security and Emergency Management Division. Wikipedia, Sperling’s Best Places, and community websites were used along with past newspaper clippings for an overview of communities and their histories. These and other materials were consulted and utilized in this plan as well, most of which indicated in the sections where they were used.

6. Evaluation & Monitoring in Future

This plan is, as all plans are, intended to be a living document to be used in decision making and in new projects within the community. This first draft cannot anticipate all things that might happen eventually and so it will be necessary for the plan to be updated periodically. Updates to this plan shall be made no fewer than once every five years as is required by FEMA.

Much of the background data for the jurisdictions in Lucas County is from the 2010 Census. Newer information will be available using the U.S. Census Community Survey data for the next update.

Update and Review Cycle

In the suggested timeline below, the start and end times are given in number of months after the adoption date of this document. Annual reviews should include a narrative covering the tasks listed in Evaluating Mitigation Actions and Goals and any disasters that have occurred in the past year. If no action has progressed or there have been no disasters during this time, the narrative should still describe how the review took place and the fact that there have been no notable events or actions completed. The purpose of this is to maintain a record to aid in future updates and to aid in updating and revising the plan as needed.

Since it may not be reasonable to assume that the planning team will remain the same from year to year, it should consist of at least one city representative (mayor, elected official, or city clerk), at least one emergency responder, at least one representative of the school district, and anyone else that is interested in participating. ADLM Emergency Management, Lucas County coordinator, will be responsible for reconvening the planning team for each required review.

Suggested monitoring timeline;

	Start	End	Action
Annual Review #1	11 months	12 months	Addendum added to Plan
Annual Review #2	23 months	24 months	Addendum added to Plan
Annual Review #3	35 months	36 months	Addendum added to Plan
Annual Review #4	47 months	48 months	Addendum added to Plan
Plan Update	52 months	57 months	Submit updated plan to State and FEMA for approval and Adopt plan as revised (adoption must take place by the end of the 60 th month to remain in compliance)

Plan Monitoring & Evaluation

For updates to this plan, the following tasks will need to be addressed by ADLM Emergency Management, Lucas County coordinator, charged with implementing actions in conjunction with the planning team;

Procedures and Techniques

Task A. Evaluate the effectiveness of the planning process.

1. Reconvene the Planning Team.
2. Review your Planning Process.

Items to Discuss:

- a. Building the Planning Team
- b. Engaging the Public
- c. Data Gathering and Analysis
- d. Coordinating with other Agencies

Task B. Evaluate the effectiveness of your actions.

1. What were the results of the implemented action? Did the results achieve the goals/objectives outlined in the plan? Did the actions have the intended results?
2. Were the actions cost-effective? Did (or would) the project result in the reduction of potential losses?
3. Document actions which were slow to get started or not implemented.

Task C. Determine why the actions worked (or did not work).

1. Lack of available resources
2. The political or popular support for or against the action.
3. The availability of funds
4. The workloads of the responsible parties
5. The actual time necessary to implement the actions.

Task D. Determine if there are Changes to Plan Contents.

1. Have there been any hazard events in the past year (for annual review)? In the past 5 years (for plan updates)?
2. Have there been any changes to maximum threat, vulnerability, or probability of hazards?
3. Have there been significant changes to the demographics of the county or any jurisdiction? Is there new Census information available?
4. Has there been new construction in any jurisdiction or unincorporated area? If so, is it in a potential hazard area?
5. Has there been any change to the number of repetitive loss properties in Lucas County?
6. Have there been any changes to maximum threat, vulnerability, or probability of hazards?
7. Should any hazards be added or removed?
8. Should any new mitigation actions be added?
9. Does any of the Cities or county have any new ordinances or plans? How has the hazard mitigation plan been used to develop new ordinances or plans? How have new ordinances or plans been incorporated into the hazard mitigation plan (if relevant)?

Incorporation into Existing and Future Planning Mechanisms

The hazard mitigation planning team was created to develop the mitigation plan and guide the plan preparer in its writing. The planning team should not formally end with the approval of the plan. The planning team can evolve into one of a watch dog over the practices of land developers and public officials. Members can help remind public officials of that particular year's mitigation strategy and possible funding options and can volunteer in the implementation process for certain actions. The team and local governments may participate in the process and engage regional organizations, state agencies, state universities, schools and church via memorandums of agreement.

Finally, the planning team is partly responsible to ensure that the public officials are incorporating mitigation actions into relevant plans and planning mechanisms, such as zoning, annexation plans, and bonding proposals. Communities should also include mitigation initiatives as regular line items in community capital or operational budgets to ensure ongoing funding for hazard mitigation initiatives. The following matrix shows the types of planning mechanisms available and how the plan should be incorporated into them.

Current Mechanisms	Planning	Jurisdictions Currently in Place	Method of Incorporation	Who Responsible or Lead
Comprehensive Land Use plan		Chariton (old), rural county	Review Each, develop in other jurisdictions	Zoning Commissions & staff, BOS
Capital improvement plan		Chariton	Modernize each, develop plans if they are outdated	City councils
Economic Development plan		Regional plan	Add a mitigation section to annual regional plan	CVPD, city of Chariton, Chariton Economic Dev
Open space/ conservation plan		Rural County	Incorporate mitigation projects affecting open spaces into plans	Conservation board/staff, city parks
Watershed Protection plan		none	Address mitigation actions in watershed areas	Emergency management Coordinator
Zoning Ordinance		Chariton & county	Review zoning code concerning applicable hazards	Zoning commissions & staff, BOS
Building Codes		None	Update building codes for fire & wind standards	City councils, BOS
Tree Maintenance Codes		Chariton, Limited in all areas	Consult with utilities	City of Chariton Utilities Dept, County Maintenance Dept
Soil erosion/ water control ordinance		Limited in all areas	Consult with RRWA	Emergency management coordinator
Solid/hazardous waste regulations		Limited	Review regulations as to what can be landfilled, add hazard maps	Landfill owner, Emergency Management Coordinator
Public Health Regulations		All of county is covered through Public Health Dept	Collaborate with PH agencies to incorporate new protocols	Emergency Management Coordinator, Public Health Board, & staff
Historic District Programs		County	Provide data to assist in protecting properties	Development of groups with state IDED assistance
Long-Range Transportation Plan		Regional plan for entire county	Incorporate hazard maps & transportation improvement ideas	County engineer, CVTPA, IDOT, BOS
Water source plan		All county through inter-government agreement	Include mitigation actions related to relevant hazards	RRWA
Storm water Management program		None	Include mitigation actions related to Flash Flooding	City Councils, Emergency Management Coord,
Housing & Special Needs plan		Chariton	Consider mitigation recommendations in housing plans & funding requests for improvements	City Councils, CVPD, hospitals, Emergency Management Coord
Administrative Operations processes- departments & boards		All jurisdictions	Convene meetings where possible, realignment of tasks, new or improved tasks & processes, & board goals are updated.	Emergency Management Coord, elected officials, clerks & board chairs

At this time, it is not recommended that any jurisdiction adopt a formal policy that requires each jurisdiction to include relevant parts of the plan in each planning mechanism. However, it is strongly recommended that staff and elected/appointed officials become aware of the mitigation strategy's practical applications. An annual review of the local planning mechanisms is warranted, simply to give the local leaders the opportunity to think about how mitigation actions affect the local planning mechanisms and to ensure local plans are current.

Continued Public Involvement

Obtaining public participation for planning can be difficult in both rural areas and in larger urban areas, sometimes there is significant interest, but this is not always the case. Public participation for planning exercises is particularly difficult when the public is not interested in the plan or is not clear on what the plan means to them. An advantage in small communities though,

is the capacity for word-of-mouth and informal discussion, especially with the community’s elected officials. We are hopeful that Lucas County will have a standing mitigation committee (comprised primarily of LEPC members) to answer community questions, reach out to the community, or to review proposed projects. The public shall be presented the opportunity to take part in plan reviews and updates.

The opportunity for the public to take part in updates and reviews of this plan will comply with Iowa’s Open Meeting Law (Iowa Code, Chapter 21). For each plan update (the five year period), the plan will be presented to the public for a 30 day comment and review period prior to being submitted to the State and FEMA. For each annual review, public notices should be announced as all city council meetings are in order to permit members of the public to attend planning team meetings. This document shall be available through City Halls and/or Chamber of Commerce offices to any party who requests to see it where and when practicable. However portions intended for internal use may be withheld for confidentiality purposes (such as where private individual information is disclosed) or where legitimate safety concerns are present (such as the exact location and contents of sensitive facilities, hazardous chemical storage and composition, or mine entrances are identified).

B. Jurisdiction Profiles

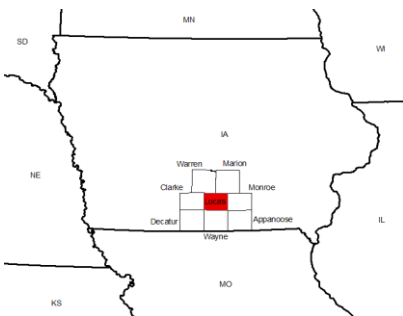
Each community in Lucas County and the County itself will be addressed separately in this section to ensure that the needs of each are adequately covered. The following profiles are divided into official jurisdictions; incorporated communities are lumped into Lucas County as the county is the most direct level of government for them. Some of the Census numbers may not be the same between tables due to statistical and sampling methods used and the originating table from the American Factfinder website.

1. Unincorporated Lucas County

LUCAS COUNTY - UNINCORPORATED

General Information

Population: 3540	Floodplain: Yes
Median Age: 42.3	NFIP Participant: #190195
75 years & Older: 268 7.5%	Historic District: No
5 years & Under: 196 5.5%	Comprehensive Plan: Yes
School buildings: 0	Zoning Ordinance: Yes
Places of Worship: 5	Subdivision Ordinance: Yes
Land Area: 434 sq. miles	Building Permits required: Yes
Most Recent Codification:	

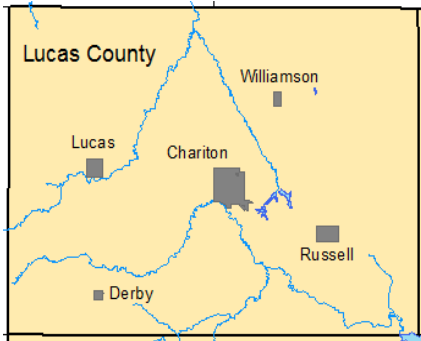


Geography

Lucas County is located in the south-central sector of Iowa at coordinates 41° 1’ 34” N, 93° 19’ 42” W. The counties surrounding Lucas are as follows; Marion, Lucas, Appanoose, Decatur, Clarke, and Warren. Lucas County encompasses an area of 434 square miles with a population density of 21 people per square mile according to the 2010 Census.

Rathbun Lake is located primarily in Appanoose County, but extends into Lucas County covering a total area of 12,040 acres across four counties. Rathbun Lake is the second largest water body in Iowa. Four smaller bodies of water exist within the county. Those include, Lake Morris, Lake Ellis, Red Haw Lake, and Crystal Lake. Eight rivers and creeks cross through Lucas County, the most significant of which is the Chariton River which created Rathbun Lake once dammed in the 1970's. Lucas County's terrain is predominantly undulating topography that characterizes the rolling hills of the Southern Iowa Drift Plain. Lucas County is located in 3 different watersheds, all within the Mississippi Basin. The Lake Red Rock watershed encompasses slightly more of the county than the other two.

Population Data



As of the 2010 Census, the total population of Lucas County was 8,898 with a total of 3,689 households. This is down 524 persons since the 2000 Census count of 9,422 people; According to Iowa State University's Regional Capacity Analysis Program¹ (ReCAP), Lucas County has faced five decades of decline starting in 1920 through 1970. A slight population increase occurred between 1970 and 1980 followed by a 12% population decline in the 1980's. There was a modest growth occurred as captured in the 2000 Census, however, now the new data indicates a significant decrease of 524 in 2010.

The population of the unincorporated county is over half of the total population of the count in 1417 households.

Lucas County at risk groups are identified as young children, the elderly, those with disabilities, and those that are linguistically isolated. As of the 2010 Census, the census estimated that 10.2% people have a primary language that is other than English and would be considered linguistically isolated in Lucas County. There are approximately 196 (5.5% of total population) children under the age of five years. The population over the age of 75 years account for 29% (268 people) in Lucas County.

The remaining "at risk" category would be individuals that have a disability. It is estimated that 1361 residents of Lucas County have a confirmed disability. That accounts for approximately 38.4% of the population.

The combination of all these populations qualifies nearly 38.4% of the total population deemed "at risk".

Table 1: Woods & Poole Population Projection for Lucas County

AREA	2000	2005	2010	2015	2020	2025	2030
LUCAS	9,411	9,627	8,898	9,602	9,660	9,744	9,863
PERCENT CHANGE		2.24%	-0.54%	0.34%	0.60%	0.86%	1.21%

Source: Iowa State Data Center, <http://www.iowadatacenter.org>

In the 2010 Census, median household income for Lucas County was \$44,020, up from \$30,876 in the 2000 Census. Approximately 42% households in unincorporated Lucas County had incomes under \$35,000 annually. In 2010, 17.6% of people in Lucas County were determined to be under the Federal Poverty Guidelines.

Major Employers

Ten major employers are identified in Lucas County by the Location One Information System (LOIS) website.

Astoria Industries Of Ia Inc	Johnson Machine Works
Chariton Public Schools	Midwest Heritage Bank FSB
Chariton Nursing & Rehab Ctr	C & C Cycle
Circle of Life Hospice	Lucas County Health Center
Hy-Vee	Tenco Industries Inc

Structures

Some of the housing stock (13%) in Lucas County was constructed before 1940 suggesting that the structural integrity of the buildings likely does not meet newer building codes designed to ensure the safety of residents. These structures are likely the most vulnerable to various hazards due to their age and the difference in construction techniques which have improved in many ways since they were built. A larger proportion of the older housing stock is found in incorporated communities in Lucas County. Median year built of the homes in Lucas County is 1948, meaning that half of the homes were built before and half after this year.

Another potential concern is the prevalence of bottled fuels such as LP gas, kerosene, and oil used as heating fuel in the homes in Lucas County; 26% of homes use LP gas as heating fuel and approximately 39% have utility gas for a heating source. While LP tanks can be safe forms of fuel containment and transport, liquefied petroleum gas is flammable and can explode. LP gas is heavier than air and so it will sink to the lowest level possible; if inhaled it can cause asphyxiation through oxygen deprivation but is otherwise nontoxic. A further concern is that 270 homes (7.4%) in 2010 reported using wood as the primary heating fuel. This becomes a concern due to its potential fire hazard but also to carbon monoxide poisoning in the home if a chimney is blocked.

About 28% of the owner-occupied homes in unincorporated Lucas County was valued at less than \$50,000 as of the 2010. About 30% of the homes in the unincorporated portion of Lucas County are valued between \$50,000 and \$99,999.

Below are valuations for the unincorporated county from the Lucas County Assessor's office. The number of structures for exempt properties is not readily available and thus is omitted from the chart.

Type of Structure (Occupancy Class)	Number of Structures	Total Valuation	Average Valuation
Residential	1598	\$127,778,883	\$79,962
Commercial	57	\$16,815,709	\$29,501
Industrial	2	\$1,057,800	\$528,900
Agricultural	1070	\$79,256,638	\$74,072
Religious / Non-profit		\$10,000,000.00	
Government		\$5,000,000.00	
Education		\$0.00	
Utilities		\$17,680,081.00	

Community Assets

1. Red Haw Lake

The 649 acre park is filled with hawthorns, oaks, maples, pines, and redbud trees which line the roadways and the shore line. During the summer months visitors can enjoy swimming, camping, fishing and boating. In winter, ice skating, sledding, skiing and snowmobiling. Hiking trails wind through the park and around the sparkling clear 72 acre lake. Red Haw's shady campground overlooks the beautiful lake. There are 80 camping units (58 with electrical hookups), paved roads, modern rest rooms, showers and a trailer dumping station. A playground provides fun for little campers. A boat ramp is conveniently located near the campground.

2. Stephens State Forrest

Stephens State Forest is located in south-central Iowa and is divided into seven units totaling over 15,000 acres. The forest is dispersed over five counties: Lucas, Clarke, Lucas, Appanoose, and Davis. Stephens State Forest is administered by the Iowa DNR - Bureau of Forestry.

A majority of Iowa's largest forest is located in Lucas Co. with over 7,300 acres, providing a forest wilderness experience as well as recreational opportunities. There are 31 miles of equestrian trails, rustic campgrounds, 4 stocked ponds and the entire area is open for public hunting.

3. Lucas, Whitebreast, and Woodburn Units

These units are contiguous and are located southwest of the town of Lucas, Iowa. Most of the recreational development on Stephens State Forest has taken place on these units. Recreational activities include fishing, picnicking, camping, hunting, hiking, equestrian riding, snowmobiling, cross-country skiing, mountain biking, and wildlife watching.



come, first-serve.

The Woodburn Unit has over six miles of backpacking trails and five pack-in (backcountry) campsites. This unit has an all-weather road along its west side and through the middle of the unit. Parking and trail head for the backpack trail system is on 330th Avenue in Clarke County. These sites are primitive; there is no electricity, no modern restroom facilities, and no water available on site. There is a picnic table and fire ring at each campsite. There is no fee for the pack-in sites and they are first-

The Whitebreast Unit has two lakes, three equestrian campgrounds, and one group-camp area. This unit also has 25 miles of multi-use trails that can be utilized for hiking, mountain biking, cross country skiing, and equestrian riding. This unit is served by an all-weather road. The North Pond has recently completed improvements including an access road, parking area, aquatic habitat, and sediment basin. Stocking began in fall of 2011 and will continue through 2012 while the water level returns to normal range.

The Lucas Unit has two small lakes and three campgrounds. There are 10 miles of trails that can be utilized for hiking, snowmobiling, and cross country skiing. This unit is served by an all-weather road.

4. Cedar Creek, Chariton and Thousand Acres Unit

These units do not have any developed recreational facilities such as picnic areas, campgrounds, or designated trails. They are less well served by all-weather roads; however, there are many dirt roads and access lanes. These units are well suited to hunting, hiking, and wildlife watching.

The Cedar Creek Unit is four miles east and one mile south of the town of Williamson. This unit is bisected by an all-weather road.

The Chariton Unit is six miles east of the town of Williamson. An all-weather road runs along its east side.

The Thousand Acres Unit is northeast of and contiguous with the Chariton Unit. The all-weather county line road serves as the boundary between the Thousand Acres Unit and the Chariton Unit and the east side of the Thousand Acres Unit is assessable by graveled roads. (Iowa DNR)

5. Lake Ellis

The Lake Ellis is located in Lucas County in the State of Iowa. The Lake Ellis is located at the latitude and longitude coordinates of 41.0124999 and -93.2593751 at an elevation of 281 feet.

6. Lake Morris

Lake Morris is a reservoir in Lucas County. Lake Morris is located within the Lincoln Township or three miles east of Chariton at latitude 41.0134 and longitude -93.2515. It covers 141 acres and has a maximum depth of 20 feet.

7. Lucas County Fairgrounds

The Lucas County Fairground is located at the edge of Chariton’s city limits. Multiple events are held there throughout the year. The largest event is the County fair when local families exhibit projects. Hundreds of people are on the facility at any given point throughout the week in July. The property also now offers twelve camping slots.

Transportation

One state highway and one U.S. Highway crossing through Lucas County, state highway 34 running east to west and U.S. Highway 65 running north to south. Four distinct county highways are located in the county S23, S45, H32, and S56. Highway 14 is the only state highway in Lucas County. Two railroads cross through the county, one running east-west and one running north-south. A natural gas pipeline connects to Chariton from the north and a branch of the pipeline connects to Williamson mid-way between the two communities. A pedestrian trail, Cinder Path, connects Derby and Chariton and extends south into Wayne County.

Critical Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$16,000,000	
Landfill		X					40acres	\$ 600,000	
Lake Red Haw					X		--	\$ 3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	\$ 6,000,000	
Iowa DOT	Hwy 34				X		4800	\$ 480,000	
ITC Midwest	50415 State Hwy 14, Chariton				X				
South Central Coop	49297 215 th St, Chariton				X				

HyVee Perishable Distribution Center	21591 490 th St, Chariton				X				
---	--	--	--	--	---	--	--	--	--

Hazard Scoring & Ranking

Community representatives were responsible for scoring each hazard based on probability, severity, warning time, and duration of the event. The identified hazards of the plan were included for each jurisdiction to rate. The scoring guidelines were provided by Iowa Homeland Security and was utilized by the committee members. The comprehensive ranking is given in Page 39. Steve Laing, Lucas County Board of Supervisors, completed the comprehensive scoring chart for the county. The numbers were then added to achieve a weighted score that prioritized the hazards. Lucas County’s unincorporated region is most concerned about river flooding, infrastructure failure, hazardous materials, radiological, and extreme heat in their region.

Existing Mitigation Strategy

- Law Center (Chariton) provides service to entire county
- Mobile communication trailer(s) located at Appanoose Law Center available to neighboring counties; needs about 1-2 hours are needed to mobilize
- 28E agreements in place with surrounding jurisdictions for fire protection and hazardous materials containment
- Hydro Clean, based in Des Moines, is the designated hazardous materials clean-up agent; local fire fighters perform containment actions County-wide Emergency Operations Plan (EOP updated in July) is in place and maintained by ADLM Emergency Management; a copy of the plan is present in the Lucas County Supervisors’ office.
- Tree trimming or management is currently handled by utility services provided throughout the county.
- Chariton emergency personnel are certified in waterway rescue.

Priority Mitigation Strategies

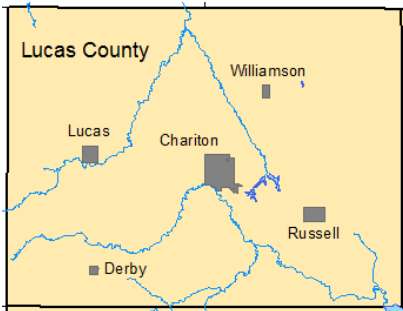
See Appendix 25 for mitigation strategies identified in the previous hazard mitigation plan. This chart will identify the progress made on those strategies. In this updated plan, the county has prioritized the following strategies: Continuity of Operations Plan and Safe Room or shelters at campgrounds.

2. Chariton

CITY OF CHARITON

General Information

Population: 4321	Floodplain: Yes
Median Age: 42.1	NFIP Participant: Yes, #190195
75 years & Older: 13% 568	Historic District: Yes
5 years & older in school: 20.7%	Comprehensive Plan:
School buildings: 9	Zoning Ordinance: Yes
Places of Worship: 13	Subdivision Ordinance: Yes
Land Area: 3.8 Square Miles	Building Permits required: Yes
Most Recent Codification:	Fire Insurance Rating: 6



Geography

The county seat of Chariton is located approximately in the center of the county at coordinates 41° 0' 58" N, 93° 18' 27" W. Chariton encompasses an area of 3.8 square miles with a population density of 1,132 people per square mile according to the 2010 Census.

Population Data

As of the 2010 Census, the total population of Chariton was 4,321 with a total of 2,097 households. Between 2000 and 2010, Chariton lost 270 people and increased 134 households in alignment with the County's loss in both population and households.

Lucas County at risk groups are identified as young children, the elderly, those with disabilities, and those that are linguistically isolated. As of the 2010 Census, the census estimated that 8.9% people have a primary language that is other than English and would be considered linguistically isolated. There are approximately 272 (6.3% of total population) children under the age of five years. The population over the age of 75 years account for 13.2% (568 people) in Chariton.

The remaining "at risk" category would be individuals that have a disability. It is estimated that 746 residents of Chariton have a confirmed disability. That accounts for approximately 17.2% of the population.

The combination of all these populations qualifies nearly 45.6% of the total population deemed "at risk".

In the 2010 Census, median household income for Chariton was \$29,571 up from \$27,844 in the 2000 Census. More than 53% of the households in Chariton had incomes less than \$35,000 in 2010. Approximately 23% of the population of Chariton have incomes below the 2010 Federal Poverty Guidelines.

Major Employers

Ten major employers are identified in Lucas County by the Location One Information System (LOIS) website.

Astoria Industries Of Ia Inc	Johnson Machine Works
Chariton Public Schools	Midwest Heritage Bank FSB
Chariton Nursing & Rehab Ctr	C & C Cycle
Circle of Life Hospice	Lucas County Health Center
Hy-Vee	Tenco Industries Inc

Structures

Nearly half (49%) of residential structures in Chariton were built prior to 1940 though there was a spike in new homes built in the 1970's with nearly 15% of the housing stock built during this decade. Nearly 2% of homes (37 homes) in Chariton are heated with bottled fuels and 18 homes reported were heated by firewood in 2000.

Over 74% of the owner-occupied homes in Chariton were valued at less than \$100,000 and 96% of homes were valued at less than \$200,000.

Below are valuations for the Chariton from the Lucas County Assessor's office. The number of structures for exempt properties is not readily available and thus is omitted from the chart.

Type of Structure (Occupancy Class)	Number of Structures	Total Valuation	Average Valuation
Residential	1597	\$99,523,675	\$62,319
Commercial	217	\$28,798,725	\$132,713
Industrial	9	\$1,475,384	\$163,932
Agricultural	8	\$1,049,936.00	\$131,242.00
Religious / Non-profit	13		
Government	2		
Education	5	\$73,250,000	
Utilities			

Community Assets

Chariton Public Schools

Chariton Public School is located in the county seat of Chariton, which is located approximately in the center of the county at coordinates 41° 0' 58" N, 93° 18' 27" W. The district is approximately 379 square miles. Neighboring school districts for comparison include: Albia, Clarke, Knoxville, Melcher-Dallas, Mormon Trail, Pleasantville, Southeast Warren, Seymour, Twin Cedars and Wayne County Schools.

Student Population: 1,408	Floodplain: No
Elementary Enrollment: 610	OTHER PLANS:
Middle School Enrollment: 272	Safety
High School Enrollment: 422	Evacuation
School buildings: 5	Active Shooter
Number of FT teachers: 106	
Number of Support Staffs: 89	
Number of Administrators: 7	

District Facts:

<i>2015-2016 School Year</i>	<i>Chariton Public School</i>	<i>Neighboring Districts</i>
<i>Enrollment Size</i>	1,408	Median 564
<i>Hispanic/Latino Enrollment</i>	26 1.8%	4.3%
<i>Minority Group Enrollment (any other than white)</i>	28 1.9%	7.1%
<i>Eligible for Free/Reduced Lunch</i>	698 49.6%	45%
<i>Students with Limited English Proficiency</i>	174 12.3%	1.4%
<i>Number of children served with an IEP</i>	152 10.7%	
<i>Total District Population</i>	8,898	--
<i>District Population under age of 5 years</i>	548 6.2%	
<i>District Population under 18 years</i>	2,175 24.4%	24.7%
<i>District Population over 65 years</i>	1,794 20.2%	17.8%

Source: www.Americanfactfinder.gov & Chariton Public Schools

Lucas County identified at risk groups are identified as young children, the elderly, those with disabilities, and those that are linguistically isolated. The combination of all these populations are illustrated above and qualifies nearly 65% of the student population could be deemed “at risk”. Chariton Community Schools offers transportation to enrolled students throughout the district. Twenty-six (26) buses travel throughout the district to transport children to and from school.

Lucas County Health Center

Construction on what would become Lucas County Memorial Hospital began in the fall of 1959. A Grand Opening was held May 1, 1961, to announce the community’s modern medical facility was open for business.

The hospital was so well used by area residents, that a 48-bed addition was constructed in 1969. A two-unit ambulance service was added in 1970. To meet the growing needs of Lucas County residents, a four-bed intensive care unit was equipped in 1971 with the latest technology.

As healthcare needs continued to evolve, the Lucas County Memorial Hospital Board of Directors kept pace. In 1985, Northridge Living Center was developed to meet the growing need for residential facilities for the elderly.

The 1990s brought more changes to the hospital, including a name change. Lucas County Memorial Hospital was renamed Lucas County Health Center. A spacious medical office building was added to the north side of the building, a project that included the construction of an airy atrium entrance to the Health Center.

The LCHC Mammography Center began offering on-site mammography every weekday in 1999. Neal Sokol, D. O., joined the LCHC staff in 1999 as general surgeon before opening his own practice, Surgical Clinic of Southern Iowa, P.C. on Court Avenue in Chariton two years later. Nearly 1,000 surgeries were performed from 1999 to 2000. Procedures performed by Dr. Sokol and other visiting physicians now include general surgeries; ear, nose and throat; oncology; podiatric; orthopedic, cataract removal and many others.

Other LCHC departments include physical, occupational and speech therapies, athletic training services, counseling services, women’s health services, and obstetrics. LCHC also has a comprehensive laboratory and full radiology services with the latest technology offered through CT, and mobile MRI and digital mammography. The Health Center also offers sleep studies, cardiac and pulmonary rehabilitation, infusion therapies, diabetes education, and wound healing treatment.

It could be state that all patients of the Health Care Center are considered vulnerable and at risk due to their physical or mental health state that is requiring additional care. In this situation, all 22 beds would be given as an estimated number to be considered “at risk” for this facility.

Also located on the property of Lucas County Health Center is “Kids' Life Discovery Center”, a childcare service of the Health Center and is licensed to meet the physical and developmental needs of up to 135 children from 5:30 a.m. to 6:30 p.m. Monday through Friday. Trained and educated staff members foster a nurturing environment of acceptance and welcome for all children.

Kids’ Life Discovery Center is an extension of the family unit, serving as a supplement to - not a replacement for - the family. Young children develop optimally through close, affectionate relationships with older people, particularly adults. Each child has a unique rate of development and level of ability, which is expected, valued, and accepted at Kids’ Life Discovery Center.

Lucas County Health Center is one of the major employers in Lucas County. There are approximately 180 employees at the location in Chariton.

Transportation

US Highway 34, running east-west, and State Highway 14, running north-south, cross near the southern boundary of Chariton. Likewise, two railroads cross near the southern border of the city as well. A natural gas pipeline enters Chariton from the north in the northwest corner of the city. There are about 46 miles of roadway within the municipal boundaries of Chariton. The Cinder Path pedestrian trail enters Chariton from the west.

Critical Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	1,500,000	
Lucas County Public Health	117 S Grand St	X	X	X	X				
SENECA Area on Aging	117 S Grand St		X				6067	600,000	
Circle of Friends Home Care	1010 N 7 th St		X				3044	600,000	
Circle of Life Hospice House	220 Northwestern								
Hammer Medical Supply	110 N Grand st			X			7647	1,300,000	
Lucas County Health Center	1200 N 7 th St	X	X				16,657	25,000,000	
Chariton Fire Hall & City Hall	115 S Main St	X		X	X		9796	2,000,000	
Lucas County Courthouse		X			X	X	11868	6,000,000	
Hy-Vee Store	2001 Court Ave			X			22,600	4,000,000	
ShopKo	1900 Court Ave			X			22,500	1,400,000	
Dollar General	1635 N Grand St			X			8405	1,000,000	
Family Dollar	307 N Grand St								
Lucas Co Sherriff's office	22 nd St	X			X		5016	1,200,000	

Farmer's Coop	2120 Osceola Ave			X			7200	5,000,000	
Casey's General Store	1421 Court Ave			X			2376	560,000	
Casey's	335 Main St			X			2400	600,000	
Elliott Oil Comp	Hwy 34& 1 st St			X			5350	600,000	
Casey's General Store	418 S 7 th Street			X			10,320	1,000,000	
South Central Coop	2120 Osceola St					X			
BP	107 Grace St					X			
Southern Iowa Oil, fuel, Propane	2130 Court								
Sewer Lift Stations		X					120	100,000	
Historic Courthouse Square		X	X	X	X	X			
Southgate Apartments	429 S Main St		X						
Autumn Park	330 N Main St		X						
Chariton Airport				X					
Landfill	220 th Ave	X							
Chariton Head Start	418 N Main St		X						
Discovery Preschool Center	1711 Osceola St		X						
HyVee Fuel Station	Osceola St			X					
Community Bldg	Main St	X							
North Ridge Assisted Living	1110 N 6 th St		X						
Chariton Nursing & Rehab Center	1214 N 7 th St		X						
ITC - Midwest	6 th & Roland					X			
Windstream-Iowa Telecom	220 N Grand St					X			
HyVee Grocery Distribution Center	1801 Osceola Ave					X			
HyVee HBC Distribution Center	1800 Osceola Ave					X			
Private In-Home Daycare	511 Orchard Ave		X						
Private In-Home Daycare	26986 550 th St		X						
Private In-Home Daycare	1120 N Grand St		X						
Private In-Home Daycare	720 N 7 th St		X						
Private In-Home Daycare	334 N 7 th St		X						
Private In-Home Daycare	1721 Ilion Ave		X						
Private In-Home Daycare	437 Court Ave		X						
Private In-Home Daycare	806 S 7 th St		X						
Private In-Home Daycare	1430 Franklin Ave		X						
Private In-Home Daycare	311 S 12 th St		X						

School Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value
Chariton High School	501 N Grand St		X	X	X		70,000	27,000,000	
Chariton Middle School	1300 N 16 th St		X	X	X		50,000	20,000,000	
Van Allen Elementary	1129 Ashland St		X	X	X		31,000	15,000,000	
Columbus Elementary	1215 Linden Ave		X	X	X		15,500	11,000,000	
The Other Hand, Alternative Ed	1516 Court Ave		X	X	X		1400	250,000	
Bus Barn									

LUCAS COUNTY HEALTH CENTER FACILITIES

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office. Insured value is according to the hospital's insurance policy.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value	Occupancy or capacity
Lucas County Health Center	1200 N 7 th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed

Hazard Scoring & Ranking

Community representatives were responsible for scoring each hazard based on probability, severity, warning time, and duration of the event. The identified hazards of the plan were included for each jurisdiction to rate. The scoring guidelines were provided by Iowa Homeland Security and was utilized by the committee members. The comprehensive ranking is given in Page 39. Steve Davis, Chariton Fire Department, completed the comprehensive scoring chart for the county. The numbers were then added to achieve a weighted score that prioritized the hazards for the entire county. Chariton is most concerned about Grass or Wild Land Fire, Transportation Incident, Flash Flooding, Windstorms and River Flooding in their region.

Existing Mitigation Strategies

- City now has three storm warning sirens. Two sirens were added to South Gate & North Park.
- 35 firemen linked by fire pagers for effective communication, 20+ hand-held radios, 10+ mobile truck radios.
- Backup generators are currently located at the fire station, public health, Lucas County Health Center, and the City's sewer systems. There are additional (older) generators at the county.
- Mobile communication trailer(s) located at Appanoose County Law Center & is available to neighboring counties; about 1-2 hours are needed to mobilize
- Sand or blade trucks are / can be used to clear paths for first responders in the event of road blockage (debris or heavy snow)
- Designated Red cross shelters established
- 28E agreements in place with surrounding jurisdictions for fire protection and hazardous materials containment.
- Hydro Clean, based in Des Moines, is the designated hazardous materials clean-up agent; local fire fighters perform containment actions.
- County-wide Emergency Operations Plan (EOP) was approved in July 2014 and maintained by ADLM Emergency Management; a copy of the plan is present in the Lucas County Supervisors' office.

- The City participates in the National Flood Insurance Program (NFIP) with a Flood Insurance Rate Map dated 7/1/1987
- Tree trimming or management is currently handled by utility services
- Rescue personnel are trained in emergency water search & rescue
- Multiple street improvements
- Infrastructure improvements including improvements to the sanitary sewer system

Priority Mitigation Strategies

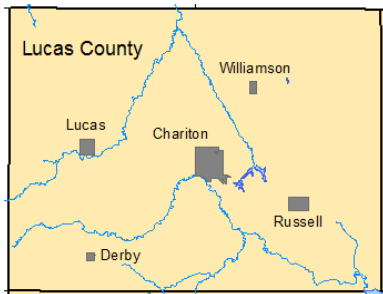
See Appendix 25 for mitigation strategies identified in the previous hazard mitigation plan. This chart will identify the progress made on those strategies. In this updated plan, the community has prioritized the following strategies: Search & Rescue Training and Equipment for First Responders, Safe Room at the school and/or hospital, new storm shelter at Northwest Park and improvements to Storm Water System/Ordinances.

3. Derby

CITY OF DERBY

General Information

Population: 115	Floodplain: No
Median Age: 41.5 yrs	NFIP Participant: N.A.
75 years & Older: 9 ppl 7.8%	Historic District: No
5 years & older in school: 18.3%	Comprehensive Plan: No
School buildings: 0	Zoning Ordinance: No
Places of Worship: 0	Subdivision Ordinance: No
Land Area: 166 acres	Building Permits required: No
Most Recent Codification: Not sure	Fire Insurance Rating: 9



Geography

Derby is the southern-most incorporated community in Lucas County in the south-west portion of the county at coordinates 40° 55' 51" N, 93° 27' 25" W. The city encompasses an area of 166 acres with a population density of 442 people per square mile according to the 2010 Census. Chariton River passes Derby a little over a mile to the north and the source of Five Mile Creek is located about two miles east of Derby.

Population Data

As of the 2010 Census, the total population of Derby was 115 with a total of 47 households. Between 2000 and 2010, Derby lost 17 people and 1 household in accordance with the County’s loss in both population and households.

Lucas County at risk groups are identified as young children, the elderly, those with disabilities, and those that are linguistically isolated. As of the 2010 Census, the census estimated that 2.7% people have a primary language that is other than English and would be considered linguistically isolated. There are approximately 8 (7% of total population) children under the age of five years. The population over the age of 75 years account for 6% (9 people) in Derby.

The remaining “at risk” category would be individuals that have a disability. It is estimated that 27 residents of Derby have a confirmed disability. That accounts for approximately 23.4% of the population.

The combination of all these populations qualifies nearly 39.1% of the total population deemed “at risk”.

In the 2010 Census, median household income for Derby was \$52,639, up from \$26,667 in the 2000 Census. Approximately 36% of the households in Derby had incomes less than \$35,000 in 2010. About 38% of the population of Derby have incomes below the 2010 Federal Poverty Guidelines.

Major Employers

Ten major employers are identified in Lucas County by the Location One Information System (LOIS) website.

Astoria Industries Of Ia Inc	Johnson Machine Works
Chariton Public Schools	Midwest Heritage Bank FSB
Chariton Nursing & Rehab Ctr	C & C Cycle
Circle of Life Hospice	Lucas County Health Center
Hy-Vee	Tenco Industries Inc

Structures

More than half (54.1%) of homes in Derby were built prior to 1940 though there was a spike in new homes built in the 1970’s with about 10% of the housing stock built during this decade. Nearly 71% of homes (47 homes) in Derby are heated with bottled fuels/gas and 29% heat by electricity.

All of the owner-occupied homes in Derby were valued at less than \$150,000 in 2010. Approximately 61.4% of the homes were valued at less than \$50,000 as of the 2010 Census.

Below are valuations for Lucas from the Lucas County Assessor’s office. The number of structures for exempt properties is not readily available and thus is omitted from the chart.

Type of Structure (Occupancy Class)	Number of Structures	Total Valuation	Average Valuation
Residential	52	\$1,251,043	\$24,059
Commercial	7	\$33,725	\$4,818
Industrial	0	\$0	

Transportation

The City of Derby has a small highway that passes through the community. County Highway H50 connects state highway 14 and US highway 65, which are approximately 10 miles apart.

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	
Private In-Home Daycare	554 Prairie Ave		X						

Hazard Scoring & Ranking

Community representatives were responsible for scoring each hazard based on probability, severity, warning time, and duration of the event. The identified hazards of the plan were included for each jurisdiction to rate. The scoring guidelines were provided by Iowa Homeland Security and was utilized by the committee members. The comprehensive ranking is given in Page 39. Chris Chapman, Mayor, completed the comprehensive scoring chart for the city. The numbers were then added to achieve a weighted score that prioritized the hazards. Derby is most concerned about Thunderstorm & Lightning, Tornadoes, Windstorms, Transportation Incident, and Hazardous Materials in their region.

Existing Mitigation Strategies

- Fire department comprised of volunteers
- Mobile communication trailer(s) located at Appanoose County Law Center & is available to neighboring counties; about 1-2 hours are needed to mobilize
- Law Center (in Chariton) has contact information for firefighters
- 28E agreements in place with surrounding jurisdictions for fire protection and hazardous materials containment.
- County-wide Emergency Operations Plan (EOP) was approved in 2014 and maintained by ADLM Emergency Management; a copy of the plan is present in the Lucas County Supervisors' office.

Priority Mitigation Strategies

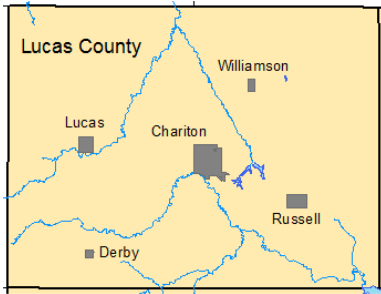
See Appendix 25 for mitigation strategies identified in the previous hazard mitigation plan. This chart will identify the progress made on those strategies. In this updated plan, the community has prioritized the following strategies: Replacement of early storm warning sirens and generators for emergency shelter site.

4. Lucas

CITY OF LUCAS

General Information

Population: 216	Floodplain: Yes
Median Age: 47.6yrs	NFIP Participant: Yes, #190196
75 years & Older: 8.3%	Historic District: No
5 years & older in school: 14.8%	Comprehensive Plan: No
School buildings: 0	Zoning Ordinance: No
Places of Worship: 1	Subdivision Ordinance: No
Land Area: 628 acres	Building Permits required: No
Most Recent Codification: uncertain	Fire Insurance rating:



Geography

Lucas is in the western third of Lucas County at coordinates 41° 1' 47" N, 93° 27' 42" W. The city encompasses an area of 628 acres with a population density of 222.7 people per square mile according to the 2010 Census. White Breast Creek passes just to the south of Lucas.

Population Data

As of the 2010 Census, the total population of Lucas was 216 with a total of 89 households. Between 2000 and 2010, Lucas lost 20 people and lost 4 households in alignment with the County's loss in both population and households.

Lucas County at risk groups are identified as young children, the elderly, those with disabilities, and those that are linguistically isolated. As of the 2010 Census, the census estimated that less than 1% people have a primary language that is other than English and would be considered linguistically isolated. There are approximately 17 (7.9% of total population) children under the age of five years. The population over the age of 75 years account for 8.3% (18 people) in Lucas.

The remaining "at risk" category would be individuals that have a disability. It is estimated that 43 residents of Lucas have a confirmed disability. That accounts for approximately 20% of the population.

The combination of all these populations qualifies nearly 37.2% of the total population deemed "at risk".

In the 2010 Census, median household income for Lucas was \$27,750 and was down from \$31,250 in the 2000 Census. Approximately 74% of the households in Lucas had incomes less than \$50,000 in 2010. Nearly 16% of the population of Lucas have incomes below the 2010 Federal Poverty Guidelines.

Major Employers

Ten major employers are identified in Lucas County by the Location One Information System (LOIS) website.

Astoria Industries Of Ia Inc	Johnson Machine Works
Chariton Public Schools	Midwest Heritage Bank FSB
Chariton Nursing & Rehab Ctr	C & C Cycle
Circle of Life Hospice	Lucas County Health Center
Hy-Vee	Tenco Industries Inc

Structures

The majority (56.5%) of homes in Lucas were built prior to 1940 though there was a spike in new homes built in the 1980's with about 14% of the housing stock built during this decade. Nearly 98% of homes (88 homes) in Lucas are heated with bottled fuels and 12 homes were heated by firewood in 2010.

Over 64% of the owner-occupied homes in Lucas were valued at less than \$50,000; no homes were valued above \$200,000 in the 2010 Census. However, committee members indicate that within the past 5 years, several newer homes have been built on the edge of the community that will exceed the \$150,000 in value.

Below are valuations for Lucas from the Lucas County Assessor's office. The number of structures for exempt properties is not readily available and thus is omitted from the chart.

Type of Structure (Occupancy Class)	Number of Structures	Total Valuation	Average Valuation
Residential	98	\$2,885,880	\$29,448
Commercial	13	\$231,717	\$17,824
Industrial	1	\$183,000	\$183,000
Agricultural	3	\$251,015	\$83,671.67
Religious / Non-profit			
Government			
Education			
Utilities			

Transportation

The City of Lucas has two major highways that are on the edge of the community. US Highway 65 and State Highway 14 are critical roadways providing access to more resources. BNSF and Amtrak railway is on the edge of the community near Highway 14.

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	180,000	
Fire Hall		X					6000	600,000	
Water plant		X							
Water tower		X						1,500,000	
City Maintenance/ Storage					X		1860	200,000	
Lagoon		X					20acres	65,000	
Gas & Go				X					
John L Lewis Mining & Labor Museum	102 Division St					X	3200	650,000	
Lucas Community Center					X		1800	180,000	
Southern Iowa Petroleum, LLC	Hwys 5 & 34			X			2400	540,000	
In-Home Daycare	506 Vine St			X					

Hazard Scores & Ranking

Community representatives were responsible for scoring each hazard based on probability, severity, warning time, and duration of the event. The identified hazards of the plan were included for each jurisdiction to rate. The scoring guidelines were provided by Iowa Homeland Security and was utilized by the committee members. The comprehensive ranking is given on Page 39. Kathy Egbert, City Council, completed the comprehensive scoring chart for the county. The numbers were then added to achieve a weighted score that prioritized the hazards for the entire county. City of Lucas is most concerned about Extreme Heat, Drought, Flash Flooding, Thunderstorm & Lightning, and Tornadoes in their region.

Existing Mitigation Strategies

- Fire Station has a storm warning system activated by members pagers
- Mobile communication trailer(s) located at Appanoose County Law Center & is available to neighboring counties; about 1-2 hours are needed to mobilize
- Red Cross trailer housed at fire station
- Law Center (in Chariton) has contact information for firefighters
- Blade trucks are / can be used to clear paths for first responders in the event of road blockage (debris or heavy snow)
- 28E agreements in place with surrounding jurisdictions for fire protection and hazardous materials containment.
- Hydro Clean, based in Des Moines, is the designated hazardous materials clean-up agent; local fire fighters perform containment actions.
- County-wide Emergency Operations Plan (EOP) was approved in 2014 and maintained by ADLM Emergency Management; a copy of the plan is present in the Lucas County Supervisors' office.
- Tree trimming or management is currently handled to an extent by utility services
- The City participates in the National Flood Insurance Program (NFIP) with a Flood Insurance Rate Map dated 2/16/1988

Priority Mitigation Strategies

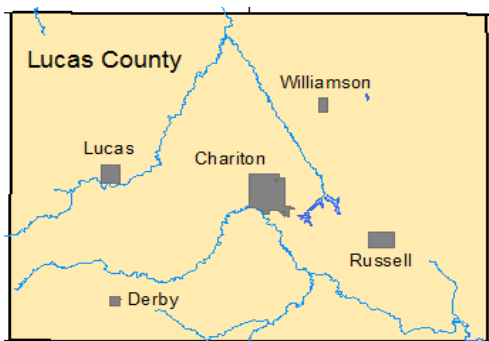
See Appendix 25 for mitigation strategies identified in the previous hazard mitigation plan. This chart will identify the progress made on those strategies. In this updated plan, the community has prioritized the following strategies: Generators for emergency shelter location.

5. Russell

CITY OF RUSSELL

General Information

Population: 554	Floodplain: No
Median Age: 39.4	NFIP Participant: N.A.
75 years & Older: 9.3%	Historic District: No
5 years & older in school: 24.4%	Comprehensive Plan: No
School buildings: 0	Zoning Ordinance: No
Places of Worship: 3	Subdivision Ordinance: No
Land Area: 1.039 sq miles	Building Permits required: No
Most Recent Codification: Unsure	Fire Insurance Rating: 8



Geography

Russell is in the south-east quadrant of Lucas County at coordinates 40° 58' 57" N, 93° 11' 55" W. The city encompasses an area of 1 square mile with a population density of 532.7 people per square mile according to the 2010 Census. No stream or river passes within one mile of Russell.

Population Data

As of the 2010 Census, the total population of Russell was 554 with a total of 212 households. Between 2000 and 2010, Russell lost 26 people and lost 10 households in alignment with the County’s loss in both population and households. This is a gain of about 8% of population and a little more than a 4% loss of households.

Lucas County at risk groups are identified as young children, the elderly, those with disabilities, and those that are linguistically isolated. As of the 2010 Census, the census estimated that 5.4% people have a primary language that is other than English and would be considered linguistically isolated in Russell. There are approximately 42 (7.6% of total population) children under the age of five years. The population over the age of 75 years account for 9.4% (32 people) in Russell.

The remaining “at risk” category would be individuals that have a disability. It is estimated that 75 residents of Russell have a confirmed disability. That accounts for approximately 13.5% of the population.

The combination of all these populations qualifies nearly 35.9% of the total population deemed “at risk”.

In the 2010 Census, median household income for Russell was \$36,042, up from \$28,125 in the 2000 Census. Approximately 61% of the households in Russell had incomes less than \$50,000 in 2010. About 28% of the population of Russell have incomes below the 2010 Federal Poverty Guidelines.

Major Employers

Ten major employers are identified in Lucas County by the Location One Information System (LOIS) website.

Astoria Industries Of Ia Inc	Johnson Machine Works
Chariton Public Schools	Midwest Heritage Bank FSB
Chariton Nursing & Rehab Ctr	C & C Cycle
Circle of Life Hospice	Lucas County Health Center
Hy-Vee	Tenco Industries Inc

Structures

Approximately 40% of homes in Russell were built prior to 1940 though there was a spike in new homes built in the 1970’s with nearly 28% of the housing stock built during this decade. Nearly 59% of homes in Russell are heated with bottled fuels and 9 homes were heated by firewood in 2010.

Over 64% of the owner-occupied homes in Russell were valued at less than \$50,000; no homes were valued above \$200,000 in the 2010 Census.

Below are valuations for Russell from the Lucas County Assessor’s office. The number of structures for exempt properties is not readily available and thus is omitted from the chart.

Type of Structure (Occupancy Class)	Number of Structures	Total Valuation	Average Valuation
Residential	214	\$8,787,186	\$41,062
Commercial	19	\$378,610	\$19,927
Industrial	0	0	
Agricultural	1	\$18,196.00	\$18,196.00
Religious / Non-profit			
Government	1		

Transportation

County Highway S56 travels north and south through the heart of Russell. The city maintains the streets of the community that is approximately ___ city blocks by ___ city blocks. Burlington Northern railroad has a track line that enters the northern half of the city from the east and west.

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	60,000	
Fire Hall		X					1200	120,000	
Community Bldg					X		2800	280,000	
Water plant		X					--		
Water tower		X					--	1,000,000	
City Maintenance/ Storage					X		1860	100,000	
Lagoon		X					20acres	100,000	
Public Library/Russell Historical Society Museum	106 S Prairie St					X	2000	450,000	
D&D Market	114 S Prairie St			X			1859	260,000	

Hazard Scoring & Ranking

Community representatives were responsible for scoring each hazard based on probability, severity, warning time, and duration of the event. The identified hazards of the plan were included for each jurisdiction to rate. The scoring guidelines were provided by Iowa Homeland Security and was utilized by the committee members. The comprehensive ranking is given in Page 39. Mark McCurdy, Russell Fire Department, completed the comprehensive scoring chart for the county. The numbers were then added to achieve a weighted score that prioritized the hazards. Russell is most concerned about a thunderstorm and lightning, transportation incident, tornadoes, windstorms, and river flooding in their region.

Existing Mitigation Strategies

- Fire Station has a storm warning system activated manually
- Mobile communication trailer(s) located at Appanoose County Law Center & is available to neighboring counties; about 1-2 hours are needed to mobilize
- Red Cross shelter established at community center
- Law Center (in Chariton) has contact information for firefighters
- Sand or blade trucks are / can be used to clear paths for first responders in the event of road blockage (debris or heavy snow)
- 28E agreements in place with surrounding jurisdictions for fire protection and hazardous materials containment.
- Has trained volunteers on fire department & first responders.
- Hydro Clean, based in Des Moines, is the designated hazardous materials clean-up agent; local fire fighters perform containment actions
- County-wide Emergency Operations Plan (EOP) is in place and maintained by ADLM Emergency Management; a copy of the plan is present in the Lucas County Supervisors' office.
- Tree trimming or management is currently handled to an extent by utility services

Priority Mitigation Strategies

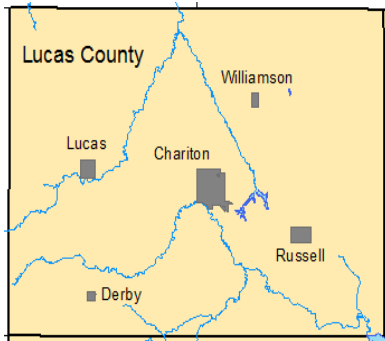
See Appendix 25 for mitigation strategies identified in the previous hazard mitigation plan. This chart will identify the progress made on those strategies. In this updated plan, the community has prioritized the following strategies: Generators for emergency shelter location and replacement of early storm warning sirens.

6. Williamson

CITY OF WILLIAMSON

General Information

Population: 152	Floodplain: No
Median Age: 40.0yrs	NFIP Participant: N.A.
75 years & Older: 11 7.2%	Historic District: No
5 years & older in school: 41 27%	Comprehensive Plan: No
School buildings:	Zoning Ordinance: No
Places of Worship:	Subdivision Ordinance: No
Land Area: .32 sq miles	Building Permits required: No
Most Recent Codification: not sure	Fire Insurance Rating: 9



Geography

Williamson is in the south-east quadrant of Lucas County at coordinates 41° 5' 22" N, 93° 15' 20" W. The city encompasses an area of 1 square mile with a population density of 475 people per square mile according to the 2010 Census. No stream or river passes within one mile of Williamson.

Population Data

As of the 2010 Census, the total population of Williamson was 152 with a total of 63 households. Between 2000 and 2010, Williamson lost 11 people and lost 8 households in alignment with the County's loss in both population and households. This is a loss of about 7% of population and a little more than a 12% loss of households.

Lucas County at risk groups are identified as young children, the elderly, those with disabilities, and those that are linguistically isolated. As of the 2010 Census, the census estimated that 2% people have a primary language that is other than English and would be considered linguistically isolated in Williamson. There are approximately 12 (8.6% of total population) children under the age of five years. The population over the age of 75 years account for 7.2% (11 people) in Williamson.

The remaining "at risk" category would be individuals that have a disability. It is estimated that 11 residents of Williamson have a confirmed disability. That accounts for approximately 45.5% of the population.

The combination of all these populations qualifies nearly 63.3% of the total population deemed "at risk".

In the 2010 Census, median household income for Williamson was \$38,750, up from \$20,000 in the 2000 Census. Approximately 53.8% of the households in Williamson had incomes less than \$50,000 in 2010. About 28% of the population of Williamson have incomes below the 2010 Federal Poverty Guidelines.

Major Employers

Ten major employers are identified in Lucas County by the Location One Information System (LOIS) website.

Astoria Industries Of Ia Inc	Johnson Machine Works
Chariton Public Schools	Midwest Heritage Bank FSB
Chariton Nursing & Rehab Ctr	C & C Cycle
Circle of Life Hospice	Lucas County Health Center
Hy-Vee	Tenco Industries Inc

Structures

Approximately 64.9% of homes in Williamson were built prior to 1940 though there was a spike in new homes built in the 1970's and 1980's with nearly 21% of the housing stock built during this decade. Nearly 20.9% of homes in Williamson are heated with bottled fuels and 14 homes were heated by firewood in 2010.

Over 78.4% of the owner-occupied homes in Williamson were valued at less than \$50,000; no homes were valued above \$200,000 in the 2010 Census.

Below are valuations for Williamson from the Lucas County Assessor's office. The number of structures for exempt properties is not readily available and thus is omitted from the chart.

Type of Structure (Occupancy Class)	Number of Structures	Total Valuation	Average Valuation
Residential	73	\$1,231,664	\$16,872
Commercial	2	\$41,942	\$20,971
Industrial	0	0	
Agricultural			
Religious / Non-profit			
Government			

Transportation

County Highway H20 connects the City of Williamson to state highway 14. The city maintains the streets of the community that includes about twenty city blocks. Union Pacific Railroad has a track line that enters intersects the heart of the city from north to south.

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
Fire station	201 N Main	X		X				\$546,698	\$162,365	
Community Bldg				X						
Water tower	Main St	X								
City Maintenance/ Storage				X	X			\$546,698	\$162,365	
Shelter House		X						\$ 54,121		

Hazard Scoring & Ranking

Community representatives were responsible for scoring each hazard based on probability, severity, warning time, and duration of the event. The identified hazards of the plan were included for each jurisdiction to rate. The scoring guidelines were provided by Iowa Homeland Security and was utilized by the committee members. The comprehensive ranking is given in Page 39 Nancy Stansbery, City Clerk, completed the comprehensive scoring chart for the county. The numbers were then added to achieve a weighted score that prioritized the hazards for the entire county. Williamson is most concerned about Windstorms, Flash Flooding, Extreme Heat, Thunderstorm & Lightning, and Tornadoes in their region.

Existing Mitigation Strategies

- Fire Station has a storm warning system
- Mobile communication trailer(s) located at Appanoose County Law Center & is available to neighboring counties; about 1-2 hours are needed to mobilize
- Law Center (in Chariton) has contact information for firefighters
- Sand or blade trucks are / can be used to clear paths for first responders in the event of road blockage (debris or heavy snow)
- 28E agreements in place with surrounding jurisdictions for fire protection and hazardous materials containment.
- Hydro Clean, based in Des Moines, is the designated hazardous materials clean-up agent; local fire fighters perform containment actions
- County-wide Emergency Operations Plan (EOP) is in place and maintained by ADLM Emergency Management; a copy of the plan is present in the Lucas County Supervisors' office.
- Tree trimming or management is currently handled to an extent by utility services

Priority Mitigation Strategies

See Appendix 25 for mitigation strategies identified in the previous hazard mitigation plan. This chart will identify the progress made on those strategies. In this updated plan, the community has prioritized the following strategies: replacement of early storm warning siren and Search & rescue training and equipment for first responders.

C. Identifying Hazards

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

The hazards addressed in this plan were identified by taking the list of hazards from the Iowa Hazard Mitigation Plan (*Figure 1*) which were evaluated in relation to local conditions. Descriptions of the hazards and preliminary data on the impacts and the vulnerable populations and structures were taken largely from the State Plan supplemented with local knowledge during the meeting where the hazards were selected initially. There were hazards that clearly apply to Lucas County, some that may or may not, and a few that clearly do not apply. The ones that do not apply were removed from the list of hazards that were detailed in the hazard profiles.

Figure 1: Hazards Identified in 2013 Iowa State Plan

Natural Hazards

Flash Flood	Tornadoes
Windstorms	Extreme Heat Hailstorms
Sinkholes	River Flooding
Severe Winter Storms	
Drought	Earthquake
Landslide	Expansive Soils
Thunderstorm & Lightning	Grass/Wild Fire
Dam Failure	Levee Failure

Human Caused / Combination Hazards

Human Disease
Hazardous Materials Transportation Incident
Infrastructure Failure
Terrorism
Radiological
Animal/Plant/Crop Disease

Source: Iowa Hazard Mitigation Plan: Iowa Comprehensive Emergency Plan
September 2013

1. Hazard Definitions

Natural Hazards

Dam Failure – The uncontrolled release of impounded water resulting in downstream flooding, which can affect life and property. There are 3 categories of dams: High Hazard (in an area that would cause serious threat of loss of life or serious damage to properties/businesses), Significant Hazard (damage would be limited to isolated homes, buildings, businesses or moderately traveled roads and no loss of human life), Low Hazard (damage would be limited to loss of dam, loss of livestock, agricultural land, low maintenance roads and loss of life unlikely).

High Risk Dam – 1 Appanoose County, 1 Lucas County

Significant Risk Dam – 3 Appanoose County, 3 Lucas County, 2 Lucas County

Drought – prolonged lack of precipitation that produces severe dry conditions. There are 3 types of drought relevant to this area: Metrological drought (lack of precipitation), hydrological drought (dwindling surface and groundwater supplies) and agricultural drought (lack of soil moisture).

Earthquake – is the rapid shaking of the earth caused by the sudden release of energy from the breaking and shifting of rock beneath the earth’s surface. There are three general classes tectonic, volcanic, and artificially produced.

Expansive Soils – soils and soft rock that tend to swell or shrink excessively due to changes in moisture content.

Extreme Heat – defined as temperatures (including heat index) in excess of 100 degrees Fahrenheit or 3 consecutive days of 90+degrees Fahrenheit. Heat advisories are issued when temperatures reach 105 degrees Fahrenheit and a heat warning is issued when temperatures reach 115 degrees Fahrenheit.

Flash Flooding – an event where water levels rise at an extremely fast rate with little or no warning. Flash Flooding can be the result of intense rainfall in a short time, rapid snowmelt, and release of an ice jam, frozen or saturated soils, or a combination of these conditions.

Grass or Wild land Fire – an uncontrolled fire that threatens life and property in either a rural or wooded area. Grass and wild-land fires can occur when conditions are favorable, such as during periods of drought when natural vegetation would be drier and subject to combustibility.

Hailstorm – created when a severe thunderstorm produces pellets or irregularly shaped balls of ice greater than one inch in diameter, which then fall to the earth with rain.

Landslide – is the downward and outward movement of slope-forming materials reacting to gravity. Masses of rock, soil, and/or debris can break loose and move down a slope.

Levee Failure – the loss of structural integrity of a levee wall, dike, berm, or adjacent soil by erosion, seepage, or soil saturation.

River Flooding – the rising or overflowing of a river, tributary, or body of water to the adjacent lands not usually covered by water. Heavy spring rains, intense thunderstorms, snowmelt, levee or dam failure, or waterway obstructions can cause river flooding. Often flooding is the result of a combination of conditions.

Severe Winter Storm – severe winter conditions that affect day-to-day activities which can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold.

Sinkholes – the loss of surface elevation due to the removal of subsurface support. They can range from broad, regional lowering of the land surface to localized collapse. The primary cause of most subsidence are human activities such as underground mining of coal, groundwater or petroleum withdraw, and drainage of organic soils.

Thunderstorms & Lightning – Thunderstorms usually produce thunder, lightning, and rain but may also develop tornadoes and straight-line winds, micro-bursts, hail, and/or flooding. Lightning is an electrical discharge that results from the buildup of positive and negative charges in a thunderstorm.

Tornado – a violent whirling wind characteristically accompanied by a funnel shaped cloud extending down from a cumulonimbus cloud that progress in a narrow, erratic path. They are known for being extremely destructive and are usually visible due to water vapor from clouds and debris from the ground.

Windstorm – extreme winds associated with severe winter storms, severe thunderstorms, downbursts and very steep pressure gradients. It may or may not be accompanied by rain or snow. It is difficult to separate windstorms and tornado damage when winds get above 64 knots.

Human Caused/Combination Hazards

Human Disease – an incident that is a medical, health or sanitation threat to the general public such as contamination, epidemics, plagues, insect infestations, and pandemics.

Infrastructure Failure – an incident that has extended interruption of critical services, widespread breakdown, or collapse (part or all) of any public or private infrastructure that threatens life and property. This includes communication failure (including 911 & emergency personnel), energy failure (electric, gas or natural gas), structural failure (collapse of any public or private roads, bridges, towers & buildings), and structural fire (uncontrolled fire in populated areas that threaten life & property).

Animal/Crop/Plant Disease – An outbreak of disease that can be transmitted from animal to animal or plant to plant represents an animal/crop/plant disease. The disease outbreak will likely have a significant economic implication or public health impact resulting in potential production loss in crops and/or environmental damage.

Hazardous Materials – this encompasses fixed hazardous materials (accidental release of chemical substance or mixtures that present a danger to public health and safety), pipeline transportation (occurs when a break in a pipeline for risk of explosion or leak), and transportation of hazardous materials. This includes the accidental release of flammable or combustible, explosive, toxic, noxious, corrosive, oxidizable, an irritant or radioactive substances or mixtures that can pose a risk to life, health, or property possibly requiring evacuation.

Transportation Incident – a transportation accident involving any mode of transportation that directly threatens life and which results in property damage and/or death/injury and/or adversely impacts a community’s capabilities to provide emergency services. This includes air transportation, highway transportation, railway transportation, and waterway incident.

Terrorism – 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. This does include enemy attack, biological terrorism, agro-terrorism, chemical terrorism, conventional terrorism, cyber terrorism, radiological terrorism, and public disorder.

Radiological – an incident resulting in a release of radiological material in transport or at a fixed facility to include power plants, hospitals, laboratories, and the like. This does include fixed radiological incidents and transportation radiological incident. (Potential transportation radiological incident is along the BNSF rail line traveling through Lucas and Lucas Counties. This railroad is responsible for shipment of some nuclear waste materials.)

2. State and FEMA Recognized Hazards not detailed

The State of Iowa and FEMA recognize a certain list of hazards that all hazard mitigation plans are to address initially. However, not all hazards impact all areas, this brief section indicates what hazards are not addressed and why. Likewise, not all hazards were determined by the Lucas Planning Committee to be significant enough to include in this plan.

Levees – There are no levees in Lucas County as of the writing of this plan

Fixed Radiological Incident – There are no radiological facilities (power plant, etc.) in Lucas County. Discussion of committee members were concerned about the radiological services located within the Lucas County Medical Center. CVPD later determined that hospitals do not provide enough of a concern to be included into the plan.

3. Fire Insurance Rating

The fire insurance rating is measured on a scale of 1 to 10 with 1 representing exemplary public protection. A rating of 10 indicates that a community's fire suppression program does not meet minimum requirements of ISO. ISO is an organization that provides data, analysis, and decision-making support for various professions about risk.

Community	Fire Dept. (Y/N)	Rating 1 - 10
Lucas County	-	-
Chariton	Y	6
Derby	Y	9

Community	Fire Dept. (Y/N)	Rating 1 - 10
Lucas	Y	9
Russell	Y	8
Williamson	Y	9

4. National Flood Insurance Program (NFIP) Participation

The following table organizes information provided by the Iowa DNR's flood plain coordinator for Lucas County and its communities.

Community	Participates?	NFIP #	Mapped?	Map Date	Repetitive Properties	Loss
	(Y / N)		(Y / N)			
Lucas County	N	-	-	-	-	-
Chariton	Y	190195	Y	02/01/1987	0	
Derby	N	-	-	-	-	-
Lucas	Y	190196	Y	08/16/1988	0	
Russell	N					
Williamson	N	-	-	-	-	-

5. Risk Assessment

The risk assessment identifies how people, properties, and structures will be damaged by the event. If the hazard can harm people or damage their homes and other structures, they are vulnerable. The scoring criteria used was the same hazard scoring Iowa Homeland Security utilized.

PROBABILITY: Reflects the likelihood of the hazard occurring again in the future, considering both the hazard's historical occurrence and the projected likelihood of occurring again in any given year.

1 -Unlikely

Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.

2 -Occasional

Between 10%-20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could "possibly occur".

3 -Likely

Between 20%-33% probability in any given year (up to 1 in 3 chance of occurring) history of events if greater than 20% but less than 33% or the event is "likely to occur".

4 - High Likelihood

More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is "highly likely" to occur.

SEVERITY/MAGNITUDE: Assessment of severity in terms of injuries and fatalities, personal property, and infrastructure and the degree and extent with which the hazard affects the area.

1-Negligible

Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours and/or injuries/illness treatable with first aid.

2-Limited

10%-25% of property severely damaged, shutdown of facilities and services for more than a week, and/or injuries/illness that do not result in permanent disability.

3-Critical

25%-50% of property severely damaged, shutdown of facilities and services for at least 2 weeks, and/or injury/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/ multiple deaths.

WARNING TIME: Rating of the potential amount of warning time that is available before the hazard occurs.

- 1 More than 24 hours warning time
- 2 12-24 hours warning time
- 3 6-12 hours warning time
- 4 Minimal or no warning (Up to 6 hours warning)

DURATION: A measure of the duration of time that the hazard will affect the area.

- 1 Less than 6 hours
- 2 Less than 1 day
- 3 Less than 1 week
- 4 More than 1 week

6. Hazard Prioritization

Once the Lucas County Hazard Mitigation Committee had identified the hazards, they examined each hazard in relation to the risk that hazard presented to each community. A representative from each community assigned a ranking to hazards and then an overall comprehensive ranking was given for the entire region of Lucas County. The comprehensive ranking hazards are listed below:

<i>Comprehensive Ranking</i>	<i>Hazard</i>	<i>Comprehensive score</i>
1	Thunderstorm & Lightning	10.83
2	Transportation Incident (includes Air, Highway, Rail & Waterway Incidents)	10.83
3	Infrastructure Failure (includes Structural Failure, Structural Fire, Energy Failure, & Communication Failure)	10.83
4	Hazardous Materials (includes Fixed Hazardous Materials, Transportation of Hazardous Materials, & Pipeline Incidents)	10.83
5	Windstorm	10.83
6	Terrorism	10.66
7	Tornado	10.5
8	River Flooding	10.5
9	Radiological (includes Fixed Radiological & Transportation of Radiological)	10.5
10	Flash Flooding	10.16
11	Drought	10
12	Severe Winter Storms	9.66
13	Grass or Wild Land Fire	9.5
14	Dam Failure	9
15	Hailstorm	9
16	Sinkholes	8.83
17	Human Disease	8.66
18	Earthquake	8.33
19	Extreme Heat	8.33
20	Expansive Soils	8.33
21	Animal/Plant/ Crop Disease	8.16
22	Landslide	7.8

D. Goals, Objectives & Mitigation Strategies

1. Protect critical facilities, infrastructure, services and other community assets from the impacts of hazards.

Objective 1.1 Seek mitigation projects that provide the highest degree of hazard protection at the least cost.

- Strategy 1.A: Continuity of Operations Plan – Post Disaster
- Strategy 1.B: Public Education & Outreach of Warnings – self protection
- Strategy 1.C: Community Emergency Response Team
- Strategy 1.D: Local Hazardous Materials Capabilities
- Strategy 1.E: Hazardous Materials Protection for Storm Shelters
- Strategy 1.F: Maintain Current Evacuation Plans
- Strategy 1.G: Search & Rescue Training and Equipment for First Responders
- Strategy 1.H: Digging Hotline/Pipeline Safety Regulations
- Strategy 1.I: Temporary Debris Disposal Plan
- Strategy 1.J: Expanded Hazard Area Mapping & Mine Location
- Strategy 1.K: Mass Casualty Preparation
- Strategy 1.L: Replace or Install New Storm Warning System
- Strategy 1.M: Weather Radios for Citizens
- Strategy 1.N: Surge Protection/Lightning Protection
- Strategy 1.O: Burying Power Lines

Strategy 1.P: Participation in Community Rating System for Flooding
Strategy 1.Q: Flood Proofing of Properties
Strategy 1.R: Storm Water Management
Strategy 1.S: Generators for Storm Shelters
Strategy 1.T: New Storm Shelter/ Cooling & Heating Shelter Location
Strategy 1.U: Snow Fences/Barriers – Natural & Artificial
Strategy 1.V: Maintenance of Heating & Cooling Systems
Strategy 1.W: Tree Management/Trimming
Strategy 1.X: Collection & Protection of Vital Records
Strategy 1.Y: Acquisition or Relocation of Buildings in Floodplain
Strategy 1.Z: Hazardous Material Disposal Program
Strategy 1.AA: Safe Room in School, Mobile Home Parks, Campgrounds, Fairgrounds, etc.
Strategy 1.BB: Secure Funding for removal of Vacant/ Collapsed Buildings
Strategy 1.CC: Review Floodplain Management for Effectiveness
Strategy 1.DD: Flood Insurance by Homeowners
Strategy 1.EE: Rehabilitate Older Buildings
Strategy 1.FF: Water Storage Saving Plan – Reduce Usage
Strategy 1.GG: Evaluate/Maintain/Repair Area Dams
Strategy 1.HH: Encourage Smoke/Fire/ Carbon Monoxide Detectors & sprinkler systems
Strategy 1.II: Immunization plans – Emergency & Scheduled
Strategy 1.JJ: Pest Management – through Property Regulations
Strategy 1.KK: Radon/Lead Mitigation
Strategy 1.LL: Critical Infrastructure Protection from Terrorism
Strategy 1.MM: Assessment Risk for Terrorism
Strategy 1.NN: Manufactured Home Tie-Down Regulation/Ordinance
Strategy 1.OO: Building Code Enforcement
Strategy 1.PP: NFIP Participation
Strategy 1.QQ: Establish Burning Restrictions
Strategy 1.RR: Fireplace Maintenance
Strategy 1.SS: Waste Disposal Enforcement
Strategy 1.TT: Hazard Occurrence Data Collection & Reporting System

Objective 1.2 Strengthen partnerships and collaboration of jurisdictions, as well as, invite corporate partners, education systems, agencies and faith based representatives to participate in emergency planning and recovery.

Strategy 1.A: Continuity of Operations Plan – Post Disaster
Strategy 1.B: Public Education & Outreach of Warnings – self protection
Strategy 1.C: Community Emergency Response Team
Strategy 1.D: Hazardous Materials Protection for Storm Shelters
Strategy 1.E: Maintain Current Evacuation Plans
Strategy 1.F: Mass Casualty Preparation
Strategy 1.G: Weather Radios for Citizens
Strategy 1.H: Surge Protection/Lightning Protection
Strategy 1.I: Generators for Storm Shelters
Strategy 1.J: Safe Room in School, Mobile Home Parks, Campgrounds, Fairgrounds, etc.

Objective 1.3 Utilize public funds/grant opportunities to protect critical facilities, public services & transportation entities.

Strategy 1.A: Continuity of Operations Plan – Post Disaster
Strategy 1.B: Local Hazardous Materials Capabilities
Strategy 1.C: Search & Rescue Training and Equipment for First Responders
Strategy 1.D: Replace or Install New Storm Warning System
Strategy 1.E: Weather Radios for Citizens
Strategy 1.F: Surge Protection/Lightning Protection
Strategy 1.G: Burying Power Lines
Strategy 1.H: Storm Water Management
Strategy 1.I: Generators for Storm Shelters
Strategy 1.J: New Storm Shelter/ Cooling & Heating Shelter Location
Strategy 1.K: Snow Fences/Barriers – Natural & Artificial
Strategy 1.L: Acquisition or Relocation of Buildings in Floodplain
Strategy 1.M: Safe Room in School, Mobile Home Parks, Campgrounds, Fairgrounds, etc.
Strategy 1.N: Secure Funding for removal of Vacant/ Collapsed Buildings
Strategy 1.O: Rehabilitate Older Buildings
Strategy 1.P: Evaluate/Maintain/Repair Area Dams
Strategy 1.Q: Encourage Smoke/Fire/ Carbon Monoxide Detectors & sprinkler systems
Strategy 1.R: Radon/Lead Mitigation
Strategy 1.S: Critical Infrastructure Protection from Terrorism

2. Protect the health, safety & quality of life for Lucas County residents by minimizing the vulnerability of people and property in Lucas County

Objective 2.1 Ensure that property owners can maintain & improve their properties.

- Strategy 1.A: Weather Radios for Citizens
- Strategy 1.B: Surge Protection/Lightning Protection
- Strategy 1.C: Flood Proofing of Properties
- Strategy 1.D: Maintenance of Heating & Cooling Systems
- Strategy 1.E: Tree Management/Trimming
- Strategy 1.F: Flood Insurance by Homeowners
- Strategy 1.G: Rehabilitate Older Buildings
- Strategy 1.H: Encourage Smoke/Fire/ Carbon Monoxide Detectors & sprinkler systems
- Strategy 1.I: Pest Management – through Property Regulations
- Strategy 1.J: Radon/Lead Mitigation
- Strategy 1.K: Manufactured Home Tie-Down Regulation/Ordinance
- Strategy 1.L: Building Code Enforcement
- Strategy 1.M: Establish Burning Restrictions
- Strategy 1.N: Fireplace Maintenance
- Strategy 1.O: Waste Disposal Enforcement
- Strategy 1.P: Hazardous Material Disposal Program

Objective 2.2 Ensure that disaster recovery can proceed promptly following a disaster.

- Strategy 1.A: Continuity of Operations Plan – Post Disaster
- Strategy 1.B: Public Education & Outreach of Warnings – self protection
- Strategy 1.C: Community Emergency Response Team
- Strategy 1.D: Local Hazardous Materials Capabilities
- Strategy 1.E: Hazardous Materials Protection for Storm Shelters
- Strategy 1.F: Maintain Current Evacuation Plans
- Strategy 1.G: Search & Rescue Training and Equipment for First Responders
- Strategy 1.H: Mass Casualty Preparation
- Strategy 1.I: Temporary Debris Disposal Plan
- Strategy 1.J: Generators for Storm Shelters
- Strategy 1.K: Collection & Protection of Vital Records
- Strategy 1.L: New Storm Shelter/ Cooling & Heating Shelter Location
- Strategy 1.M: Water Storage Saving Plan – Reduce Usage
- Strategy 1.N: Immunization plans – Emergency & Scheduled
- Strategy 1.O: Waste Disposal Enforcement
- Strategy 1.P: Hazardous Material Disposal Program

Objective 2.3 Provide back-up energy supplies in all vital assets identified in this plan.

- Strategy 1.A: Continuity of Operations Plan – Post Disaster
- Strategy 1.B: Search & Rescue Training and Equipment for First Responders
- Strategy 1.C: Community Emergency Response Team
- Strategy 1.D: Local Hazardous Materials Capabilities
- Strategy 1.E: Surge Protection/Lightning Protection
- Strategy 1.F: Generators for Storm Shelters
- Strategy 1.G: New Storm Shelter/ Cooling & Heating Shelter Location
- Strategy 1.H: Tree Management/Trimming
- Strategy 1.I: Water Storage Saving Plan – Reduce Usage

Objective 2.4 Promote improving zoning codes, building codes, nuisance abatement, and health codes, especially in relation to areas with older buildings.

- Strategy 1.A: Digging Hotline/Pipeline Safety Regulations
- Strategy 1.B: Flood Proofing of Properties
- Strategy 1.C: Storm Water Management
- Strategy 1.D: Tree Management/Trimming
- Strategy 1.E: Acquisition or Relocation of Buildings in Floodplain
- Strategy 1.F: Secure Funding for removal of Vacant/ Collapsed Buildings
- Strategy 1.G: Rehabilitate Older Buildings
- Strategy 1.H: Water Storage Saving Plan – Reduce Usage
- Strategy 1.I: Pest Management – through Property Regulations
- Strategy 1.J: Radon/Lead Mitigation
- Strategy 1.K: Manufactured Home Tie-Down Regulation/Ordinance
- Strategy 1.L: Building Code Enforcement
- Strategy 1.M: Establish Burning Restrictions
- Strategy 1.N: Waste Disposal Enforcement
- Strategy 1.O: Hazardous Material Disposal Program

Objective 2.5 Improve protection of residents & structures from effects of flooding.

- Strategy 1.A: Participation in Community Rating System for Flooding
- Strategy 1.B: Flood Proofing of Properties
- Strategy 1.C: Storm Water Management
- Strategy 1.D: Acquisition or Relocation of Buildings in Floodplain
- Strategy 1.E: Review Floodplain Management for Effectiveness
- Strategy 1.F: Maintain Current Evacuation Plans
- Strategy 1.G: Search & Rescue Training and Equipment for First Responders
- Strategy 1.H: Flood Insurance by Homeowners
- Strategy 1.I: Temporary Debris Disposal Plan
- Strategy 1.J: Evaluate/Maintain/Repair Area Dams
- Strategy 1.K: NFIP Participation
- Strategy 1.L: Weather Radios for Citizens

3. Reduce losses due to natural and man-made hazards

Objective 3.1 Educate members of the county about hazards, how to be prepared, & shelter locations.

- Strategy 1.A: Continuity of Operations Plan – Post Disaster
- Strategy 1.B: Public Education & Outreach of Warnings – self protection
- Strategy 1.C: Community Emergency Response Team
- Strategy 1.D: Search & Rescue Training and Equipment for First Responders
- Strategy 1.E: Hazardous Materials Protection for Storm Shelters
- Strategy 1.F: Digging Hotline/Pipeline Safety Regulations
- Strategy 1.G: Search & Rescue Training and Equipment for First Responders
- Strategy 1.H: Replace or Install New Storm Warning System
- Strategy 1.I: Weather Radios for Citizens
- Strategy 1.J: Surge Protection/Lightning Protection
- Strategy 1.K: Snow Fences/Barriers – Natural & Artificial
- Strategy 1.L: Collection & Protection of Vital Records
- Strategy 1.M: Safe Room in School, Mobile Home Parks, Campgrounds, Fairgrounds, etc.
- Strategy 1.N: Encourage Smoke/Fire/ Carbon Monoxide Detectors & sprinkler systems
- Strategy 1.O: Radon/Lead Mitigation
- Strategy 1.P: Establish Burning Restrictions
- Strategy 1.Q: Hazard Occurrence Data Collection & Reporting System

Objective 3.2 Review & upgrade warning systems and communications for sufficient coverage.

- Strategy 1.A: Continuity of Operations Plan – Post Disaster
- Strategy 1.B: Public Education & Outreach of Warnings – self protection
- Strategy 1.C: Community Emergency Response Team
- Strategy 1.D: Replace or Install New Storm Warning System
- Strategy 1.E: Weather Radios for Citizens

Objective 3.3 Provide certified shelters/safe rooms

- Strategy 1.A: Hazardous Materials Protection for Storm Shelters
- Strategy 1.B: Search & Rescue Training and Equipment for First Responders
- Strategy 1.C: Generators for Storm Shelters
- Strategy 1.D: New Storm Shelter/ Cooling & Heating Shelter Location
- Strategy 1.E: Safe Room in School, Mobile Home Parks, Campgrounds, Fairgrounds, etc.

Objective 3.4 Provide adequate training, equipment and exercises to train responding emergency personnel.

- Strategy 1.A: Continuity of Operations Plan – Post Disaster
- Strategy 1.B: Search & Rescue Training and Equipment for First Responders
- Strategy 1.C: Community Emergency Response Team
- Strategy 1.D: Local Hazardous Materials Capabilities
- Strategy 1.E: Mass Casualty Preparation
- Strategy 1.F: Immunization plans – Emergency & Scheduled
- Strategy 1.G: Critical Infrastructure Protection from Terrorism
- Strategy 1.H: Hazard Occurrence Data Collection & Reporting System

Objective 3.5 Maintain current & create new planning and exercises related to any terrorism event.

- Strategy 1.A: Continuity of Operations Plan – Post Disaster
- Strategy 1.B: Search & Rescue Training and Equipment for First Responders
- Strategy 1.C: Community Emergency Response Team
- Strategy 1.D: Mass Casualty Preparation
- Strategy 1.E: Critical Infrastructure Protection from Terrorism
- Strategy 1.F: Assessment Risk for Terrorism

Objective 3.6 Identify and map the greatest risk potential of hazards in order to determine locations where improvements could be made.

Strategy 1.A: Digging Hotline/Pipeline Safety Regulations
Strategy 1.B: Expanded Hazard Area Mapping & Mine Location
Strategy 1.C: Participation in Community Rating System for Flooding
Strategy 1.D: Acquisition or Relocation of Buildings in Floodplain
Strategy 1.E: Secure Funding for removal of Vacant/ Collapsed Buildings
Strategy 1.F: Review Floodplain Management for Effectiveness
Strategy 1.G: Rehabilitate Older Buildings
Strategy 1.H: Evaluate/Maintain/Repair Area Dams
Strategy 1.I: Pest Management – through Property Regulations

E. Hazard Profiles, Vulnerability, & Mitigation Strategies.

1. Hazard Profile – Thunderstorm & Lightning

THUNDERSTORM: A thunderstorm is formed from a combination of moisture, rapidly rising warm air and a force capable of lifting air such as a warm and cold front, a sea breeze or a mountain. All thunderstorms contain lightning. Thunderstorms may occur singly, in clusters or in lines. Thus, it is possible for several thunderstorms to affect one location in the course of a few hours. Some of the most severe weather occurs when a single thunderstorm affects one location for an extended time.

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

Description

Thunderstorms are common in Iowa and can occur singly, in clusters, or in lines. They are formed from a combination of moisture, rapidly raising warm air, and a lifting mechanism such as clashing warm and cold air masses. Most thunderstorms produce only thunder, lightning, and rain. Severe storms however, can produce tornadoes, high straight-line winds above 58 mph, microburst's, lightning, hailstorms, and flooding. The NWS considers a thunderstorm severe if it produces hail at least 3/4-inch in diameter, wind 58 mph or higher, or tornadoes. High straight-line winds, which can often exceed 60 mph, are common occurrences and are often mistaken for tornadoes. Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt." This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches temperatures approaching 50,000 degrees Fahrenheit in a split second. This rapid heating, expansion, and cooling of air near the lightning bolt creates thunder.

Lightning associated with thunderstorms is itself a major hazard. In the United States, from 75 to 100 Americans are hit and killed each year by lightning. The power of lightning's electrical charge and intense heat can electrocute on contact, split trees, ignite fires and cause electrical failures.

Past Occurrences & Severity

Between 1955 and March of 2010, at least 10,090 severe thunderstorm events have impacted Iowa. Because thunderstorms may occur singly, in clusters, or in lines, it is possible that several thunderstorms may affect an area in the course of a few hours. It is likely that more than 10,090 individual severe storm systems occurred in the state, one system may spawn multiple events.

There have been 13 Presidential Declarations for Major Disaster since 1990 related to severe storms. All of these disasters resulted from severe storm system that produced tornados, river flooding, and/or flash flooding.

November 2005 the Governor signed a Proclamation of Disaster Emergency due to a strong line of thunderstorms that moved across portions of Iowa, these storms spawned high winds, hail and tornadoes, causing injury and a fatality, damages to private and public property including residences, businesses, infrastructure and agriculture. The severe line of storms occurred in mostly 2 counties in Iowa. A similar event occurred in Iowa in July 2009 due to strong thunderstorms across Iowa mainly affecting Black Hawk County and triggering a Presidential Declaration in August of 2009.

Since 1965 there has been 80 Thunderstorm events recorded in Lucas County as documented by NOAA. Since 1965, thunderstorms have caused approximately \$51.355 million in property damage, \$397 thousand in crop damage, 1 death and 11 injuries. The most crop loss was noted in Lucas during September 2001 with a loss of \$10,000 in crops.

Between 1996 and 2007 there has been one recorded Lightning event in Lucas County, which caused \$3,000 in property damage.

In the past five years, there have been eleven Thunderstorm events in Lucas County. The strongest winds in the storms were documented at 61kts on five different occasions. The greatest amount of property damage occurred in Chariton in August 2011 with \$25,000 in reported damage. The following event has taken place as documented by NOAA:

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
RUSSELL	LUCAS CO.	IA	06/01/2010	20:30	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	07/18/2010	03:07	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	06/19/2011	23:45	CST-6	Thunderstorm Wind	54 kts. MG	0	0	5.00K	0.00K
RUSSELL	LUCAS CO.	IA	06/19/2011	23:53	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	06/26/2011	17:04	CST-6	Thunderstorm Wind	57 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	07/23/2011	17:15	CST-6	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
RUSSELL	LUCAS CO.	IA	07/23/2011	17:25	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	50.00K
CHARITON	LUCAS CO.	IA	08/06/2011	22:30	CST-6	Thunderstorm Wind	61 kts. EG	0	0	25.00K	10.00K
WILLIAMSON	LUCAS CO.	IA	08/06/2011	22:50	CST-6	Thunderstorm Wind	52 kts. EG	0	0	2.00K	0.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	04/12/2014	22:00	CST-6	Thunderstorm Wind	52 kts. MG	0	0	0.00K	0.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	06/17/2014	01:15	CST-6	Thunderstorm Wind	57 kts. MG	0	0	25.00K	0.00K
Totals:								0	0	109.00K	60.00K

Between 1996 and 2014 there has been three recorded Lightning event in Lucas County, which caused \$18,000 in property damage. The following chart displays lightning events documented by NOAA in the past five years:

Location	County/Zone	St.	Date	Type	Dth	Inj	PrD	CrD
CHARITON	LUCAS CO.	IA	05/24/2011	Lightning	0	0	15.00K	0.00K
Totals:					0	0	15.00K	0.00K

1. Vulnerable Locations/Buildings

UNINCORPORATED COUNTY AREA – THUNDERSTORM & LIGHTNING

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	1598	100%	\$127,778,883	\$127,778,883	100%	3540	3540	100%
Commercial	57	57	100%	\$16,815,709	\$16,815,709	100%			100%
Industrial	2	2	100%	\$1,057,800	\$1,057,800		-	-	-
Agricultural							-	-	-
Religious / Non-profit	5	5							
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Unincorporated County Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	16,000,000	
Landfill		X					40acres	600,000	
Lake Red Haw					X		--	3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	6000,000	
Iowa DOT	Hwy 34						4800	480,000	

CHARITON – THUNDERSTORM & LIGHTNING

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	1597	100%	\$99,523,675	\$99,523,675	100%	4321	4321	100%
Commercial	217	217	100%	\$28,798,725	\$28,798,725	100%			100%
Industrial	9	9	100%	\$1,475,384	\$1,475,384	100%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	13	100%						
Government	5	5	100%						
Education	9	9	100%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	1,500,000	
Auburn Manor, Inc	815 Auburn St		X				6875	800,000	
SENECA Area on Aging	117 S Grand St		X				6067	600,000	
Circle of Life Hospice	1010 N 7 th St		X				3044	600,000	
Kiddie Kampus	East Court St		X				5200	1,000,000	
Hammer Medical Supply	110 N Grand st			X			7647	1,300,000	
Chariton Fire Hall		X		X	X		9796	2,000,000	
Dept of Correctional Services	115 S Main St			X	X				
Lucas County Courthouse		X			X	X	11868	6,000,000	
Hy-Vee Store	2001 Court Ave			X			22,600	4,000,000	
ShopKo	1900 Court Ave			X			22,500	1,400,000	
Dollar General	307 N Grand St			X			8405	1,000,000	
Lucas Co Sherriff's office		X			X		5016	1,200,000	
Farmer's Coop	2120 Osceola Ave			X			7200	5,000,000	
Casey's General Store	1421 Court Ave			X			2376	560,000	
Kum & Go	335 Main St			X			2400	600,000	
Elliott Oil Comp	Hwy 34& 1 st St			X			5350	600,000	
Casey's General Store	418 S 7 th Street			X			10,320	1,000,000	
Corydon Oil company	8 th & Court			X			3300	750,000	
Kum & Go	1155 N 7 th St			X			1736	450,000	
Sewer Lift Stations		X					120	100,000	
Historic Courthouse Square		X	X	X	X	X			
North Ridge Assisted Living	1110 N 6 th St		X						
Chariton Nursing & Rehab Center	1214 N 7 th St		X						
Private In-Home Daycare	511 Orchard Ave		X						
Private In-Home Daycare	26986 550 th St		X						
Private In-Home Daycare	1120 N Grand St		X						
Private In-Home Daycare	720 N 7 th St		X						
Private In-Home Daycare	334 N 7 th St		X						
Private In-Home Daycare	1721 Ilion Ave		X						
Private In-Home Daycare	437 Court Ave		X						
Private In-Home Daycare	806 S 7 th St		X						
Private In-Home Daycare	1430 Franklin Ave		X						
Private In-Home Daycare	311 S 12 th St		X						

School Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor's

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value
Chariton High School	501 N Grand St		X	X	X		70,000	\$ 27,000,000	
Chariton Middle School	1300 N 16 th St		X	X	X		50,000	\$ 20,000,000	
Van Allen Elementary	1129 Ashland St		X	X	X		31,000	\$ 15,000,000	
Columbus Elementary	1215 Linden Ave		X	X	X		15,500	\$ 11,000,000	
The Other Hand, Alternative Ed	1516 Court Ave		X	X	X		1400	\$ 250,000	
Bus Barn									

LUCAS COUNTY HEALTH CENTER FACILITIES

*Insured value is according to the hospital's insurance policy.

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value	Occupancy or capacity
Lucas County Health Center	1200 N 7th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed

DERBY - THUNDERSTORM & LIGHTNING

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	52	100%	\$1,251,043	\$1,251,043	100%	115	115	100%
Commercial	7	7	100%	\$33,725	\$33,725	100%			100%
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-

Derby Structural Inventory

**Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	180,000	
Sewer Lift Station		X					60	150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	180,000	
Private In-Home Daycare	554 Prairie Ave		X						

LUCAS – THUNDERSTORM & LIGHTNING

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	98	100%	\$2,885,880	\$2,885,880	100%	216	216	100%
Commercial	13	13	100%	\$231,717	\$231,717	100%			
Industrial	1	1	100%	\$183,000	\$183,000	-	-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit			100%						
Government			100%						
Education									
Utilities			-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
Fire Hall		X					6000	\$ 600,000	
Water plant		X							
Water tower		X						\$ 1,500,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
Lagoon		X					20acres	\$ 65,000	
Gas & Go				X					
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	
Southern Iowa Petroleum, LLC	Hwys 5& 34			X			2400	\$ 540,000	
In-Home Private Daycare	506 Vine St			X					

RUSSELL – THUNDERSTORM & LIGHTNING

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	214	100%	\$8,787,186	\$8,787,186	100%	554	554	100%
Commercial	19	19	100%	\$378,610	\$378,610	100%			100%
Industrial	-	-	-	-	-	-	-	-	-
Agricultural			-		\$320,790	-	-	-	-
Religious / Non-profit	3	3	100%						
Government	2	2	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	60,000	
Fire Hall		X					1200	120,000	
Community Bldg					X		2800	280,000	
Water plant		X					--		
Water tower		X					--	1,000,000	
City Maintenance/ Storage					X		1860	100,000	
Lagoon		X					20acres	100,000	
Public Library/Russell Historical Society Museum	106 S Prairie St					X	2000	450,000	
D&D Market	114 S Prairie St			X			1859	260,000	

WILLAMSON – THUNDERSTORM & LIGHTNING

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	73	100%	\$1,231,664	\$1,231,664	100%	152	152	100%
Commercial	2	2	100%	\$41,942	\$41,942	100%			100%
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	2	100%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
Fire Hall								\$ 546,698		
Williamson Community Center										

2. Loss Estimation

Countywide damage was established from the NCDC data base from the past 65 years. Loss factors were developed specific to the attributes of Thunderstorm & Lightning throughout the region. These factors were able to provide an annual damage estimate by dividing the total loss by number of years of data. Per event damage calculated by dividing total loss by number of events. The past 65 years have produced two lightning events with \$18,000 in property damage. This indicates an annual loss estimate of \$277.

The past 65 years have produced 46 Thunderstorm events with \$734,000 in property damage. This indicates an annual loss estimate of \$11,292. During this same period, \$597,000 of crop damage occurred to produce an annual crop loss of \$9,185.

3. Hazard Scoring & Ranking.

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
3	2	4	1	10

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	Iowa experiences between 30 and 50 thunderstorm days per year on average. With Iowa's location in the interior of the U.S., there is a very high likelihood that a few of these summer storms will become severe and cause damage. Because of the humid continental climate that Iowa experiences, ingredients of a severe thunderstorms are usually available (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). The SHMT analysis evaluated the probability that thunderstorms and lightning affect Iowa as highly likely in any given year.	3
<i>MAGNITUDE / SEVERITY</i>	<p>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 roads and power lines. 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 following flooding and flash flooding. 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.</p> <p>Like tornadoes, thunderstorms and lightning can cause death, serious injury, and substantial property damage. 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 also bring large hail that can damage homes and businesses, break glass, destroy vehicles, and cause bodily injury to people, pets, and livestock.</p> <p>Response personnel are exposed to the same risk as the general public when caught in the storm without shelter. Work on ladders and other apparatus during lightning can expose responders to higher risk situations.</p> <p>Continuity of operations would be affected through indirect impacts such as loss of critical services. High winds can damage trees, homes (especially mobile homes), and businesses and can knock vehicles off of the road. Straight-line winds are responsible for most thunderstorm damage.</p> <p>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.</p> <p>Thunderstorms and lightning can damage trees, but this is a naturally occurring hazard and the environment proves to be resilient following these and other natural hazards.</p> <p>Thunderstorms and lightning occur rapidly and do not persist. The aftermath may cause moderate economic impacts, but most will be related to cascading hazards such as flooding.</p> <p>Timely and adequate response will stave off any negative reputation that the</p>	2

	jurisdiction could be exposed to. Clean up procedures should be established including a debris removal and disposal plan	
<i>WARNING TIME</i>	Some thunderstorms can be seen approaching, while others hit without warning. 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 TV and radio stations. Advances in weather prediction and surveillance have increased warning times. The resolutions of radar and Doppler radar have increased the accuracy of storm location and direction. Weather forecasting and severe weather warnings issued by the National Weather Service usually provide residents and visitors alike adequate time to prepare. Isolated problems arise when warnings are ignored.	4
<i>DURATION</i>	The immediate response related to severe thunderstorm and lightning events are more aptly associated with the cascading effects of multiple events occurring over a short amount of time in the case of flash and river flooding, and in particularly severe thunderstorm events in the case of tornadoes. Response to thunderstorm events is relatively minor in scope.	1
	WEIGHTED SCORE	10

4. Mitigation

Generators	
Program/Project Description	Acquisition of mobile and / or fixed generators for use at community buildings used for temporary storm shelters and / or for public facilities
Anticipated Cost	Moderate
Timeline/Schedule	Medium term
Responsible Agency	City Council, critical facility property owners, Board of Directors', or School Board
Mitigation Category	Emergency services, Prevention, Property Protection
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 2.5, 3.1, 3.3, 3.4
Address High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County

New Storm Shelter/ Cooling or Heating Shelter	
Program/Project Description	Construction of comprehensive storm shelter to Tornado Safe Room standards to serve as a temporary shelter for multiple hazards as often a Church, Community Center, Legion Hall, City Hall, and School are currently utilized as needed
Anticipated Cost	Moderate to high – grant dependent
Timeline/Schedule	Long term
Responsible Agency	City Council
Mitigation Category	Structural project
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.3
Address High Risk Hazards?	yes
Jurisdictions	Chariton

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5
Address High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Safe Rooms	
Program/Project Description	Risk to lives can be improved through construction and use of concrete safe rooms in homes and shelter areas of mobile home parks, fairgrounds, shopping malls, & other vulnerable public areas.
Anticipated Cost	Moderate to high – grant dependent
Timeline/Schedule	Long term
Responsible Agency	School Board, Board of Directors
Mitigation Category	Structural project
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 3.1, 3.3
Address High Risk Hazards?	Yes
Jurisdictions	Chariton, Unincorp County

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Storm Warning System	
Description	Acquisition and installation of community early warning system to compliment system at fire station
Estimated Cost	Moderate to high
Timeline/Schedule	Long Term
Responsible Entity	City Council
Mitigation Category	Structural Project
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 3.2
Addresses High Risk Hazards?	Yes
Jurisdictions	Derby, Lucas, Russell, Williamson

Weather Radios	
Description	Encouragement of residents and businesses to obtain NOAA weather radios
Estimated Cost	Voluntary program; approximately \$30 per radio
Timeline/Schedule	Short Term
Responsible Entity	City Council and city residents
Mitigation Category	Prevention and Public Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.2, 3.3, 3.4
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Surge Protection / Lightning Protection	
Description	Encourage property owners to use surge protectors to protect computers and other sensitive electrical appliances from lightning strikes and power surges; purchase, use, and maintenance of surge protectors for City facilities as needed
Estimated Cost	Minimal , Voluntary
Timeline/Schedule	Ongoing / Short Term
Responsible Entity	City Maintenance dept, private home owners
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Burying Power Lines	
Description	Encourage burying of power lines to new construction and upon significant maintenance or upgrades of existing power supply
Estimated Cost	Minimal (for City), Moderate to High (for power companies)
Timeline/Schedule	Long Term
Responsible Entity	City Council, Power Companies,
Mitigation Category	Property Protection, Structural Projects
Related Goals/Objectives	1.1, 1.3, 2.3
Addresses High Risk Hazards?	Yes
Jurisdictions	Unincorp County

Temporary Debris Disposal Plan	
Description	Develop policy for temporary debris disposal for city and private property owners for post-disaster clean-up
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Councils,
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1, 3.6
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Safe Rooms	
DESCRIPTION	Risk to lives can be improved through construction and use of concrete safe rooms in homes and shelter areas of mobile home parks, fairgrounds, shopping malls, & other vulnerable public areas.
ESTIMATED COST	Moderate to high – grant dependent
TIMELINE/SCHEDULE	Long term
RESPONSIBLE ENTITY	Albia Community School Board, Lucas BOS
MITIGATION CATEGORY	Structural project
RELATED GOALS/OBJECTIVES	1.1, 1.2, 1.3, 2.2, 3.1, 3.3
ADDRESSES HIGH RISK HAZARD?	
JURISDICTIONS	Albia Community School, Unincorporated County

2. Hazard Profile – Transportation Incident

This hazard encompasses the following consolidated hazards from the 2007 mitigation plan: air transportation, highway transportation, railway transportation, and waterway incident. This includes a transportation accident involving any mode of transportation that directly threatens life and which results in property damage and/or death(s)/injury(s) and/or adversely impacts a community's capabilities to provide emergency services.

Description

AIR TRANSPORTATION INCIDENT- an air transportation incident may involve a military, commercial, or private aircraft. Air transportation is playing a more prominent role in transportation as a whole; airplanes, helicopters, and other modes of air transportation are used to transport passengers for business and recreation as well as thousands of tons of cargo. A variety of circumstances can result in an air transportation incident; mechanical failure, pilot error, enemy attack, terrorism, weather conditions, and on-board fire can all lead to an incident at or near the airport. Air transportation incidents can occur in remote unpopulated areas, residential areas, or downtown business districts. Incidents involving military, commercial, or private aircraft can also occur while the aircraft is on the ground.

HIGHWAY TRANSPORTATION INCIDENT – can be a single or multi-vehicle incident that requires responses exceeding normal day-to-day capabilities. An extensive surface transportation network exists in Iowa; local residents, travelers, business, and industry rely on this network on a daily basis. Hundreds of thousands of trips a day are made on the streets, roads, highways, and interstates in the state. If the designated capacity of the roadway is exceeded, the potential for a major highway incident increases. Weather conditions play a major factor in the ability of traffic to flow safely in and through the state as does the time of day (rush hour) and day of the week. Incidents involving buses and other high-occupancy vehicles could trigger a response that exceeds the normal day-to-day capabilities of response agencies.

RAILWAY TRANSPORTATION INCIDENT - is a train accident that directly threatens life and/or property, or adversely impacts a community's capabilities ability to provide emergency services. Railway incidents may include derailments, collisions, and highway/rail crossing accidents. Train incidents can result from a variety of causes; human error, mechanical failure, faulty signals, and/or problems with the track. Results of an incident can range from minor "track hops" to catastrophic hazardous materials incidents and even human/animal casualties. With the many miles of track in Iowa, vehicles must cross the railroad tracks at numerous at-grade crossings.

WATERWAY INCIDENT - a waterway incident is an accident involving any water vessel that threatens life and/or adversely affects a community's capability to provide emergency services. Waterway incidents will primarily involve pleasure craft on rivers and lakes. In the event of an incident involving a water vessel, the greatest threat would be drowning, fuel spillage, and/or property damage. Water rescue events would largely be handled by first responding agencies. Waterway incidents may also include events in which a person, persons or object falls through the ice on partially frozen bodies of water.

Past Occurrences & Severity

AIR TRANSPORTATION - Since 1960, there have been 1,999 air transportation incidents/accidents in Iowa (Iowa National Transportation Safety Board). Of these incidents, 237 were fatal to at least one person, totaling 530 fatalities. This figure does include the 111 fatalities in the crash of United Flight 232 in Sioux City, Iowa in 1989. According to the National Transportation Safety Board (NTSB), there have been no aviation accidents or incidents in Lucas County in the last ten years. Only a few major accidents have impacted Iowa since 1935 but numerous less severe accidents have occurred around the state in both large and small cities.

HIGHWAY TRANSPORTATION INCIDENT- Numerous major and minor traffic accidents occur daily in Iowa and result in property damage and injury, major accidents involving multiple vehicles and serious injury are not uncommon. According to the Iowa Department of Motor Vehicles, in the 77-year-period that Iowa has tracked crash statistics from 1932-2008, there were 4,295,017 traffic accidents resulting in 1,856,643 injuries and 44,036 deaths. As the volume of traffic on Iowa streets, highways, and interstates increase, the number of traffic accidents will increase. The combination of large number of people on the road, unpredictable weather conditions, potential mechanical problems, and human error create the potential for transportation accidents. The Department of Transportation does not make accident data available for cities under 5,000 residents online so obtaining an accurate number of traffic accidents is difficult for some communities.

About 56% of traffic accidents in Lucas County are serious defined as involving a fatality or a major injury.

Highway/Roadway Incidents (2007-2011)			
Name	Total	Fatal	Major Injury
County total	751	10	28

RAIL TRANSPORTATION - From 1975 to April 2010, there have been 7,087 documented rail incidents in Iowa. These incidents range from minor “rail jumps” to passenger train derailments. With reported data from 1995 to April 2010 there have been 2,203 injuries and 161 deaths related to these incidents. According to the National Transportation Safety Board, there have been eight railway accidents in Iowa since 1967. On October 12, 1987 an Amtrack passenger train derailed in Russell, Iowa. The train was operating eastbound and inadvertently took a sub-track and struck a piece of maintenance-of-way work equipment at the rate of 60mph. Fifteen crew members and 107 of the 203 passengers were injured in the incident. Two locomotive units and 11 of the 14 passenger cars were derailed, as well as the maintenance crane and 3 flat cars. A track laborer later acknowledged that he failed to return the west stub track switch back to its normal/correct position after placing the maintenance equipment on the alternate rail system. The Burlington Northern Santa Fe Rail line experienced flooding damage in the wide-spread Iowa flooding of 2008. Near the east edge of Lucas, rail cars were overturned and several yards of the line had to be repaired.

WATERWAY INCIDENT - There have been no disasters causing waterway incidents in Iowa. There have been numerous search and rescue events involving a single person or small boats with only a few people on board. Small-scale incidents on the state’s lakes and rivers have resulted in the loss of life from commercial purposes in Iowa are the Mississippi and Missouri Rivers.

Vulnerable Locations/Buildings

AIR TRANSPORTATION INCIDENT- Maximum population and building exposure to an Air Transportation Incident. The Chariton Municipal Airport is located in the unincorporated county area west of Chariton. A heliport is located at the Lucas County Hospital on the north side of Chariton. It is described as a “Basic Service Airport” by the National Plan of Integrated Airport System (NPIAS).

UNINCORPORATED COUNTY AREA – AIR TRANSPORTATION INCIDENT

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	16	1%	\$127,778,883	\$1,277,788	1%	3540	177	5%
Commercial	57	1	1%	\$16,815,709	\$168,157	1%			
Industrial	2	0	0%	\$1,057,800	0	0%	-	-	-
Agricultural			15%				-	-	-
Religious / Non-profit									

Critical Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	16,000,000	
Landfill		X					40acres	600,000	
Lake Red Haw					X		--	3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	6000,000	
Iowa DOT	Hwy 34						4800	480,000	

CHARITON – AIR TRANSPORTATION INCIDENT

Lucas County Hospital offers helipad service that could place a small surrounding area of homes a few businesses at risk of a potential incident. Chariton Municipal Airport lies just west of the city limits in the unincorporated region of Lucas County.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	16	1%	\$99,523,675	\$995,237	1%	4321	43	1%
Commercial	217	2	1%	\$28,798,725	\$287,987	1%			
Industrial	9	1	1%	\$1,475,384	\$14,7534	1%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	1	1%						
Government	5	0	0%	\$ 64,450,000					
Education	9	0	0%	\$ 73,250,000					
Utilities	-	-	-	-	-	-	-	-	-

Chariton Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000	
Auburn Manor, Inc	815 Auburn St		X				6875	\$ 800,000	
SENECA Area on Aging	117 S Grand St		X				6067	\$ 600,000	
Circle of Life Hospice	1010 N 7 th St		X				3044	\$ 600,000	
Kiddie Kampus	East Court St		X				5200	\$ 1,000,000	
Hammer Medical Supply	110 N Grand st			X			7647	\$ 1,300,000	
Chariton Fire Hall		X		X	X		9796	\$ 2,000,000	
Dept of Correctional Services	115 S Main St			X	X				

Lucas County Courthouse		X			X	X	11868	\$ 6,000,000	
Hy-Vee Store	2001 Court Ave			X			22,600	\$ 4,000,000	
ShopKo	1900 Court Ave			X			22,500	\$ 1,400,000	
Dollar General	307 N Grand St			X			8405	\$ 1,000,000	
Lucas Co Sherriff's office		X			X		5016	\$ 1,200,000	
Farmer's Coop	2120 Osceola Ave			X			7200	\$ 5,000,000	
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000	
Kum & Go	335 Main St			X			2400	\$ 600,000	
Elliott Oil Comp	Hwy 34 & 1st St			X			5350	\$ 600,000	
Casey's General Store	418 S 7th Street			X			10,320	\$ 1,000,000	
Corydon Oil company	8th & Court			X			3300	\$ 750,000	
Kum & Go	1155 N 7th St			X			1736	\$ 450,000	
Sewer Lift Stations		X					120	\$ 100,000	
Historic Courthouse Square		X	X	X	X	X			
North Ridge Assisted Living	1110 N 6th St		X						
Chariton Nursing & Rehab Center	1214 N 7th St		X						
Private In-Home Daycare	511 Orchard Ave		X						
Private In-Home Daycare	26986 550th St		X						
Private In-Home Daycare	1120 N Grand St		X						
Private In-Home Daycare	720 N 7th St		X						
Private In-Home Daycare	334 N 7th St		X						
Private In-Home Daycare	1721 Ilion Ave		X						
Private In-Home Daycare	437 Court Ave		X						
Private In-Home Daycare	806 S 7th St		X						
Private In-Home Daycare	1430 Franklin Ave		X						
Private In-Home Daycare	311 S 12th St		X						

School Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value
Chariton High School	501 N Grand St		X	X	X		70,000	\$ 27,000,000	
Chariton Middle School	1300 N 16 th St		X	X	X		50,000	\$ 20,000,000	
Van Allen Elementary	1129 Ashland St		X	X	X		31,000	\$ 15,000,000	
Columbus Elementary	1215 Linden Ave		X	X	X		15,500	\$ 11,000,000	
The Other Hand, Alternative Ed	1516 Court Ave		X	X	X		1400	\$ 250,000	
Bus Barn									

LUCAS COUNTY HEALTH CENTER FACILITIES Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value	Occupancy or capacity
Lucas County Health Center	1200 N 7th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed

DERBY – AIR TRANSPORTATION INCIDENT

The nearest local airport is located in Chariton, Iowa approximately 14 miles northeast of Derby. This distance doesn't place any portion of the community at a greater risk than another.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	1	1%	\$1,251,043	\$12,510	1%	115	1	1%
Commercial	7	1	1%	\$33,725	\$337	1%	-	-	-
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-

Derby Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	
Private In-Home Daycare	554 Prairie Ave		X						

LUCAS – AIR TRANSPORTATION INCIDENT

The City of Lucas is positioned 8 miles west of Chariton airport and 16 miles east of Osceola local airport. The distance places the entire community at an equal risk for an event.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	1	1%	\$2,885,880	\$28,859	1%	216	2	1%
Commercial	13	1	1%	\$231,717	\$2,317	1%			
Industrial	1	0	1%	\$183,000	\$1,830	-	-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit	1	1							
Government									
Education									
Utilities			-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
Fire Hall		X					6000	\$ 600,000	
Water plant		X							
Water tower		X						\$ 1,500,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
Lagoon		X					20acres	\$ 65,000	
Gas & Go				X					
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	
Southern Iowa Petroleum, LLC	Hwys 5 & 34			X			2400	\$ 540,000	
In-Home Private Daycare	506 Vine St			X					

RUSSELL – AIR TRANSPORTATION INCIDENT

The City of Russell is approximately 11 miles southeast of Chariton airport and the hospital heli-pad. It is unlikely that an air transportation incident would occur in Russell, but the entire community would be at equal risk since there is not an air facility nearby but rather an event of an aircraft flying over.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	2	1%	\$8,787,186	\$87,872	1%	554	277	1%
Commercial	19	1	1%	\$378,610	\$3,786	1%			
Industrial	-		-			-	-	-	-
Agricultural	-		-	-		-	-	-	-
Religious / Non-profit	3	1	1%						
Government	2	1	1%						

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	60,000	
Fire Hall		X					1200	120,000	
Community Bldg					X		2800	280,000	
Water plant		X					--		
Water tower		X					--	1,000,000	
City Maintenance/ Storage					X		1860	100,000	
Lagoon		X					20acres	100,000	
Public Library/Russell Historical Society Museum	106 S Prairie St					X	2000	450,000	

WILLAMSON – AIR TRANSPORTATION INCIDENT

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	1	1%	\$1,231,664	\$12,317	1%	152	2	1%
Commercial	2	0	1%	\$41,942	\$419	1%			
Industrial	-			-	-	-	-	-	-
Agricultural	-			-			-	-	-
Religious / Non-profit	2								
Government	1								
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall									
Sewer Lift Station									
Williamson Community Center									

UNINCORPORATED COUNTY AREA – HIGHWAY TRANSPORTATION INCIDENT

The chart displays the number of structures that are located within 50 yards of a highway and could potentially be affected by a Highway Transportation Incident. Given the reliance on private vehicles and trucking in rural Iowa, the probability of an accident on any given roadway is relatively high. The county has three state highways that are identified in the county. Highway 14 transports traffic north and south across the county, as well as highway 65 operating 9 miles west of highway 14 in Lucas County. Highway 34 extends east and west through Lucas County and passes through Chariton on the very south edge of Chariton's city limits as a 4 lane highway for approximately 3 miles. It also extends to bypass the city of Lucas. Highway 14 passes through the heart of Chariton's residential area and near Williamson on the north edge of the county. More than 20% of the serious accidents in Lucas County have occurred at intersections between 2004 and 2008. During that time, 27% of the accidents had be speed related. Figure 2.

Transportation north to south through the county. Highway 65 extends 47 miles and passes near the communities of Lucas and Derby but doesn't enter either city limit. State highway 14 is approximately 40 miles in length from the south edge of the county, through the City of Chariton, and near the city of Williamson. Iowa State Highway 34 passes through the county from west boarder to east county line border. Highway 34 passes near Russell and Lucas but does enter the city limits of Chariton on its 46 miles of transportation. This creates multiple major intersections throughout the county and particular areas of concern are where the state highways intersect. However, it is acknowledged that there are many gravel road intersections that an incident could potentially occur.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	320	20%	\$127,778,883	\$25,555,777	20%	3540	708	20%
Commercial	57	11	20%	\$16,815,709	3,363,142	20%			
Industrial	2	0	1%	\$1,057,800	\$10,578	1%	-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Unincorporated Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$ 16,000,000	
Landfill		X					40acres	\$ 600,000	
Lake Red Haw					X		--	\$ 3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	\$ 6,000,000	
Iowa DOT	Hwy 34						4800	\$ 480,000	

CHARITON – HIGHWAY TRANSPORTATION INCIDENT

The table below that depicts the maximum threat to the population and building exposures. Iowa State Highway 14 and US Highway 34 offers an increased potential for a Transportation of Hazardous Materials incident. As well as, semis frequently transport along this roadway in addition to local farmers that commonly transport Anhydrous Ammonia tanks. State Highway 14 extends the entire length of the city from north to south for 3 miles. This highway is also the only access route to the local hospital and multiple gas stations. State Highway 34 dusts the southern edge of Chariton's city limits. There are multiple exit/entrance ramps from the 4 lane highway that increase the potential for accidents.

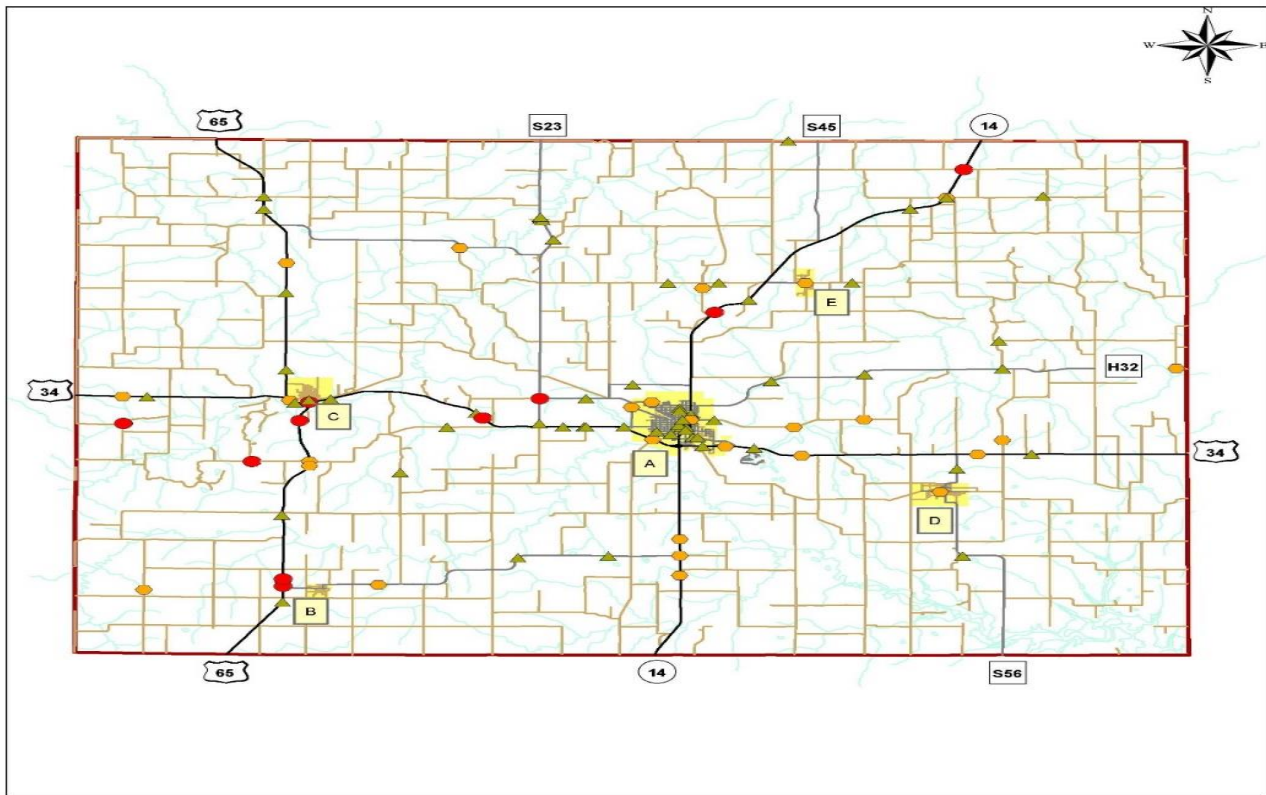
Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	958	60%	\$99,523,675	59,714,205	60%	4321	2593	60%
Commercial	217	87	40%	\$28,798,725	11,519,490	40%			
Industrial	9	2	20%	\$1,475,384	295,077	20%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	5	40%						
Government	5	2	40%						
Education	9	2	20%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Critical Facilities

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Circle of Life Hospice	1010 N 7 th St		X				3044	600,000		
Lucas County Health Center	1200 N 7th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed
Lucas County Courthouse		X			X	X	11868	6,000,000		
Hy-Vee Store	2001 Court Ave			X			22,600	4,000,000		
ShopKo	1900 Court Ave			X			22,500	1,400,000		
Dollar General	307 N Grand St			X			8405	1,000,000		
Lucas Co Sherriff's office		X			X		5016	1,200,000		
Casey's General Store	1421 Court Ave			X			2376	560,000		
Kum & Go	335 Main St			X			2400	600,000		
Elliott Oil Comp	Hwy 34 & 1 st St			X			5350	600,000		
Casey's General Store	418 S 7 th Street			X			10,320	1,000,000		
Corydon Oil company	8 th & Court			X			3300	750,000		
Kum & Go	1155 N 7 th St			X			1736	450,000		
Historic Courthouse Square		X	X	X	X	X				

Lucas County – Crash History – Figure 2



**Lucas County
2007 - 2011 Reportable Crash History
All Rural Crashes
By Crash Severity**

0 2.5 5 Miles



- A CHARITON
- B DERBY
- C LUCAS
- D RUSSELL
- E WILLIAMSON

- Legend**
- Interstate
 - US
 - Iowa
 - County
 - Fatal
 - Major Injury
 - Minor Injury

DERBY – HIGHWAY TRANSPORTATION INCIDENT

Given the reliance on private vehicles and trucking in rural Iowa, the probability of an accident on any given roadway is relatively high. The county has one state highway and two US highways that are identified in the county. US Highways 65 transports traffic north and south across the county and US Highway 34 extends east and west through Lucas County. State Highway north and south through the county as well. County Highway H50 is a small highway that passes through the city of Derby and connects State highway 14 and State highway 65.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	26	50%	\$1,251,043	\$625,522	50%	115	58	50%
Commercial	7	4	57%	\$33,725	\$16,863	57%			
Industrial	-						-	-	-
Agricultural	-	-	-				-	-	-

Derby Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	180,000	
Sewer Lift Station		X					60	150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	180,000	
Private In-Home Daycare	554 Prairie Ave		X						

LUCAS – HIGHWAY TRANSPORTATION INCIDENT

Highway 34 passes on the south edge of city limits and highway 65 is just on the outskirts of the western city limits. Highway 34 intersects Lucas County from west to east. The route of the highway passes on the southern edge of the City of Lucas. This is the only highway access provided to the City that could provide opportunity for highway accidents. There are minimal structures placed at risk because the location is the extreme southern boundary.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	10	10%	\$2,885,880	\$288,588	10%	216	22	10%
Commercial	13	1	10%	\$231,717	\$23,171	10%			
Industrial	1	1	10%	\$183,000	\$18,300	-	-	-	-
Agricultural	-	-	-	\$482,065	-	-	-	-	-
Religious / Non-profit	2	0	0%						
Government	2	0	0%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Southern Iowa Petroleum, LLC	Hwys 5& 34			X			2400	\$ 540,000	
Kent Construction									

RUSSELL – HIGHWAY TRANSPORTATION INCIDENT

Given the reliance on private vehicles and trucking in rural Iowa, the probability of an accident on any given roadway is relatively high. The county has one state highways that is identified in the county. State Highway 14 transports traffic north and south across the county and US Highway 34 extends east and west through Lucas County. County Highway S56 goes through the center of the community from north to south.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	54	25%	\$8,787,186	\$2,196,797	25%	554	139	25%
Commercial	19	5	25%	\$378,610	\$94,653	25%			
Industrial	-						-	-	-
Agricultural	-			-			-	-	-
Religious / Non-profit	3	2	50%						
Government	2	1	50%						
Education									

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall					X		600	60,000		
Fire Hall		X					1200	120,000		
Community Bldg					X		2800	280,000		
Water plant		X					--			
Water tower		X					--	1,000,000		
City Maintenance/ Storage					X		1860	100,000		
Lagoon		X					20acres	100,000		
Public Library/Russell Historical Society Museum	106 S Prairie St					X	2000	450,000		

WILLAMSON – HIGHWAY TRANSPORTATION INCIDENT

Given the reliance on private vehicles and trucking in rural Iowa, the probability of an accident on any given roadway is relatively high. The county has one state highway and one US that are identified in the county. State Highway 14 transports traffic north and south across the county and US Highway 34 extends east and west through Lucas County. A short county highway spur, H20, connects Williamson to highway 14.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	15	20%	\$1,231,664	\$246,333	20%	152	30	20%
Commercial	2	1	50%	\$41,942	\$8,388	20%			
Industrial	-			-			-	-	-
Agricultural	-			-			-	-	-
Religious / Non-profit	2	2	100%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall									
Sewer Lift Station									
Williamson Community Center									

UNINCORPORATED COUNTY AREA – RAILROAD INCIDENT

Maximum Population and building exposure for Rail Transportation Incident is displayed below. Multiple rail lines in the unincorporated region of Lucas County place many at risk in the event of a Rail Transportation Incident and the maximum population and building exposures are shown in the table below. There are two rail lines that intersect Lucas County. The rails are owned by Burlington Northern and Union Pacific. Burlington Northern cross-sections the county from East to West. It enters the city limits of Chariton, Russell and Lucas. Union Pacific operates tracks that cross the county from north to south. It passes through Williamson and enters the eastern third of Chariton's city limits. There multiple crossings present the opportunity for train-vehicle or pedestrian accidents. Derailments are also possible, while major derailments are less likely.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	559	35%	\$127,778,883	\$44,722,609	35%	3540	1239	35%
Commercial	57	20	35%	\$16,815,709	\$5,885,498	35%			
Industrial	2	0	0%	\$1,057,800	0		-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	16,000,000	
Landfill		X					40acres	600,000	
Lake Red Haw					X		--	3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	6000,000	
Iowa DOT	Hwy 34						4800	480,000	

CHARITON – RAILROAD INCIDENT

Citizens of the community of Chariton are particularly concerned with the Union Pacific line that could potentially isolate the east third of the city from emergency personnel if there were to be a derailment. There are 3 intersections that keep that portion of the city connected to services and potentially all three could be affected in a disaster.

The City of Chariton has many buildings are located within about 500 feet of the line, including the industrial area home to Hy-Vee distribution center, grain elevator, and numerous small businesses. The western portion of the historic square in Chariton would be affect by a rail incident if it were to occur through that region of the tracks.

The rail line intersects the city of Chariton to provide service to the Industrial Park. On the journey, the rail passes near the western portion of the historic business square that places 12 businesses at risk of a rail incident. There are multiple industries in the Industrial Park, including Hy-Vee Distribution Center, and a grain elevator that lie within 75 yards of the rail line.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	639	40%	\$99,523,675	39,809,470	40%	4321	1728	40%
Commercial	217	98	45%	\$28,798,725	12,959,426	45%			
Industrial	9	4	40%	\$1,475,384	590,154	40%	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	13	1	10%						
Government	5	1	10%						
Education	9	0	0%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Critical Facilities

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Chariton Fire Hall		X		X	X		9796	\$ 2,000,000	
Farmer's Coop	2120 Osceola Ave			X			7200	\$ 5,000,000	
Elliott Oil Comp	Hwy 34 & 1 st St			X			5350	\$ 600,000	
Historic Courthouse Square		X	X	X	X	X			

DERBY- RAILROAD TRANSPORTATION INCIDENT

There is no railroad line in the city limits of Derby.

LUCAS – RAILROAD TRANSPORTATION INCIDENT

Maximum Population and building exposure for Rail Transportation Incident is displayed below There are two rail lines that intersect Lucas County. The rails are owned by Burlington Northern and Union Pacific. Burlington Northern cross-sections the county from East to West. It enters the city limits of Chariton, Russell and Lucas. Burlington Northern Santa Fe is the rail line that crosses the southern half of Lucas from east to west. The community was built around the rail line/coal mining and, therefore, has several homes within 50 yards of the track line.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	10	10%	\$2,885,880	\$288,588	10%	216	22	10%
Commercial	13	1	10%	\$231,717	\$23,171	10%			
Industrial	1	1	10%	\$183,000	\$18,300	-	-	-	-
Agricultural	-	-	-	\$482,065	-	-	-	-	-
Religious / Non-profit	2	0	0%						
Government	2	0	0%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Southern Iowa Petroleum, LLC	Hwys 5& 34			X			2400	\$ 540,000	

RUSSELL – RAIL INCIDENT

The community of Russell would jeopardize the safety of the Post Office, the Bank of Russell, a local insurance agency, and the small convenience store in a potential rail incident. Burlington Northern Santa Fe is the rail line that crosses the northern half of Russell from east to west. The community was built around the rail line and therefore has multiple structures and homes within 50 yards of the track line. Businesses at risk include the bank, insurance agency and abandon historical structures.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	54	25%	\$8,787,186	\$2,196,797	25%	554	139	25%
Commercial	19	5	25%	\$378,610	\$94,653	25%			
Industrial	-						-	-	-
Agricultural	-			-			-	-	-
Religious / Non-profit	3	2	50%						
Government	2	1	50%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Community Bldg					X		2800	\$ 280,000	

WILLAMSON – RAILROAD INCIDENT

Union Pacific operates tracks that cross the county from north to south. The Union Pacific rail line intersects the center of the city of Williamson from north to south and places many houses that are with 50 yards at risk. There multiple crossings present the opportunity for train-vehicle or pedestrian accidents. Derailments are also possible, while major derailments are less likely.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	37	50%	\$1,231,664	\$615,822	50%	152	76	50%
Commercial	2	1	50%	\$41,942	\$20,971	50%			
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	1	50%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Fire Hall								\$ 546,698	\$162,365
Williamson Community Center								\$ 546,698	\$162,365

DERBY WATERWAY INCIDENT – There are no bodies of water or streams in the city limits of Derby.

CHARITON WATERWAY INCIDENT – There are limited places that would allow for a waterway incident to occur in the city limits of Chariton. There are small streams and small ponds on the outskirts of the city limits. The ponds could hold small fishing boats. Crystal Lake is on the west edge of city but outside the city boundary.

LUCAS WATERWAY INCIDENT – The Lucas Bottoms is a small body of water in the city limits that a person could place a small canoe or boat for a possible waterway incident.

RUSSELL WATERWAY INCIDENT – There are no large bodies of water within the city limits. There are two small streams.

WILLIAMSON WATERWAY INCIDENT – There are no bodies of water in the city limits of Williamson.

UN-INCORPORATED WATERWAY INCIDENT – There are multiple locations in rural Lucas County that could potentially experience a waterway incident. Although, none are considered large bodies of water, they are navigable by small boats. This region of Iowa is known for abundant fishing. The following bodies of water are frequently explored by outdoorsmen and families: Lake Morris, Lake Ellis, Crystal Lake, Red Haw Lake, Chariton River, Whitebreast Creek, and English Creek. Risk of a waterway incident can occur in many locations throughout the un-incorporated region of Lucas County and the following chart displays the maximum population at risk (Source 2010 US Census). A drowning or contamination spill has the potential of occurring at any of these. The campers or visitors of any lake could be affected by a waterway incident because the proximity to a body of water.

<i>Lucas County (Unincorporated) Maximum Population Waterway Incident 2010 US Census</i>						
Total Population	Population 65yrs & older		Population 18 years & younger		Population living below poverty guidelines	Residents living with a diagnosed disability
8898	1794	20.2%	2175	24.4%	34%	544 6.1%

1. Loss Estimates

Loss estimates can vary by incident and severity. Insurance Research Council indicates that the average Highway transportation incident claim \$3,231 in damages per event. It is estimated that more than \$31 Million in property at risk of damage during a Rail Transportation Incident. The severity and loss estimate would be dependent about the size of the event and the cargo transported.

2. Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
2	4	4	2	12

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	Since 1960, there have been 1,999 air transportation incidents/accidents in Iowa (Iowa National Transportation Safety Board). Of these incidents, 237 were fatal to at least one person, totaling 530 fatalities. This figure does include the 111 fatalities in the crash of United Flight 232 in Sioux City, Iowa in 1989. Iowa has eight (8) commercial airports, one (1) reliever airport, eight (8) private owned for public use airports, 101 public owned for general use airports, and 129 heliports. Anywhere in Iowa could experience a significant air transportation incident; the most likely scenarios exist near airports. Private airports are also in the area as well as major airports within 200 miles located in Des Moines and in Kansas City. With indication of air facilities there is a possibility that an Air Transportation Incident could happen anywhere in Lucas County. The Chariton Municipal Airport is located in the unincorporated county area west of Chariton. A heliport is located at the Lucas County Hospital on the north side of Chariton. The probability of an air transportation incident is increased with the greater number of landings and takeoffs, the greater the probability of a crash and an accident could occur. More and more people are utilizing air travel now than in the past; the trend of increasing numbers of people flying is likely to continue as	2

will the crowdedness of airports and the skies above Iowa. The SHMT evaluated the probability of a serious transportation incident (crash of a major airliner) is unlikely any given year.

Numerous major and minor traffic accidents occur daily in Iowa and result in property damage and injury, major accidents involving multiple vehicles and serious injury are not uncommon. According to the Iowa Department of Motor Vehicles, in the 77-year-period that Iowa has tracked crash statistics from 1932-2008, there were 4,295,017 traffic accidents resulting in 1,856,643 injuries and 44,036 deaths. Although traffic engineering, inspection of traffic facilities, land use management of areas adjacent to roads and highways, and the readiness of local response agencies have increased, highway incidents continue to occur. As the volume of traffic on the state’s streets, highway, and interstates increases, the number of traffic accidents will likely also increase. The combination of large numbers of people on the road, wildlife, unpredictable weather conditions, potential mechanical problems, and human error always leaves open the potential for a transportation accident. The probability of Highway Transportation Incidents is often higher on heavily used roads. However more than 16% of the serious accidents in Lucas County have occurred at intersections in 2011, according to Iowa Department of Transportation. During that time, 19% of the accidents had be speed related. Given the reliance on private vehicles and trucking in rural Iowa, the probability of an accident on any given roadway is relatively high, each jurisdiction can anticipate at least one accident in the next year, not all will necessarily be serious.

Jurisdictions with a State Highway	
Name	Highway
County	14,34,65
Chariton	14,34
Lucas	34, 65
Williamson	14
Derby	65
Russell	34

The SHMT analysis has evaluated the probability that a serious highway transportation incident occurring in Iowa is very likely to occur any given year. Lucas County plans to join efforts with Iowa DOT to perform a Highway Safety Audit to identify locations that have a greater probability of incident.

From 1975 to April 2010, there have been 7,087 documented rail incidents in Iowa. These incidents range from minor “rail jumps” to passenger train derailments. With reported data from 1995 to April 2010 there have been 2,203 injuries and 161 deaths related to these incidents. The miles of railroad track in the state, combined with the large number of street and highway crossings, makes the probability of a highway/rail collision significant statewide. Derailments are also possible, while a major derailment would occur less frequently. There are two rail lines that intersect Lucas county. The rails are owned by Burlington Northern and Union Pacific. Burlington Northern cross-sections the county from East to West. It enters the city limits of Chariton, Russell and Lucas. Union Pacific operates tracks that cross the county from north to south. It passes through Williamson and enters the eastern third of Chariton’s city limits. There multiple crossings present the opportunity for train-vehicle or pedestrian accidents. Derailments are also possible, while major derailments are less likely. There are 7,870 railroad crossings in Iowa with 4,470 public crossings, 3,400 private crossings, and hundreds of railroad track miles, combined with eh many streets and highway crossings make the

	<p>probability of an incident more likely to happen. Derailments are also possible, while a major derailment would occur less frequently. The SHMT evaluated the probability of a severe railroad accident (causing loss of life and/or release of hazardous materials) to be likely to occur in any given year.</p> <p>There have been few significant waterway incidents in Iowa. There have been numerous search and rescue events involving a single person or small boats with only a couple people on board. Small scale incidents on the state's lakes and rivers have resulted in loss of life from pleasure craft collisions and falls from vessels. The only waterways navigable for commercial purposes are the Mississippi and Missouri Rivers. Each summer thousands of Iowans and visitors take to pleasure craft across the state. Thousands of visitors to the state's riverboat casinos board craft annually. The casinos make regularly trips up and down the rivers during summer months. The SHMT has evaluated the probability a serious waterway incident to be unlikely in any given year.</p>	
<p><i>MAGNITUDE / SEVERITY</i></p>	<p>People aboard airplanes are most vulnerable. Statistics from the National Transportation Safety Board and the airline industry show that the majority of airplane crashes and accidents occur during the takeoff or landing phases of the 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 valuable.</p> <p>As mentioned above, most accidents occur during takeoffs and landings. Accordingly, the spatial extent of the majority of incidents would occur on airport grounds or adjacent areas. Compared to many other hazards, an air transportation accident would occupy a relatively small area. The extent to which the impact would be felt would depend on the materials involved. The largest share of accidents would likely only affect a few city blocks.</p> <p>Those who use the surface transportation systems are most vulnerable. Travelers, truckers, delivery personnel, and commuters are at risk at all times 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 still not immune from the impacts of a highway incident.</p> <p>Iowa is crisscrossed by thousands of miles of roads, highways, and interstates. Highway incidents are usually contained to areas on the roadway or directly adjacent to the roadway. Very few highway incidents affect areas outside the travel portion of the road and the right-of-way. Extensive segments of the transportation systems can be impacted during significant weather events. The area of impact can extend beyond the localized area if the vehicle(s) involved transporting hazardous materials.</p> <p>People and property in close proximity to the railway lines, crossing, 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.</p> <p>Numerous railways crisscross Iowa also. Vehicle/train accidents are usually limited to areas in and near intersections. Rarely, the incident will result in widespread effects. The direct area of impact is usually quite small, but</p>	<p>4</p>

	<p>depending on the products and materials involved, the effects could reach areas up to 1.5 miles from the scene. Harmful products may contaminate streams, rivers, water distribution systems, and storm water systems. If this occurs, a large portion of the community would be affected. The ability of response agencies to contain the product on-scene usually limits the area affected.</p> <p>Passengers of pleasure craft and riverboat casinos are vulnerable to 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. In the case of hazardous material being released to the waterway, the impact could expand considerably.</p>	
<i>WARNING TIME</i>	<p>The amount of warning time prior to an aircraft accident could vary from tens of minutes to a matter of seconds. Crew aboard a troubled aircraft can radio to ground crews to prepare for the incident, but little can be done to lessen the direct effects of the impact. Rarely is there adequate time to do more than position on-site personnel and alert mass casualty care providers of the possible event.</p> <p>There is usually no warning of highway incidents. During snowstorms and other weather events that may impede travel, travelers and response agencies can be notified of hazardous travel conditions.</p> <p>Like 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 harmful effects.</p> <p>Leading causes of waterway incidents are inclement weather and operator error and incidents would occur with little to no warning. Weather forecasts are usually available days in advance and would give ample time to take shelter off the water.</p>	4
<i>DURATION</i>	Instances of 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.	2
	WEIGHTED SCORE	12

3. Mitigation

Collection & Protection of Vital Records	
Description	Encourage property owners to inventory and protect critical information for improved disaster recovery and minimize disruptions to lives following disaster events; critical information includes titles to property, bank information, insurance documents, wills, copies of prescription medications, family contact information, social security cards, passports, marriage licenses, birth certificates, and other forms of information that may be difficult to replace or needed to document eligibility for disaster aid
Estimated Cost	Voluntary
Timeline/Schedule	Short Term
Responsible Entity	ADLM, first responders, fire department
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 3.1, 3.5, 3.6
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Hazardous Materials Protection for storm shelters	
Description	Develop HAMA policies (shutting off air conditioning, closing windows, etc.), prepare kits for sealing off rooms including duct tape and plastic sheeting (see FEMA guidance; http://www.fema.gov/hazard/hazmat/hz_during.shtm)
Estimated Cost	Minimal or Voluntary
Timeline/Schedule	Short Term
Responsible Entity	City Maintenance Dept and Property Owners
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 3.3, 3.4
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, ,Lucas, Russell, Unincorp County, Williamson

Temporary Debris Disposal Plan	
Description	Develop policy for temporary debris disposal for city and private property owners for post-disaster clean-up
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Councils
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1, 3.6
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Search and Rescue Training for First Responders	
Description	Training Firefighters and other local emergency responders best practices in search and rescue operations
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	Fire Department
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 3.4, 3.5, 3.6
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Mass Casualty Preparation	
Description	Develop plan for how to handle mass casualties resulting from hazard events in and near each jurisdiction
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	First Responders, ADLM-Emergency Management
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.2, 3.5
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

3. Hazard Profile – Infrastructure Failure

This hazard encompasses the following consolidated hazards from the 2007 mitigation plan: 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.

Description

COMMUNICATION FAILURE – is the widespread breakdown or disruption of normal communication capabilities. This could include major telephone outages, loss of local government radio facilities, long-term interruption of electric broadcast services, emergency 911, law enforcement, fire, emergency medical services, public works and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Business and industry rely heavily on various communication media as well. Mechanical failure, traffic accidents, power failure, line severance, and weather can affect communication systems and disrupt service. Disruptions and failures can range from localized and temporary to widespread and long-term. If switching stations are affected, the outage could be more widespread. Thus, the SHMT supports developing interoperability throughout the state.

ENERGY FAILURE – an extended interruption of service either electric, petroleum or natural gas, which by an actual or impending acute shortage of usable energy could create a potential health problem for the population and possibly mass panic. International events could 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 ice storms can disrupt transportation and distribution systems; if disruptions are long lasting, public shelters may need to activate to provide shelter from extreme cold or extreme heat. Stockpiles of energy products eliminate short disruptions but can increase the level of risk to the safety of people and property near the storage site.

STRUCTURAL FAILURE – The collapse (part or all) of any public or private structure including roads, bridges, towers, and buildings is considered a structural failure. A road, bridge or building may collapse due to the failure of the structural components or because the structure was overloaded. Natural events such as heavy snow may cause the roof of a building to collapse (under the weight of the snow). Heavy rains and flooding can undercut and washout a road or bridge. The age of the structure is sometimes independent of the cause of the failure. Enforcement of building codes can better guarantee that structures are designed to hold-up under normal conditions. Routine inspections of older structures may alert inspectors to “weak” points. The level of damage and severity of the failure is dependent on factors such as the size of the building or bridge, the number of occupants of the building, the time of day, day of the week, amount of traffic on the road or bridge, and the type, and amount of the products stored in the structure.

Civil Structures may fail in a variety of modes. The unprecedented growth in technology has resulted in a host of problems related to complex structures, special materials, and severe operational and environmental loads, such as fire, excessive

vibrations, explosion, high-energy piping failures, missiles, and earthquakes. With the possible exception of misuse, accidental or environmental loads, the causes of failure may be found in deficiencies of design, detailing, material, workmanship, or inspection. With the aging structures in the country along with problems with new materials discussed above, structural failure will continue to occur. Efforts to inspect and maintain these structures will lessen the probability of a failure but not guarantee that it will not happen in the future. Internal weaknesses can be hidden from inspectors and not be realized until it is too late.

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

Past Occurrences & Severity

COMMUNICATION FAILURE - No widespread communication failures have occurred in Iowa. Local incidents; due to weather conditions, equipment failure, excavation incidents, or traffic accidents have been reported, the outages were usually resolved in a timely manner. Widespread communication losses are unlikely due to backup systems and redundant system designs. Local communication failures are likely to affect small areas of a country. Communications failures have presumably occurred in Lucas County; however documentation is not readily available.

ENERGY FAILURE- The energy crisis of the 1970's had significant impact on many consumers in Iowa. High inflation and unemployment were associated with the excessive dependence on foreign oil during the early and mid-1970's. An energy shortage of that magnitude has not affected Iowa in recent years. Only when free market forces cease to provide for the health, welfare, and safety of the citizens can governments take appropriate actions to limit the effects of an energy shortage. Energy Failure in Lucas County can and has involved real or perceived gasoline shortages and downed power lines. The most recent occurrence was in 2007 when a severe ice storm crippled this area. Essentially all of Lucas County experienced Energy Failure or disruption for 3-5 days.

STRUCTURAL FAILURE - There have been several sporadic structural failures across the state. They have included homes, commercial structures, and communication towers. There is no central collection point for this information. There has not been any anecdotal information identified stating that such a failure has occurred in Lucas County.

STRUCTURAL FIRE - Structural fires are almost a daily occurrence in some communities. Nearly all are quickly extinguished by on-site personnel or local fire departments. There have been 1,535 deaths in Iowa from fires between the years 1974-2002 (this doesn't include the years 1978-79). From 2006 through April of 2010, there have been 167 recorded fire fatalities. There have been a number of fires that have occurred within Lucas County; however, nearly all of these fires there have been individual house fires or small fires. Many of the home fires were accidental home fires caused by children playing with matches, homeowners' negligence, lightning strikes, or rodents chewing electrical wiring.

Vulnerable Locations/Buildings

COMMUNICATION FAILURE – Communication Failure is the widespread breakdown or disruption of normal communication capabilities. This could include major telephone outages, loss of local government radio facilities, long-term interruption of electronic broadcast services, emergency 911, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Business and industry rely heavily on various communication media as well. Mechanical failure, traffic accidents, power failure, line severance, and weather can affect communication systems and disrupt service

Potentially the entire county could be vulnerable to a communications failure, especially in the event that the local telephone system and radio system should fail. The cellular phones could be used as a back-up, however, that system could also fail do to the large number of calls going through or if the cell towers are damaged.

ENERGY FAILURE – An extended interruption of service electric, petroleum or natural gas, which by an actual or impending acute shortage of usable energy could create a potential health problem for the population and possibly mass panic. International events could 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 ice storms can disrupt transportation and distribution systems; if disruptions are long lasting, public shelters may need to be activated to provide shelter from extreme cold or extreme heat. Stockpiles of energy products eliminate short disruptions but can increase the level of risk to the safety of people and property near the storage site. The effects of an energy shortage would be felt throughout the state. Because the distribution systems are very well developed, local shortages can quickly be covered. Storm-related Energy Failures may impact a few homes or the entire community and surrounding areas. Response to such disruptions depends on the severity of the damage and the availability of staff to repair the system. During the holiday season, staff availability may be limited. Due to the rural population and the relative isolation of Chariton, Russell, Derby, and Lucas in relation to more urbanized parts of Iowa, Lucas County residents may face longer periods without energy. Much like the storms in the winter of 2007, Lucas County and all jurisdictions profiled experienced a widespread Energy Failure due to a Severe Winter Storm. The area experienced this energy crisis for 2-3 days in the jurisdictions and 5-6 days in the un-incorporated regions. The hospital operated off of generators, one shelter site had a generator and residents took shelter with each other.

STRUCTURAL FAILURE – - A summary of the maximum population and building exposure for Structural Failure are stated in the table below. Given the age of homes throughout the unincorporated region, the risk of Structural Failures may be relatively high. Additionally, many of the buildings in Lucas County were constructed in the late 1800's and early 1900's prior to the advent of building codes in the United States. There are other concerns of the aging infrastructure in the communities throughout the region. All participating jurisdictions used vitrified clay tile to construct waste water and storm sewer drains when the communities were developed in the mid to late 1800's. Many of these drainage systems in this area are deteriorating and crumbling and leaving communities in desperation. Albia has received previous funding to replace portions of their storm drainage system.

According to the Lucas County Engineer, "Lucas County has 193 bridges that we inspect (20 feet span or longer). Of those bridges, 93 have a sufficiency rating below 50. We also have 5 that are closed to traffic. Our bridge inspection consultant also rates our bridges for projected remaining life. They indicate we have 66 that have 5 or less years remaining life.

Approximately 75% of homes in rural Lucas County were built prior to 1970 and many of homes were built prior to 1939. This area flourished in the late 1800's and early 1900's and that is when most of the structures were built. The aging stock of homes and all other structures creates the concern for Structural Failure anywhere throughout the county.

UNINCORPORATED COUNTY AREA – STRUCTURE FAILURE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	559	35%	\$127,778,883	\$44,722,609	35%	3540	1239	35%
Commercial	57	20	35%	\$16,815,709	\$5,885,498	35%			
Industrial	2	0	0%	\$1,057,800	0		-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
IDOT roads maintenance shop					X		6000	\$ 6,000,000	

CHARITON – STRUCTURAL FAILURE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	639	40%	\$99,523,675	39,809,470	40%	4321	1728	40%
Commercial	217	87	40%	\$28,798,725	11,519,490	40%			
Industrial	9	1	10%	\$1,475,384	147,538	10%	-	-	-
Agricultural	-		-				-	-	-
Religious / Non-profit	13	1	10%						
Government	5	1	10%						
Education	9	1	10%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Critical Facilities

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000	
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000	
Historic Courthouse Square		X	X	X	X	X			

DERBY – STRUCTURAL FAILURE

Approximately 74% of homes in Derby were built prior to 1970 and 62% of homes were built prior to 1939. This community flourished in the late 1800’s and early 1900’s and that is when most of the businesses were built. The aging stock of homes and all other structures creates the concern for Structural Failure anywhere throughout the city.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	26	50%	\$1,251,043	\$625,522	50%	115	58	50%
Commercial	7	4	50%	\$33,725	\$16,863	50%			50%
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	-	-							
Government	-	-							
Education	-	-	-	-	-	-	-	-	-
Utilities	-	-	-	-	-	-	-	-	-

Derby Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Derby Community Center					X		1800	\$ 180,000	

LUCAS – STRUCTURAL FAILURE

Approximately 70% of homes in Lucas were built prior to 1970 and 59% of homes were built prior to 1939. This community flourished in the early 1900’s and that is when most of the businesses were built. The aging stock of homes and all other structures creates the concern for Structural Failure anywhere throughout the city, but particular concern lies with the businesses along Main Street where the buildings are joined together.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	49	50%	\$2,885,880	\$1,442,940	50%	216	108	50%
Commercial	13	6	50%	\$231,717	\$115,859	50%			
Industrial	1	1	50%	\$183,000	\$91,500	50%	-	-	-
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	2	1	50%						
Government	2	1	50%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	

RUSSELL – STRUCTURAL FAILURE

Approximately 69% of homes in Russell were built prior to 1970 and 45% of homes were built prior to 1939. This community flourished in the early 1900's and that is when most of the businesses were built. The aging stock of homes and all other structures creates the concern for Structural Failure anywhere throughout the city.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	107	50%	\$8,787,186	\$4,393,593	50%	554	277	50%
Commercial	19	10	50%	\$378,610	\$189,305	50%			
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	3	1	50%						
Government	2	1	50%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	\$ 60,000	
Fire Hall		X					1200	\$ 120,000	
Community Bldg					X		2800	\$ 280,000	

WILLIAMSON – STRUCTURAL FAILURE

Approximately 77% of homes in Williamson were built prior to 1970 and 52% of homes were built prior to 1939. This community flourished in the late 1800's and early 1900's and that is when most of the businesses were built. The aging stock of homes and all other structures creates the concern for Structural Failure anywhere throughout the City, but particular concern lies with the businesses along Main Street where the buildings are joined together.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	29	40%	\$1,231,664	\$492,666	40%	152	61	40%
Commercial	2	1	50%	\$41,942	\$20,971	50%			
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	1	50%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall								\$ 546,698	\$ 162,365
Sewer Lift Station									
Williamson Community Center								\$ 546,698	\$ 162,365

STRUCTURAL FIRE

Structural Fire is a great concern in this area and is summarized in the table below. Lucas County unincorporated area is relatively old indicating two things, 1) the wood and building materials used in its structures may be more flammable due to age and 2) structures may not meet more recent building and fire codes. Similarly, the absence of a zoning ordinance means that hazardous and flammable materials may be stored and used anywhere in town elevating the potential threat of fire spreading to homes that may not be otherwise subject to substantial fires. The age of structures in the County may make put them at more risk of fires due to faulty or substandard wiring and obsolete building methods. Older structures with outdated electrical systems not built to current fire codes are particularly vulnerable to fire.

Fire Insurance Ratings were given previously in this document. The ratings indicate reason for concern with 3 of 5 communities in Lucas County scoring the near lowest possible at "9". This score indicates that the community's fire suppression program does not meet minimum requirements for the ISO. ISO is an organization that provides data, a analysis, and decision-making support for various professions about risk.

UNINCORPORATED COUNTY AREA – STRUCTURAL FIRE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	559	35%	\$127,778,883	\$44,722,609	35%	3540	1239	35%
Commercial	57	20	35%	\$16,815,709	\$5,885,498	35%			
Industrial	2	0	0%	\$1,057,800	0		-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$ 16,000,000	
IDOT roads maintenance shop					X		6000	\$ 6,000,000	

CHARITON – STRUCTURAL FIRE

Fire Insurance Ratings were given previously in this document. The ratings indicate reason for concern with Chariton scored a “6” with the lowest possible at “9”. This score indicates that the community’s fire suppression program does not meet minimum requirements for the ISO. ISO is an organization that provides data, analysis, and decision-making support for various professions about risk.

The age of structures in the City may make put them at more risk of fires due to faulty or substandard wiring and obsolete building methods. Older structures with outdated electrical systems not built to current fire codes are particularly vulnerable to fire. Approximately 74% of homes in Chariton were built prior to 1970 and 48% of homes were built prior to 1939. This community flourished in the early 1900’s.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	799	50%	\$99,523,675	49,761,838	50%	4321	2161	50%
Commercial	217	109	50%	\$28,798,725	14,399,363	50%			
Industrial	9	4	50%	\$1,475,384	737,692	50%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	6	50%						
Government	5	2	50%						
Education	9	4	50%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Critical Facilities

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000	
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000	
Historic Courthouse Square		X	X	X	X	X			

DERBY – STRUCTURAL FIRE

The age of structures in the County may make put them at more risk of fires due to faulty or substandard wiring and obsolete building methods. Older structures with outdated electrical systems not built to current fire codes are particularly vulnerable to fire. Approximately 74% of homes in Derby were built prior to 1970 and 62% of homes were built prior to 1939. This community flourished in the late 1800’s and early 1900’s.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	26	50%	\$1,251,043	\$625,522	50%	115	58	50%
Commercial	7	4	50%	\$33,725	\$16,863	50%			50%
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	-	-							
Government	-	-							
Education	-	-	-	-	-	-	-	-	-
Utilities									

Derby Critical Facilities

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	180,000	
Elevator/COOP				X					
Derby Community Center					X		1800	180,000	

LUCAS – STRUCTURAL FIRE

The age of structures in the County may make put them at more risk of fires due to faulty or substandard wiring and obsolete building methods. Older structures with outdated electrical systems not built to current fire codes are particularly vulnerable to fire. Approximately 70% of homes in Lucas were built prior to 1970 and 59% of homes were built prior to 1939. This community flourished in the early 1900’s.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	49	50%	\$2,885,880	\$1,442,940	50%	216	108	50%
Commercial	13	6	50%	\$231,717	\$115,859	50%			
Industrial	1	1	50%	\$183,000	\$91,500	50%	-	-	-
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	2	1	50%						
Government	2	1	50%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	

RUSSELL – STRUCTURAL FIRE

The age of structures in the County may make put them at more risk of fires due to faulty or substandard wiring and obsolete building methods. Older structures with outdated electrical systems not built to current fire codes are particularly vulnerable to fire. Approximately 69% of homes in Russell were built prior to 1970 and 45% of homes were built prior to 1939. This community flourished in the early 1900's.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	107	50%	\$8,787,186	\$4,393,593	50%	554		50%
Commercial	19	10	50%	\$378,610	\$189,305	50%			
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	3	1	50%						
Government	2	1	50%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	\$ 60,000	
Fire Hall		X					1200	\$ 120,000	
Community Bldg					X		2800	\$ 280,000	
City Maintenance/ Storage					X		1860	\$ 100,000	

WILLIAMSON – STRUCTURAL FIRE

Older structures with outdated electrical systems not built to current fire codes are particularly vulnerable to fire. Approximately 77% of homes in Williamson were built prior to 1970 and 52% of homes were built prior to 1939. This community flourished in the late 1800's and early 1900's.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	29	40%	\$1,231,664	\$492,666	40%	152	61	40%
Commercial	2	1	50%	\$41,942	\$20,971	50%			
Industrial	-		-	-		-	-	-	-
Agricultural	-		-			-	-	-	-
Religious / Non-profit	2	1	50%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Williamson Critical Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Fire Hall		X						\$ 546,698	\$162,365
Community Center					X			\$ 546,698	\$162,365

1. Loss Estimate

Countywide damage was established from the NCDC data base for some hazards up to 65 years. Loss factors were developed specific to the attributes of Infrastructure Failure throughout the region. These factors were able to provide an annual damage estimate by dividing the total loss by number of years of data. Per event damage is calculated by dividing total loss by number of events. Based on countywide fire statistics, the loss from a structure fire can vary from \$0 to a complete loss or hundreds of thousands of dollars.

2. Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
2	4	4	4	14

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>No widespread communication failures have occurred in Iowa. Local incidents; due to weather conditions, equipment failure, excavation incidents, or traffic accidents have been reported, the outages were usually resolved in a timely manner. Widespread communications losses are unlikely due to backup systems and redundant systems designs. Local communication failures are likely to affect small areas of the county. The Lucas County committee believes that it is likely to have a communications failure in the next year (11%-100% chance) While massive failures are unlikely to occur or to last long due to redundancy measures, the possibility of such an event does exist. Weather events are the most likely cause of communications failures in Lucas County.</p> <p>The energy crisis of the 1970's had significant impact on many consumers in Iowa. High inflation and unemployment were associated with the excessive dependence on foreign oil during the early and mid-1970's. An energy shortage</p>	2

	<p>of that magnitude has not affected Iowa in recent years. Structural fires are almost a daily occurrence in some communities. Nearly all are quickly extinguished by on-site personnel or local fire departments. The committee stated that with previous history of energy failures it could be likely that an energy failure event could occur during any given year.</p> <p>Much of the fire prevention efforts have gone into nonresidential fires and the results have been highly effective. Even with an increase in the prevention efforts in residential fires, both residential and nonresidential fires will continue to occur. During cold months, clogged chimneys and faulty furnaces and fire places can increase the probability of structural fires. Structural fires with the potential to exceed city and county response resources are unlikely in any given year.</p> <p>The SHMT evaluated the probability that a serious communication failure in Iowa at less than 10% probability in any given year.</p> <p>The SHMT evaluated the probability of an energy failure will occur in Iowa is less than 10% in any given year.</p> <p>The SHMT analysis has evaluated the probability that structural failures will occur in Iowa is less than 10% in any given year. Given the age of homes in Lucas County and on when the County flourished, and nationwide concerns over aging infrastructure, the risk of Structural Failures may be relatively high. This risk is alongside the risk of mine collapses addressed in the Sinkholes hazard profile. Additionally, many of the buildings in Lucas County were constructed in the late 1800's and early 1900's prior to the advent of building codes in the United States. Sixty percent of Iowa's bridges are rated as "functionally obsolete" meaning that they were designed for very different and much less intense conditions than they are subjected to. This may also include the width of the bridge being insufficient for modern vehicles and farm machinery.</p> <p>The SHMT analysis has evaluated the probability that a major structural fire will occur in Iowa has an occasional probability in any given year.</p>	
<p><i>MAGNITUDE / SEVERITY</i></p>	<p>Most communication systems that are highly necessary have backup and redundant designs to provide continuity of service. Most communications failures would be limited to localized areas. In the event of a widespread communication failure, only portions of Iowa would be impacted, but this is highly unlikely due to the support to other jurisdictions and secondary communication devices.</p> <p>Because Iowa is almost entirely dependent on out-of-state resources for energy, Iowans must purchase oil, coal, and natural gas from outside sources. World and regional fuel disruptions are felt in Iowa. It is likely that increasing prices will occur as market mechanisms are used to manage supply disruptions. This will disproportionately affect the low-income population because of their lower purchasing power. In Iowa, petroleum represents 97% of transportation fuel.</p> <p>The effects of an energy shortage would be felt throughout the state. Because the distribution systems are very developed, local shortages can quickly be covered.</p> <p>There are many buildings in Lucas County, Iowa that are very old or which may become hazardous in the event of an earthquake, fire, high winds, or other natural events. All bridges are vulnerable to the effects of the elements and the</p>	<p>4</p>

	<p>deterioration that results. Increases in the amount and weight of traffic they are expected to support increase their vulnerability to failure.</p> <p>The impacts of the failed structures would be contained to the immediate area and adjacent properties. This could be as small as the house and yard of a fallen chimney or the area could be relatively extensive if the structure that failed was a multi-story building of a downtown high-rise or a tall communication tower. Dam and levee failures would affect a much larger area and are discussed as separate hazards.</p> <p>Older structures with outdated electrical systems not built to the current fire codes are particularly vulnerable to fire. Combustible building materials obviously are more vulnerable than structures constructed of steel or concrete. 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 such as water mains and hydrants are also a significant risk. Problems vary from region to region often because of climate, property, education and demographics. The fire death risk for the elderly and children under 5 years of age is more than two times that of the average population. All people in the County are potentially at risk, but elderly and young children comprise about 33.2% of the total county population.</p> <p>With modern training, equipment, fire detection services 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 age and density of a particular neighborhood can also make it more vulnerable to fire due to the spreading of fire from neighboring structures.</p>	
<i>WARNING TIME</i>	<p>A communication failure would likely occur with little or no warning. It is usually impossible to predict a communication failure. Some communication failures may be shut down for a short while for improvements or maintenance. These disruptions are usually made during periods of low demand and those who rely on them are given previous notice that the system will be without service.</p> <p>The Iowa Department of Natural Resources Energy Bureau monitors domestic and international energy situations and has developed a plan to deal with an energy crisis. Signs that an energy shortage may be developing can be recognized even months in advance, but energy shortages/ emergencies can rise suddenly and unexpectedly. Supply distribution problems in other counties and local weather situations can lead to low supply coupled with high demand in a matter of a day or two.</p> <p>The actual failure of the structure would likely occur suddenly with little or no warning. There several events that could lead up to the failure, and these have various warning times and are discussed in separate hazard worksheets. Casual hazards can include fire, explosion, overloading the ice and snow, vibration, earthquakes, flooding, high wind, erosion, chemical corrosion, subsidence, and lack of general upkeep.</p> <p>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.</p>	4
<i>DURATION</i>	With the exception of structural fires which are largely handled by local	4

	response personnel, the response to the hazards of communication failure, energy failure, and structural failure are widespread in nature and are likely to require outside resources to assist the region in emergency response.	
	WEIGHTED SCORE	14

3. Mitigation

Generators	
Program/Project Description	Acquisition of mobile and / or fixed generators for use at community buildings used for temporary storm shelters and / or for public facilities
Anticipated Cost	Moderate
Timeline/Schedule	Medium term
Responsible Agency	City Council, critical facility property owners, Board of Directors', or School Board
Mitigation Category	Emergency services, Prevention, Property Protection
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 2.5, 3.1, 3.3, 3.4
Address High Risk Hazards?	yes
Jurisdictions	Chariton, Derby, ,Lucas, Russell, Unincorp County, Williamson

New Storm Shelter/ Cooling or Heating Shelter	
Program/Project Description	Construction of comprehensive storm shelter to Tornado Safe Room standards to serve as a temporary shelter for multiple hazards as often a Church, Community Center, Legion Hall, City Hall, and School are currently utilized as needed
Anticipated Cost	Moderate to high – grant dependent
Timeline/Schedule	Long term
Responsible Agency	City Council
Mitigation Category	Structural project
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.3
Address High Risk Hazards?	yes
Jurisdictions	Chariton, Unincorp County

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	Board of Supervisors, City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5
Address High Risk Hazards?	yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Safe Rooms	
Program/Project Description	Risk to lives can be improved through construction and use of concrete safe rooms in homes and shelter areas of mobile home parks, fairgrounds, shopping malls, & other vulnerable public areas.
Anticipated Cost	Moderate to high – grant dependent
Timeline/Schedule	Long term
Responsible Agency	School Board, Board of Directors
Mitigation Category	Structural project
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 3.1, 3.3
Address High Risk Hazards?	yes
Jurisdictions	Chariton

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Demolish & Remove Dilapidated Buildings	
Description	Leverage funds for property owners or cities that are unable to afford to remove/repair/demolish dilapidated structures.
Estimated Cost	Moderate-high
Timeline/Schedule	Ongoing
Responsible Entity	City Council, Property Owners, ADLM
Mitigation Category	Property Protection, Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.4, 2.5,
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Surge Protection / Lightning Protection	
Description	Encourage property owners to use surge protectors to protect computers and other sensitive electrical appliances from lightning strikes and power surges; purchase, use, and maintenance of surge protectors for City facilities as needed
Estimated Cost	Minimal , Voluntary
Timeline/Schedule	Ongoing / Short Term
Responsible Entity	City Maintenance dept, private home owners
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Burying Power Lines	
Description	Encourage burying of power lines to new construction and upon significant maintenance or upgrades of existing power supply
Estimated Cost	Minimal (for City), Moderate to High (for power companies)
Timeline/Schedule	Long Term
Responsible Entity	City Council, Power Companies,
Mitigation Category	Property Protection, Structural Projects
Related Goals/Objectives	1.1, 1.3, 2.3
Addresses High Risk Hazards?	Yes
Jurisdictions	Unincorp County

Temporary Debris Disposal Plan	
Description	Develop policy for temporary debris disposal for city and private property owners for post-disaster clean-up
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Councils,
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1, 3.6
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Rehabilitate Older, historic Buildings	
Description	Encourage property maintenance and help leverage funds for property owners unable to afford more significant structural maintenance
Estimated Cost	Minimal to moderate
Timeline/Schedule	Ongoing
Responsible Entity	City, Property Owners
Mitigation Category	Property Protection, Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.3
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Evacuation Plans	
Description	Develop evacuation plans for school, community buildings, and for town
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	City Councils and ADLM-Emergency Management
Mitigation Category	Prevention, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.2, 3.4, 3.5, 3.6
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Maintenance of Heating / Cooling Systems	
Description	Encourage property owner maintenance of heating and cooling systems and maintenance of heating and cooling systems in community buildings
Estimated Cost	Minimal to moderate
Timeline/Schedule	Short Term
Responsible Entity	City Maintenance and Property Owners
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.3, 3.5
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Search and Rescue Training for First Responders	
Description	Training Firefighters and other local emergency responders best practices in search and rescue operations
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	Fire Department
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 3.4, 3.5, 3.6
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Mass Casualty Preparation	
Description	Develop plan for how to handle mass casualties resulting from hazard events in and near each jurisdiction
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	First Responders, ADLM-Emergency Management
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.2, 3.5
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Collection & Protection of Vital Records	
Description	Encourage property owners to inventory and protect critical information for improved disaster recovery and minimize disruptions to lives following disaster events; critical information includes titles to property, bank information, insurance documents, wills, copies of prescription medications, family contact information, social security cards, passports, marriage licenses, birth certificates, and other forms of information that may be difficult to replace or needed to document eligibility for disaster aid
Estimated Cost	Voluntary
Timeline/Schedule	Short Term
Responsible Entity	ADLM, first responders, fire departments
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 3.1, 3.5, 3.6
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Tree Management/Trimming	
Description	Encourage private home owners, businesses, and jurisdictions to regularly perform tree trimming and maintenance to prevent limb breakage and for safeguarding nearby utility lines.
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City council, property home owners, utility companies
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 2.1, 2.3, 3.1
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Building Code Enforcement	
Description	Encourage all local governments to adopt and enforce updated building codes to reduce the risk of collapse, failure or injury in the event of a disaster.
Estimated Cost	Moderate
Timeline/Schedule	ongoing
Responsible Entity	City Council, First Responders, ADLM, County Public Health Department
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.4, 2.5, 3.4
Addresses High Risk Hazards?	Yes
Jurisdictions	Derby, Lucas, Russell, Unincorp County, Williamson

SECURE FUNDING FOR VACANT STRUCTURES/COLLAPSED BUILDINGS	
DESCRIPTION	LEVERAGE FUNDS FOR PROPERTY OWNERS OR CITIES THAT ARE UNABLE TO AFFORD TO REMOVE/REPAIR/DEMOLISH DILAPIDATED STRUCTURES.
ESTIMATED COST	MODERATE-HIGH
TIMELINE/SCHEDULE	ONGOING
RESPONSIBLE ENTITY	CITY COUNCILS, PROPERTY OWNERS
MITIGATION CATEGORY	PROPERTY PROTECTION, PREVENTION, PUBLIC EDUCATION AND AWARENESS
RELATED GOALS/OBJECTIVES	1.1, 1.3, 2.1, 2.4, 2.5- SEE ALSO PAGE 31 OR APPENDIX 17
ADDRESSES HIGH RISK HAZARDS?	YES
JURISDICTIONS	ALL

4. Hazard Profile – Hazardous Materials

The hazard encompasses the following consolidated hazards from the 2007 mitigation plan: fixed hazardous materials, pipeline transportation, and transportation hazardous materials. This includes accidental release of flammable or combustible, explosive, toxic, noxious, corrosive, oxidizable, an irritant or radioactive substances or mixtures that can pose a risk to life, health, or property possibly requiring evacuation.

Description

FIXED HAZARDOUS MATERIALS INDICENT- A fixed hazardous materials incident is the accidental release of chemical substances or mixtures, which presents a danger to the public health or safety, during production or handling at a fixed facility. A hazardous substance is one that may cause damage to persons, property or the environment when released to soil, water, or air. Chemicals are manufactured and used in ever-increasing types and quantities, each year, over 1,000 new synthetic chemicals are introduced and as many as 500,000 products pose physical or health hazards and can be defined as “hazardous chemicals”. Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous material incidents generally affect a localized area and the use of planning and zoning can minimize the area of impact.

PIPELINE INCIDENT – a pipeline incident occurs when a break in a pipeline creates the potential for an explosion or leak of a dangerous substance (oil, gas, etc.) possibly requiring evacuation. An underground pipeline incident can be caused by environmental disruption, accidental damage, or sabotage. Incidents can range from a small slow leak to a large rupture where an explosion is possible. Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure can lessen the risk to those near the pipelines.

TRANSPORTATION OF HAZARDOUS MATERIALS- This hazard constitutes an accidental release of chemical substances or mixtures that presents a danger to public health or safety during transportation. A hazardous substance is one that may cause damage to person(s), property, or the environment when released to soil, water, or air. The Union Pacific rail line intersects the center of the city of Williamson from north to south and places many houses that are with 50 yards at risk.

Past Occurrences & Severity

During the period 2000-2010, fixed facilities experienced 4,972 incidents according to the Iowa Department Natural Resources (DNR). Fixed facility releases accounted for 57.6% of total releases. (Note: the number of trips to drug related operations has risen sharply in the state.) There are 4,057 sites in Iowa that because of the volume or toxicity of the materials on site are designated as Tier Two facilities under the Superfund Amendments and Reauthorization Act.

Thirteen hazardous materials releases were filed with the DNR between 2015 and 2010. The manufacturing plants, automobile repair, and gas stations are potential sites for hazardous materials incidents in Lucas County.

Spill Date	Location
4/30/2014	Chariton
4/12/2014	Lucas
4/7/2014	Chariton
6/26/2013	Chariton
1/16/2013	Chariton
2/23/2012	Chariton
8/7/2011	Lucas
7/20/2011	Chariton
2/17/2011	Lucas
11/9/2010	Chariton
10/25/2010	Russell
7/20/2010	Russell
5/3/2010	Chariton

According to the Iowa Utilities Board (IUB) and the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration, 43 pipeline accidents, incidents, or service outages were reported from 2000-2009 resulting in a total of six (6) injuries. The vast majority of incidents that occur are caused by third party damage to the pipeline, often due to construction or some other activity that involves trenching or digging. With development occurring at an unprecedented rate and the ground becoming more and more congested with utilities, the probability of an underground pipeline incident is significant. Petroleum and natural gas pipeline accidents occur with some regularity, but they usually have a limited impact and are quickly and adequately handled by pipeline company emergency crews and local and state responders. Pipeline operators are required to coordinate all safety preparedness and response activities with the communities. Continuing to plan, train, and exercise emergency procedures help to limit the occurrence and severity of incidents.

According to the National Transportation Safety Board (NTSB), there have been no pipeline incidents in Lucas County since 1969. However, there have been pipeline explosions and fires in Iowa during this time period.

Vulnerable Locations/Buildings

FIXED HAZARDOUS MATERIALS – The table below summarizes the maximum threat to residents and structures that can be affected by Fixed Hazardous Materials. The manufacturing plants, automobile repair, gas stations, and farm yards are potential sites for hazardous materials incidents in Lucas County.

The manufacturing plants, automobile repair, and gas stations are potential sites for hazardous materials incidents in Lucas County.

Anecdotal evidence suggests that meth use and production is not uncommon in Lucas County. Chemical spills can occur anytime there is a traffic accident as oil, gasoline, and other fluids used in vehicles are released. Dumping of household cleaners, paints, and old oil can happen at any time and are more likely in areas where people do not understand hazardous materials laws.

A number of homes (27.4%) in Lucas County use LP Gas for heating fuel. Liquid petroleum is not by nature toxic, but can cause asphyxiation through oxygen deprivation. LP Gas is heavier than air so it will sink to the lowest places possible and is flammable. Stores of anhydrous ammonia in the county pose health and safety threats to potentially large areas of the county and are potential targets for meth producers as a source of raw materials.

Fixed hazardous materials could potential affect three in-home daycare facility, one preschool, and Chariton Public Middle School all in the city limits of Chariton. There are no vulnerable populations identified at an increased risk in the unincorporated region of the county. Appendix 24 contains maps that will show specific locations.

UNINCORPORATED COUNTY AREA – FIXED HAZARDOUS MATERIALS

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	559	35%	\$127,778,883	\$44,722,609	35%	3540	1239	35%
Commercial	57	20	35%	\$16,815,709	\$5,885,498	35%			
Industrial	2	0	0%	\$1,057,800	0		-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office.

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Landfill		X					40acres	\$ 600,000	
IDOT roads maintenance shop					X		6000	\$ 6,000,000	
Iowa DOT	Hwy 34						4800	\$ 480,000	
ITC Midwest	50415 State Hwy 14, Chariton				X				
South Central Coop	49297 215 th St, Chariton				X				
HyVee Perishable Distribution Center	21591 490 th St, Chariton				X				

CHARITON – FIXED HAZARDOUS MATERIALS

A number of homes (1.9%) in Chariton use LP Gas for heating fuel. Liquid petroleum is not by nature toxic, but can cause asphyxiation through oxygen deprivation. LP Gas is heavier than air so it will sink to the lowest places possible and is flammable. Stores of anhydrous ammonia in the county pose health and safety threats to potentially large areas of the county and are potential targets for meth producers as a source of raw materials.

Fixed hazardous materials could potential affect three in-home daycare facility, one preschool, and Chariton Public Middle School. Appendix 24 contains maps that will show specific locations.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	160	10%	\$99,523,675	9,952,368	10%	4321	432	10%
Commercial	217	22	5%	\$28,798,725	1,439,936	5%			
Industrial	9	1	5%	\$1,475,384	737,692	5%	-	-	-
Agricultural	-		-				-	-	-
Religious / Non-profit	13	1	5%						
Government	5	1	5%						
Education	9	1	5%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Critical Facilities

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Sq feet	Replacement Value	Content Value
Farmer's Coop	2120 Osceola Av			X			7200	\$ 5,000,000	
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000	
Kum & Go	335 Main St			X			2400	\$ 600,000	
Elliott Oil Comp	Hwy 34 & 1st St			X			5350	\$ 600,000	
Casey's General Store	418 S 7th Street			X			10,320	\$ 1,000,000	
Corydon Oil company	8th & Court			X			3300	\$ 750,000	
Kum & Go	1155 N 7th St			X			1736	\$ 450,000	
ITC - Midwest	6th & Roland				X				
Windstream- Iowa Telecom	220 N Grand St				X				
HyVee Grocery Distribution Center	1801 Osceola Ave				X				
HyVee HBC Distribution Center	1800 Osceola Ave				X				
Discovery Preschool Center	1711 Osceola St		X						
Private In-Home Daycare	334 N 7th St		X						
Private In-Home Daycare	1721 Ilion Ave		X						
Private In-Home Daycare	1430 Franklin Ave		X						

DERBY – FIXED HAZARDOUS MATERIALS

A number of homes (68.5%) in Derby use LP Gas for heating fuel. Liquid petroleum is not by nature toxic, but can cause asphyxiation through oxygen deprivation. LP Gas is heavier than air so it will sink to the lowest places possible and is flammable. Stores of anhydrous ammonia in the county pose health and safety threats to potentially large areas of the county and are potential targets for meth producers as a source of raw materials.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52			\$1,251,043			115		
Commercial	7			\$33,725					
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-

Derby Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	

LUCAS – FIXED HAZARDOUS MATERIALS

A number of homes (62.4%) in the City of Lucas use LP Gas for heating fuel. Liquid petroleum is not by nature toxic, but can cause asphyxiation through oxygen deprivation. LP Gas is heavier than air so it will sink to the lowest places possible and is flammable. Stores of anhydrous ammonia in the county pose health and safety threats to potentially large areas of the county and are potential targets for meth producers as a source of raw materials.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	10	10%	\$2,885,880	\$288,588	10%	216	22	10%
Commercial	13	1	10%	\$231,717	\$23,171	10%			
Industrial	1	1	10%	\$183,000	\$18,300	-	-	-	-
Agricultural	-	-	-	\$482,065	-	-	-	-	-
Religious / Non-profit	2	0	0%						
Government	2	0	0%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Southern Iowa Petroleum, LLC	Hwys 5& 34			X			2400	540,000	

RUSSELL – FIXED HAZARDOUS MATERIALS

Approximately 5.4% homes in Russell use LP Gas for heating fuel. Liquid petroleum is not by nature toxic, but can cause asphyxiation through oxygen deprivation. LP Gas is heavier than air so it will sink to the lowest places possible and is flammable. Stores of anhydrous ammonia in the county pose health and safety threats to potentially large areas of the county and are potential targets for meth producers as a source of raw materials. There is one gas station located within Russell and multiple private mechanical/construction businesses that could experience a fixed hazardous incident.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	43	20%	\$8,787,186	\$1,757,437	20%	554	111	20%
Commercial	19	4	20%	\$378,610	\$75,722	20%			
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	3	1	10%						
Government	2	1	10%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Maintenance/ Storage					X		1860	\$ 100,000	
D&D Market	114 S Prairie St			X			1859	\$ 260,000	

WILLAMSON – FIXED HAZARDOUS MATERIAL

A number of homes (20.9%) in Williamson use LP Gas for heating fuel. Liquid petroleum is not by nature toxic, but can cause asphyxiation through oxygen deprivation. LP Gas is heavier than air so it will sink to the lowest places possible and is flammable. Stores of anhydrous ammonia in the county pose health and safety threats to potentially large areas of the county and are potential targets for meth producers as a source of raw materials.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	15	20%	\$1,231,664	\$246,333	20%	152	30	20%
Commercial	2	1	50%	\$41,942	\$8,388	20%			
Industrial	-			-			-	-	-
Agricultural	-			-		-	-	-	-
Religious / Non-profit	2	2	100%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall								\$ 546,698	\$ 162,365
Sewer Lift Station									
Williamson Community Center								\$ 546,698	\$ 162,365

PIPELINE INCIDENT

A Pipeline Incident occurs when a break in a pipeline creates the potential for an explosion or leak of a dangerous substance (oil, gas, etc.) possibly requiring evacuation. An underground pipeline incident can be caused by environmental disruption, accidental damage, or sabotage. Incidents can range from a small slow leak to a large rupture where an explosion is possible. Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure can lessen the risk to those near to the pipelines.

About 5 interstate pipelines operate in the state under federal pipeline jurisdiction. There are many high-pressure gas mains throughout the state which supply residential and industrial users. People and property with pipelines on their land or nearby are the most at risk. People excavating earth near a pipeline are also at risk. Whether the greater hazard is posed to those upwind or downwind from a site depends on the product spilled, for example - natural gas is lighter than air. Private homes and business served by natural gas have smaller diameter pipelines connected to their structure.

The underground pipelines cross public streets, roads, and highways as well as streams. Iowa's natural environment is also vulnerable to contamination from an underground pipeline incident. A natural gas pipeline exists through the rural district from the north central county line to the northwest corner of Chariton. A spur line off of this offers service to Williamson. This pipeline is approximately 40 miles in length and provides an opportunity for a Pipeline Incident to occur.

DERBY, LUCAS, & RUSSELL PIPELINE INCIDENT –No pipeline has been identified.

UNINCORPORATED COUNTY AREA – PIPELINE INCIDENT

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	80	5%	\$127,778,883	\$63,889,442	5%	3540	177	5%
Commercial	57	1	1%	\$16,815,709	\$168,157	1%			
Industrial	2	0	0%	\$1,057,800	0	0%	-	-	-
Agricultural			15%				-	-	-
Religious / Non-profit									

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	16,000,000	
Landfill		X					40acres	600,000	
Lake Red Haw					X		--	3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	6000,000	
Iowa DOT	Hwy 34						4800	480,000	

CHARITON – PIPELINE INCIDENT

A natural gas pipeline exists through the rural district from the north central county line to the northwest corner of Chariton. A spur line off of this offers service to Williamson. This pipeline is approximately 40 miles in length and provides an opportunity for a Pipeline Incident to occur.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	48	3%	\$99,523,675	\$39,809,470	40%	4321	1728	40%
Commercial	217	2	1%	\$28,798,725	287,987	1%			
Industrial	9	1	1%	\$1,475,384	14,754	1%	-	-	-
Agricultural	-		-				-	-	-
Religious / Non-profit	13	1	1%						
Government	5	1	1%						
Education	9	1	1%						
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Sq feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000	
Lucas County Public Health	117 S Grand St	X			X				
SENECA Area on Aging	117 S Grand St		X				6067	\$ 600,000	
Circle of Friends Home Care	1010 N 7 th St		X				3044	\$ 600,000	
Circle of Life Hospice House	220 Northwestern								
Hammer Medical Supply	110 N Grand st			X			7647	\$ 1,300,000	
Chariton Fire Hall & City Hall	115 S Main St	X		X	X		9796	\$ 2,000,000	
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000	
Hy-Vee Store	2001 Court Ave			X			22,600	\$ 4,000,000	
ShopKo	1900 Court Ave			X			22,500	\$ 1,400,000	
Dollar General	1635 N Grand St			X			8405	\$ 1,000,000	
Family Dollar	307 N Grand St								
Lucas Co Sherriff's office	22 nd St	X			X		5016	\$ 1,200,000	
Farmer's Coop	2120 Osceola Ave			X			7200	\$ 5,000,000	
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000	
Casey's	335 Main St			X			2400	\$ 600,000	
Elliott Oil Comp	Hwy 34& 1 st St			X			5350	\$ 600,000	
Casey's General Store	418 S 7 th Street			X			10,320	\$ 1,000,000	
South Central Coop	2120 Osceola St			X					
BP	107 Grace St			X					
Southern Iowa Oil, fuel, Propane	2130 Court			X					
Sewer Lift Stations		X					120	\$ 100,000	
Historic		X	X	X	X	X			

Courthouse Square									
Southgate Apartments	429 S Main St		X						
Autumn Park	330 N Main St		X						
Chariton Airport					X				
Landfill	220 th Ave				X				
Chariton Head Start	418 N Main St		X						
Discovery Preschool Center	1711 Osceola St		X						
Hyvee Fuel Station	Osceola St								
Community Bldg	Main St								

WILLIAMSON – PIPELINE INCIDENT

A natural gas pipeline exists through the rural district from the north central county line to the northwest corner of Chariton. A spur line off of this offers service to Williamson. This pipeline is approximately 40 miles in length and provides an opportunity for a Pipeline Incident to occur.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	11	15%	\$1,231,664	\$184,750	15%	152	23	15%
Commercial	2	0	15%	\$41,942	0	15%			
Industrial	-		-	-		-	-	-	-
Agricultural	-		-			-	-	-	-
Religious / Non-profit	2	0	10%						
Government	1	0	0%						
Education									
Utilities	-		-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall								\$ 546,698	\$ 162,365
Sewer Lift Station									
Williamson Community Center								\$ 546,698	\$ 162,365

UNINCORPORATED COUNTY AREA – TRANSPORTATION HAZARDOUS MATERIALS

The Transportation of Hazardous Materials is common in a rural area due to critical farming chemicals. This creates the potential of an incident of hazardous materials in transportation on any state highway or gravel road. The largest risk occurs along the Burlington Northern Santa Fe Railroad which transports Nuclear Waste through Lucas County.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	320	20%	\$127,778,883	\$25,555,777	20%	3540	708	20%
Commercial	57	11	20%	\$16,815,709	3,363,142	20%			
Industrial	2	0	1%	\$1,057,800	\$10,578	1%	-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Landfill		X					40acres	\$ 600,000	
IDOT roads maintenance shop					X		6000	\$ 6,000,000	
Iowa DOT	Hwy 34						4800	\$ 480,000	

CHARITON – TRANSPORTATION OF HAZARDOUS MATERIALS

The table below that depicts the maximum threat to the population and building exposures. U.S. Highways 65 and 34 offers an increased potential for a Transportation of Hazardous Materials incident. As well as, semis frequently transport along this roadway in addition to local farmers that commonly transport Anhydrous Ammonia tanks. The Transportation of Hazardous Materials is common in a rural area due to critical farming chemicals. This creates the potential of an incident of hazardous materials in transportation on any state highway or gravel road. A Particular area of concern is State Highway 14 which extends the entire length of the city from north to south for 3 miles. This highway is also the only access route to the local hospital, multiple gas stations and has frequent transporters of hazardous materials. Highway 34 dusts the southern edge of Chariton’s city limits. There are multiple exit/entrance ramps from the 4 lane highway that increase the potential for accidents. The largest risk occurs along the Burlington Northern Santa Fe Railroad which transports Nuclear Waste through Lucas County, including the City of Russell. See Appendix 7.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	319	20%	\$99,523,675	19,904,735	20%	4321	864	20%
Commercial	217	43	20%	\$28,798,725	5,759,745	20%			
Industrial	9	2	20%	\$1,475,384	295,077	20%	-	-	-
Agricultural	-						-	-	-
Religious / Non-profit	13	3	20%						
Government	5	1	20%						
Education	9	2	20%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Critical Facilities

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Circle of Life Hospice	1010 N 7 th St		X				3044	\$ 600,000		
Lucas County Health Center	1200 N 7 th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000		
Hy-Vee Store	2001 Court Ave			X			22,600	\$ 4,000,000		
ShopKo	1900 Court Ave			X			22,500	\$ 1,400,000		
Dollar General	307 N Grand St			X			8405	\$ 1,000,000		
Lucas Co Sherriff's office		X			X		5016	\$ 1,200,000		
Farmers COOP	2120 Osceola			X			7200	\$ 5,000,000		
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000		
Kum & Go	335 Main St			X			2400	\$ 600,000		
Elliott Oil Comp	Hwy 34& 1 st St			X			5350	\$ 600,000		
Casey's General Store	418 S 7 th Street			X			10,320	\$ 1,000,000		
Corydon Oil company	8 th & Court			X			3300	\$ 750,000		
Kum & Go	1155 N 7 th St			X			1736	\$ 450,000		
Historic Courthouse Square		X	X	X	X	X				

DERBY – TRANSPORTATION OF HAZARDOUS MATERIALS

The table below that depicts the maximum threat to the population and building exposures. Iowa State Highways 14, 65 and 34 offers an increased potential for a Transportation of Hazardous Materials incident. As well as, semis frequently transport along this roadway in addition to local farmers that commonly transport Anhydrous Ammonia tanks. Locally, highway H50 provides a connection to highway 14 to highway 65 and goes through the heart of Derby.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	26	50%	\$625,522			115	50%	58
Commercial	7	4	57%	\$16,863					
Industrial	-	-	-				-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	-	-							
Government	-	-							
Education	-	-	-	-	-	-	-	-	-
Utilities	-	-	-	-	-	-	-	-	-

Derby Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	

LUCAS – TRANSPORTATION OF HAZARDOUS MATERIALS

The Transportation of Hazardous Materials is common in a rural area due to critical farming chemicals. This creates the potential of an incident of hazardous materials in transportation on any state highway or gravel road. A Particular area of concern is State Highway 34 intersects Lucas County from west to east. The route of the highway passes on the southern edge of the City of Lucas. This is the only highway access provided to the City that could provide opportunity for highway accidents.

The rail lines pass through the community of Lucas and can transport hazardous materials. Burlington Northern Santa Fe is the rail line that crosses the southern half of Lucas from east to west. The largest risk occurs along the railroad which transports Nuclear Waste through Lucas County, including the City of Lucas. The community was built around the rail line/coal mining and, therefore, has several homes within 50 yards of the track line. See Appendix 7.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	10	10%	\$2,885,880	\$288,588	10%	216	22	10%
Commercial	13	1	10%	\$231,717	\$23,171	10%			
Industrial	1	1	10%	\$183,000	\$18,300	-	-	-	-
Agricultural	-	-	-	\$482,065	-	-	-	-	-
Religious / Non-profit	2	0	0%						
Government	2	0	0%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Southern Iowa Petroleum, LLC	Hwys 5& 34			X			2400	\$ 540,000	

RUSSELL – TRANSPORTATION OF HAZARDOUS MATERIALS

The Transportation of Hazardous Materials is common in a rural area due to critical farming chemicals. This creates the potential of an incident of hazardous materials in transportation on any state highway or gravel road. A Particular area of concern is the spur highway S56 stemming off of State Highway 34. This provides critical access to the community by emergency personnel. The largest risk occurs along the Burlington Northern Santa Fe Railroad which transports Nuclear Waste through Lucas County, including the City of Russell. See Appendix 7.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	6	25%	\$8,787,186	\$2,196,797	25%	554	139	25%
Commercial	19	5	25%	\$378,610	\$94,653	25%			
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	3	1	10%						
Government	2	1	10%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Community Bldg					X		2800	280,000	

WILLIAMSON – TRANSPORTATION OF HAZARDOUS MATERIALS

The Transportation of Hazardous Materials is common in a rural area due to critical farming chemicals. This creates the potential of an incident of hazardous materials in transportation on any state highway or gravel road. A Particular area of concern is the 2 mile spur highway that connects the jurisdiction to State Highway 14. This is the access of emergency vehicles to the community. The Union Pacific rail line intersects the center of the city of Williamson from north to south and places many houses that are with 50 yards at risk

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	37	50%	\$1,231,664	\$615,822	50%	152	76	50%
Commercial	2	1	50%	\$41,942	\$20,971	50%			
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	1	50%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall								\$ 546,698	\$ 162,365
Sewer Lift Station									
Williamson Community Center								\$ 546,698	\$ 162,365

Loss Estimates

Estimated loss numbers would vary by occurrence and location. Fixed Hazardous Materials could place more than \$64.5 million of property at risk. Pipeline Incident could potentially damage beyond \$103 Million in property. Transportation of Hazardous Materials includes areas along Burlington Northern Railroad and potentially Highways 34, 14 and 65. The estimates place more than \$57 Million in property at risk of a potential loss.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
2	4	4	3	13

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>The SHMT analysis evaluated the probability that a high impact occurrence of a fixed hazardous materials incident has a 10-20% probability to occur in any given year. A high impact occurrence is one defined as an environmental emergency by the Environmental Protection Agency. An environmental emergency is a sudden threat to the public health or the well-being of the environment, arising from the release or potential release of oil, radioactive materials or hazardous chemicals into the air, land, or water. Anecdotal evidence suggests that meth use and production is not uncommon in Lucas County. Chemical spills can occur anytime there is a traffic accident as oil, gasoline, and other fluids used in vehicles are released. Dumping of household cleaners, paints, and old oil can happen at any time and are more likely in areas where people do not understand hazardous materials laws. A number of homes (27%) in Lucas County use LP Gas for heating fuel. Liquid petroleum is not by nature toxic, but can cause asphyxiation through oxygen deprivation. LP Gas is heavier than air so it will sink to the lowest places possible and is flammable. Stores of anhydrous ammonia in the county pose health and safety threats to potentially large areas of the county and are potential targets for meth producers as a source of raw materials.</p> <p>The SHMT evaluated the probability that a serious pipeline transportation incident (enough to cause death and/or large amounts of property damage) will occur in Iowa is a likely chance of occurrence in any given year. About 5 interstate pipelines operate in the state under federal pipeline jurisdiction. There are many high-pressure gas mains throughout the state which supply residential and industrial users. People and property with pipelines on their land or nearby are the most at risk. People excavating earth near a pipeline are also at risk.</p>	2

	<p>Whether the greater hazard is posed to those upwind or downwind from a site depends on the product spilled, for example - natural gas is lighter than air. Private homes and business served by natural gas have smaller diameter pipelines connected to their structure.</p> <p>The underground pipelines cross public streets, roads, and highways as well as streams. Iowa's natural environment is also vulnerable to contamination from an underground pipeline incident. A natural gas pipeline exists through the rural district from the north central county line to the northwest corner of Chariton. A spur line off of this offers service to Williamson. This pipeline is approximately 40 miles in length and provides an opportunity for a Pipeline Incident to occur.</p> <p>Transportation of Hazardous Materials constitutes an accidental release of chemical substances or mixtures that presents a danger to public health or safety during transportation. A hazardous substance is one that may cause damage to person(s), property, or the environment when released to soil, water, or air.</p>	
<p><i>MAGNITUDE / SEVERITY</i></p>	<p>A hazardous materials accident can occur almost anywhere, so any area is considered vulnerable to an accident. People, pets, livestock, and vegetation in close proximity to facilities producing, storing or transporting hazardous substances are at higher risk. Populations downstream, downwind, and downhill of a release 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. Facilities are required to have an offsite consequence plan that addresses the population of the surrounding area. Responding personnel are required to be trained 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.</p> <p>Most of the hazardous materials incidents are localized and are quickly contained or stabilized by the highly trained fire departments and hazardous materials teams. Depending on the characteristic of the hazardous material or the volume of product involved, the affected area can be as small as a room in a building or as large as 5 square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the product contaminates the municipal water supply or water system such as a river, lake or aquifer.</p> <p>The release of some toxic gases cause immediate death, disablement, or sickness if absorbed through the skin, injected, or inhaled. Some chemicals may cause painful and damaging burns to skin if they come in direct contact with your body. 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.</p>	<p>4</p>
<p><i>WARNING TIME</i></p>	<p>When managed properly under regulations, hazardous materials pose little risk. However, when handled improperly or in the event of an accident, hazardous materials can pose a significant risk to the population. Hazardous materials incidents usually occur very rapidly without much warning. Even if reported immediately, people in the area of the release have very little time to be warned and evacuated. During some events, sheltering in-place is the best alternative to evacuation because the material has already affected the areas and there is no</p>	<p>4</p>

	time to evacuate safely. Public address systems, television, radio, and the NOAA Weather Alert Radios are used to disseminate emergency messages about hazardous materials incidents.	
DURATION	Response to a hazardous materials incident release is generally limited to the immediate effects of a release of dangerous materials and their threat to life and property. However, due to the laws surrounding hazardous materials and the duty of the public to inform and protect citizens from the effects of hazardous materials in their vicinity, response is expanded for environmental emergencies.	3
	WEIGHTED SCORE	13

Mitigation

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Address High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5(See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Local Hazardous Materials Capabilities	
Description	Encourage establishment of local hazardous materials team and / or support training for local first responders
Estimated Cost	Moderate to high
Timeline/Schedule	Medium to Long Term
Responsible Entity	City Council and fire department (in partnership with ADLM and / or County)
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 3.1, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Hazardous Materials Protection for storm shelters	
Description	Develop HAMA policies (shutting off air conditioning, closing windows, etc.), prepare kits for sealing off rooms including duct tape and plastic sheeting (see FEMA guidance; http://www.fema.gov/hazard/hazmat/hz_during.shtm)
Estimated Cost	Minimal or Voluntary
Timeline/Schedule	Short Term
Responsible Entity	City Maintenance Dept and Property Owners
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 3.3, 3.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Temporary Debris Disposal Plan	
Description	Develop policy for temporary debris disposal for city and private property owners for post-disaster clean-up
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Council
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Evacuation Plans	
Description	Develop evacuation plans for school, community buildings, and for town
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	City Council and ADLM-Emergency Management
Mitigation Category	Prevention, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.2, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Hazardous Material Disposal	
Description	Develop hazardous materials disposal program incorporating public education, community clean-up days, and household hazardous waste exchange
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	City or Fire Department and Volunteers, ADLM
Mitigation Category	Prevention, Natural Resource Protection, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4 2.5, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Search and Rescue Training for First Responders	
Description	Training Firefighters and other local emergency responders best practices in search and rescue operations
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	Fire Department
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Waste Disposal Enforcement	
Description	Develop or update waste disposal policies and enforce, review for effectiveness
Estimated Cost	Minimal
Timeline/Schedule	Short to Medium Term
Responsible Entity	City Councils
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson, Unincorp County

Hazardous Material Disposal	
Description	Develop hazardous materials disposal program incorporating public education, community clean-up days, and household hazardous waste exchange
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	ADLM emergency management, Chariton Maintenance Dept., Fire Departments
Address High Risk Hazards?	Yes
Mitigation Category	Prevention, Natural Resource Protection, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4 2.5, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Chariton, Derby, Lucas, Russell, Williamson, Unincorp County

Digging Hotline/ Pipeline/ Safety Regulations and education	
Description	Promotion and education of residents about the importance to contact the digging hotline for construction safety regarding electrical lines, pipelines, etc.
Estimated Cost	Minimal
Timeline/Schedule	Short to Medium Term
Responsible Entity	Pipeline industry, city councils,
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 2.4, 3.1, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson, Unincorp County

5. Hazard Profile – Windstorm

Extreme winds associated with severe winter storms, severe thunderstorms, downbursts, and very steep pressure gradients. It may or not may be accompanied by rain or snow. It is difficult to separate windstorms and tornado damage when winds get above 64 knots.

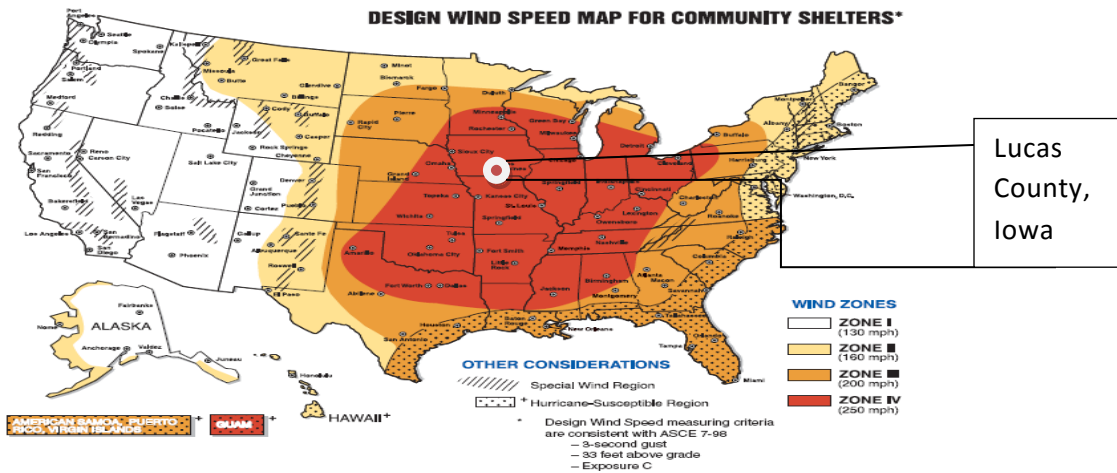
Description

Damage from severe thunderstorm winds account for half of all severe reports in the lower 48 states and is more common than damage from tornadoes. Wind speeds can reach up to 100mph and can produce a damage path extending for hundreds of miles. These winds are often called "straight-line" winds to differentiate the damage they cause from tornado damage. Strong thunderstorm winds can come from a number of different processes. Damaging winds are classified as those exceeding 50-60mph.

Since most thunderstorms produce some straight-line winds as a result of outflow generated by the thunderstorm downdraft, anyone living in thunderstorm-prone areas of the world is at risk for experiencing this phenomenon.

High winds can result from thunderstorm inflow and outflow, or downburst winds when the storm cloud collapses, and can result from strong frontal systems, or gradient winds (high or low pressure systems) moving across a region. High winds are defined as speeds reaching 50 mph or greater, either sustaining (continuous) or gusting. Downdraft winds are from a strong thunderstorm downburst which causes damaging winds on or near the ground, and can extend to as little as 2 ½ miles or extend over a hundred miles. Downdraft wind speeds can be from 80 mph up to 168 mph, and occur quite suddenly as a thunderstorm cloud collapses. This is different from the winds associated with tornadoes. Winds associated with storms are convective. Non-convective winds are caused by fronts or gradient winds. These speeds can range from light breezes to sustained speeds of 80 to 100 mph. Windstorm/High Wind Events can be with little or no rain.

Figure : Wind Zones in the United States



Past Occurrences & Severity

High winds have been responsible for 70 recorded events since 1993 in Lucas County. However, many other high wind events are on record combined with thunderstorms since 1965. High winds tend to affect a large area so an event that impacts Lucas County is very likely to include surrounding counties as well. The numbers charted below encompass more than Lucas County and so the impacts within the county are far less severe. One of the most significant events was on November 10, 1998 which affected 52 counties and resulted in \$17.3 million in property damage, \$260 thousand in crop damages, and one death. This amounts to about \$333 thousand in property damage on average per county, however it is unlikely that each of the affected counties were impacted equally. The chart below provides a summary of NOAA recorded high wind events in the past five years; property and crop damages are in thousands of dollars.

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
LUCAS (ZONE)	LUCAS (ZONE)	IA	01/26/2014	15:00	CST-6	High Wind	50 kts. EG	0	0	25.00K	0.00K
Totals:								0	0	25.00K	0.00K

High winds are also often associated with thunderstorms. NOAA has indicated 11 events of thunderstorm winds occurred in the past five years:

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
RUSSELL	LUCAS CO.	IA	06/01/2010	20:30	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	07/18/2010	03:07	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	06/19/2011	23:45	CST-6	Thunderstorm Wind	54 kts. MG	0	0	5.00K	0.00K
RUSSELL	LUCAS CO.	IA	06/19/2011	23:53	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	06/26/2011	17:04	CST-6	Thunderstorm Wind	57 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	07/23/2011	17:15	CST-6	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
RUSSELL	LUCAS CO.	IA	07/23/2011	17:25	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	50.00K
CHARITON	LUCAS CO.	IA	08/06/2011	22:30	CST-6	Thunderstorm Wind	61 kts. EG	0	0	25.00K	10.00K
WILLIAMSON	LUCAS CO.	IA	08/06/2011	22:50	CST-6	Thunderstorm Wind	52 kts. EG	0	0	2.00K	0.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	04/12/2014	22:00	CST-6	Thunderstorm Wind	52 kts. MG	0	0	0.00K	0.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	06/17/2014	01:15	CST-6	Thunderstorm Wind	57 kts. MG	0	0	25.00K	0.00K
Totals:								0	0	109.00K	60.00K

Vulnerable Locations/Buildings

High winds can cause minor damage to major damage to homes and other buildings. Outdoor furniture, trash cans, yard debris, out buildings and other materials in the immediate vicinity of homes can become air borne missiles and dangerous to people and livestock. Loose shingles, broken tree limbs or trees down are also highly possible.

People living in mobile homes, homes that are built prior to building codes and homes in deteriorating conditions are particularly vulnerable to high winds. People in automobiles and campground are also at a greater risk. Generally an injury is minor and seldom is death associated with a wind storm.

Committee members discussed the most vulnerable locations as the campground at Red Haw Lake and the mobile homes located throughout the county. Also of critical concern is the aged (and possibly weak) housing structure in the area.

Number of Mobile Homes	Number of homes built prior to 1960	Number of Camp slots at Red Haw Lake	
161	976	25	2010 US Census

UNINCORPORATED COUNTY AREA – WINDSTORM

People living in the 29 mobile homes, homes that are built prior to building codes (63% are prior to 1960) and homes in deteriorating conditions are particularly vulnerable to high winds. People in automobiles and campground are also at a greater risk. Generally an injury is minor and seldom is death associated with a wind storm. Committee members discussed the most vulnerable locations as the campground at campgrounds at Red Haw Lake, Williamson Lake, Lake Ellis, Lake Morris and the mobile homes located throughout the county. Also of critical concern is the aged (and possibly weak) housing structure in the area.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	1598	100%	\$127,778,883	\$127,778,883	100%	3540	3540	100%
Commercial	57	57	100%	\$16,815,709	\$16,815,709	100%			100%
Industrial	2	2	100%	\$1,057,800	\$1,057,800		-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Unincorporated County Structural Inventory

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$ 16,000,000	
Landfill		X					40acres	\$600,000	
Lake Red Haw					X		--	\$ 3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	\$6,000,000	
Iowa DOT	Hwy 34						4800	\$ 480,000	

CHARITON – WINDSTORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	1597	100%	\$99,523,675	\$99,523,675	100%	4321	4321	100%
Commercial	217	217	100%	\$28,798,725	\$28,798,725	100%			100%
Industrial	9	9	100%	\$1,475,384	\$1,475,384	100%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	13	100%						
Government	5	5	100%						
Education	9	9	100%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Structural Inventory

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Sq feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000	
Auburn Manor, Inc	815 Auburn St		X				6875	\$ 800,000	
SENECA Area on Aging	117 S Grand St		X				6067	\$ 600,000	
Circle of Life Hospice	1010 N 7 th St		X				3044	\$ 600,000	
Kiddie Kampus	East Court St		X				5200	\$ 1,000,000	

Hammer Medical Supply	110 N Grand st			X			7647	\$ 1,300,000	
Chariton Fire Hall		X		X	X		9796	\$ 2,000,000	
Dept of Correctional Services	115 S Main St			X	X				
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000	
Hy-Vee Store	2001 Court Ave			X			22,600	\$ 4,000,000	
ShopKo	1900 Court Ave			X			22,500	\$ 1,400,000	
Dollar General	307 N Grand St			X			8405	\$ 1,000,000	
Lucas Co Sherriff's office		X			X		5016	\$ 1,200,000	
Farmer's Coop	2120 Osceola Ave			X			7200	\$ 5,000,000	
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000	
Kum & Go	335 Main St			X			2400	\$ 600,000	
Elliott Oil Comp	Hwy 34 & 1 st St			X			5350	\$ 600,000	
Casey's General Store	418 S 7 th Street			X			10,320	\$ 1,000,000	
Corydon Oil company	8 th & Court			X			3300	\$ 750,000	
Kum & Go	1155 N 7 th St			X			1736	\$ 450,000	
Sewer Lift Stations		X					120	\$ 100,000	
Historic Courthouse Square		X	X	X	X	X			
North Ridge Assisted Living	1110 N 6 th St		X						
Chariton Nursing & Rehab Center	1214 N 7 th St		X						
Private In-Home Daycare	511 Orchard Ave		X						
Private In-Home Daycare	26986 550 th St		X						
Private In-Home Daycare	1120 N Grand St		X						
Private In-Home Daycare	720 N 7 th St		X						
Private In-Home Daycare	334 N 7 th St		X						
Private In-Home Daycare	1721 Ilion Ave		X						
Private In-Home Daycare	437 Court Ave		X						
Private In-Home Daycare	806 S 7 th St		X						
Private In-Home Daycare	1430 Franklin Ave		X						
Private In-Home Daycare	311 S 12 th St		X						

School Facilities *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value
Chariton High School	501 N Grand St		X	X	X		70,000	27,000,000	
Chariton Middle School	1300 N 16 th St		X	X	X		50,000	20,000,000	
Van Allen Elementary	1129 Ashland St		X	X	X		31,000	15,000,000	
Columbus Elementary	1215 Linden Ave		X	X	X		15,500	11,000,000	
The Other Hand, Alternative Ed	1516 Court Ave		X	X	X		1400	250,000	
Bus Barn									

LUCAS COUNTY HEALTH CENTER FACILITIES

**Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office. Insured value is according to the hospital's insurance policy.

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value	Occupancy or capacity
Lucas County Health Center	1200 N 7th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed

DERBY - WINDSTORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	52	100%	\$1,251,043	\$1,251,043	100%	115	115	100%
Commercial	7	7	100%	\$33,725	\$33,725	100%			100%
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	-	-	-			-	-	-	-
Government	-	-	-			-	-	-	-
Education	-	-	-			-	-	-	-
Utilities	-	-	-			-	-	-	-

Derby Structural Inventory

**Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	
Private In-Home Daycare	554 Prairie Ave		X						

LUCAS – WINDSTORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	98	100%	\$2,885,880	\$2,885,880	100%	216	216	100%
Commercial	13	13	100%	\$231,717	\$231,717	100%			
Industrial	1	1	100%	\$183,000	\$183,000	-	-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit	1	1	100%						
Government			100%						
Education									
Utilities			-	-	-	-	-	-	-

Lucas Structural Inventory

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
Fire Hall		X					6000	\$ 600,000	
Water plant		X							
Water tower		X						\$ 1,500,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
Lagoon		X					20acres	\$ 65,000	
Gas & Go				X					
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	
Southern Iowa Petroleum, LLC	Hwys 5& 34			X			2400	\$ 540,000	
In-Home Private Daycare	506 Vine St			X					

RUSSELL – WINDSTORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	214	100%	\$8,787,186	\$8,787,186	100%	554	554	100%
Commercial	19	19	100%	\$378,610	\$378,610	100%			100%
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	3	3	100%						
Government	2	2	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	\$ 60,000	
Fire Hall		X					1200	\$ 120,000	
Community Bldg					X		2800	\$ 280,000	
Water plant		X					--		
Water tower		X					--	\$ 1,000,000	
City Maintenance/ Storage					X		1860	\$ 100,000	
Lagoon		X					20acres	\$ 100,000	
Public Library/Russell Historical Society Museum	106 S Prairie St					X	2000	\$ 450,000	
D&D Market	114 S Prairie St			X			1859	\$ 260,000	

WILLAMSON – WINDSTORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	73	100%	\$1,231,664	\$1,231,664	100%	152	152	100%
Commercial	2	2	100%	\$41,942	\$41,942	100%			100%
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	2	100%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall								\$546,698	\$ 162,365
Sewer Lift Station									
Williamson Community Center								\$ 546,698	\$ 162,365

Loss Estimate

Countywide damage was established from the NCDC data base for some hazards up to 65 years. Loss factors were developed specific to the attributes of Windstorms throughout the region. These factors were able to provide an annual damage estimate by dividing the total loss by number of years of data. Per event damage calculated by dividing total loss by number of events. During the past 19 years, approximately 20 windstorms have caused \$785,110 in damages. This estimates \$41,322 annually. This timeframe Lucas County experienced approximately \$30,100 in crop damage and estimates damaged \$1,584 annually.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
3	3	1	2	9

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>Large scale extreme wind phenomena are experienced over every region of the United States. Historically, windstorm events are associated with severe thunderstorms and blizzards. It is often difficult to separate windstorms and tornado damage when winds get above 64 knots.</p> <p>Based on historical averages, Iowa would expect to have about 15-20 windstorm events per year. Based on historical information into storms with the potential to cause large scale power outages, the SHMT determined the probability of occurrence is between 10%-20% in any given year.</p>	3

<i>MAGNITUDE / SEVERITY</i>	<p>Vulnerability to Windstorm/High Wind Events is very similar to tornadoes as Windstorm/High Wind Events mimic tornadoes in their effects. Buildings may be damaged by debris picked up by the storm, windows could be potentially blown out, and vehicles may be overturned. Persons in mobile homes, outdoors, and in vehicles during Windstorm/High Wind Events are at the most risk. People who may not understand watches and warnings due to the language barriers are also at risk.</p> <p>Unlike tornadoes, windstorms may have a destructive path that is tens of miles wide and several hundreds of miles long. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with a storm.</p> <p>Disruption of critical services can also affect operations. Employees may be affected and unable to attend work-related issues. Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows to complete destruction and disintegration of well-constructed structures, infrastructure and trees. Windstorms can impact many critical services, mainly electrical power. Buried services are not as vulnerable but can be affected by their system components that are above ground.</p> <p>Economic impacts can result from direct damages to facilities or business disruption from the lack of critical services such as power. Crop damage is often associated with wind storms; laying down crops, breaking stalks, and twisting plants, reducing the yield and making it difficult to harvest.</p>	3
<i>WARNING TIME</i>	Wind speeds may approach 120 miles per hour and the storm can travel across the ground at more than 50 mph. These winds can uproot trees and structures and turn harmless objects into deadly missiles all in a matter of seconds. The advancement in weather forecasting has allowed watches to be delivered to those in the path of these storms up to hours in advance. The best lead-time for a specific severe storm and tornado is about 30 minutes.	1
<i>DURATION</i>	The response to a windstorm event is tied to responding to the immediate threat to life and property immediately following the event. Response time is limited to event duration and immediate impact.	2
	WEIGHTED SCORE	9

Mitigation

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what to do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Address High Risk Hazards?	yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorporated County, Williamson

Safe Rooms	
Program/Project Description	Risk to lives can be improved through construction and use of concrete safe rooms in homes and shelter areas of mobile home parks, fairgrounds, shopping malls, & other vulnerable public areas.
Anticipated Cost	Moderate to high – grant dependent
Timeline/Schedule	Long term
Responsible Agency	School Board/ Board of Directors
Mitigation Category	Structural project
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 3.1, 3.3 (See page 42 or Appendix)
Address High Risk Hazards?	yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Storm Warning System	
Description	Acquisition and installation of community early warning system to compliment system at fire station
Estimated Cost	Moderate to high
Timeline/Schedule	Long Term
Responsible Entity	City Council
Mitigation Category	Structural Project
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 3.2 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Demolish & Remove Dilapidated Buildings	
Description	Leverage funds for property owners or cities that are unable to afford to remove/repair/demolish dilapidated structures.
Estimated Cost	Moderate-high
Timeline/Schedule	Ongoing
Responsible Entity	City Council, Property Owners, ADLM
Mitigation Category	Property Protection, Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.4, 2.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Weather Radios	
Description	Encouragement of residents and businesses to obtain NOAA weather radios
Estimated Cost	Voluntary program; approximately \$30 per radio
Timeline/Schedule	Short Term
Responsible Entity	City Council and city residents
Mitigation Category	Prevention and Public Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.2, 3.3, 3.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Temporary Debris Disposal Plan	
Description	Develop policy for temporary debris disposal for city and private property owners for post-disaster clean-up
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Council
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Rehabilitate Older, historic Buildings	
Description	Encourage property maintenance and help leverage funds for property owners unable to afford more significant structural maintenance
Estimated Cost	Minimal to moderate
Timeline/Schedule	Ongoing
Responsible Entity	City Council, Property Owners
Mitigation Category	Property Protection, Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.3 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Tree Management/Trimming	
Description	Encourage private home owners, businesses, and jurisdictions to regularly perform tree trimming and maintenance to prevent limb breakage and for safeguarding nearby utility lines.
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City council, property home owners, utility companies
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 2.1, 2.3, 3.1 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Manufactured Home Tie-Downs	
Description	Encourage incorporated and rural manufactured homes to be secured by tie-downs to the ground. This anchoring can prevent damage and injuries.
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City council, property owners,
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	11, 1.3, 2.1, 2.4, 3.1 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

6. Hazard Profile – Terrorism

This hazard encompasses the following consolidated hazards from the 2007 mitigation plan: 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 treat again 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.

Description

ENEMY ATTACK – is an incident that would cause massive destruction and extensive casualties. An all-out war would affect the entire population. Some areas would experience direct weapons' effects: blast, heat, and nuclear radiation; others would experience indirect weapons' effect, primarily radioactive fallout.

PUBLIC DISORDER – Mass demonstrations, or direct conflict by large groups of citizens, as in marches, protest rallies, riots, and non-peaceful strikes are examples of public disorder. These are assembling of people together in a manner to substantially interfere with public peace to constitute a threat, and with use of unlawful force or violence against another person, or causing property damage or attempting to interfere with, disrupting, or destroying the government, political subdivision, or group of people. Labor strikes and work stoppages are not considered in this hazard unless they escalate into a threat to the community. Vandalism is usually initiated by a small number of individuals and limited to a small target group or institution. Most events are within the capacity of local law enforcement.

BIOLOGICAL TERRORISM – use of biological agents against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom can be described as biological terrorism. Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point of line sources such as munitions, covert deposits and moving sprayers. Biological agents may pose viable threats from hours to years depending upon the agent and the conditions in which it exists. Depending on the agent used and the effectiveness with which it is deployed, contamination can be spread via wind and water. Infections can be spread via human or animal vectors.

AGRO-TERRORISM – Causing intentional harm to an agricultural product or vandalism of agricultural/animal related facility is agro-terrorism. This category covers a large variety of incidents from potential to intentional introduction of disease; vandalism of facilities; theft of agricultural products, machinery, or chemicals; release of animals; and contamination of agricultural products. Depending on the type of action taken, the implications will vary greatly. Activities could include the following examples: animal rights activities who release mink or lab animals; disgruntled employees who intentionally contaminated bulk milk tanks or poison animals; eco-terrorists who destroy crops/facilities; theft of agricultural products, machinery, or chemicals; or criminals who vandalize agricultural facilities.

CHEMICAL TERRORISM - this involves the use or threat of chemical agents against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom. Liquid/aerosol or dry contaminants can be dispersed using sprayers or other aerosol generators; liquids vaporizing from puddles/containers; or munitions. Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists. Contamination can be carried out of the initial target area by persons, vehicles, water and wind. Chemicals may be corrosive or otherwise damaging over time if not mitigated.

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

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

RADIOLOGICAL TERRORISM – This is the use of radiological materials against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom. Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point of line resources such as munitions, covert deposits, and moving sprayers or by the detonation of nuclear device underground, at the surface, in the air or at high altitude.

Past Occurrences & Severity

ENEMY ATTACK – 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. There have been no enemy attacks on or in Iowa in modern times. The only history of enemy attack dates back to the days of settlement and the Civil War in the 1800's. The breakup of the Soviet Union and other Soviet-Bloc nations has ended the Cold War. However, an enemy attack is still a possibility due to international conflicts and the large number of weapons still in existence throughout the world.

PUBLIC DISORDER – Large-scale civil disturbances rarely occur, but when they do they are usually an offshoot or result of one or more of the following events; 1) labor disputes where there is a high degree of animosity between the participating parties; 2) high profile/controversial laws or other governmental actions; 3) resource shortage caused by a catastrophic event; 4) disagreements between special interest groups over a particular issue or cause; 5) a perceived unjust death or injury to a person held in high esteem or regard by a particular segment of society. There have been numerous labor disputes and protests in Iowa, but these have remained fairly non-violent. Other non-peaceful incidents have occurred in the state, but within the state, but within the response capabilities of local law enforcement.

BIOLOGICAL TERRORISM - Iowa has not been immune to acts of terrorism or sabotage, the state has experienced many threats in the past. Most incidents have been limited to reported "suspect" powders, actual threats, and hoaxes. Beginning in October 2001, following the original "Amerithrax" scares, we experienced a large number of responses for suspicious powders. Following the development of a threat assessment/response protocol the number of response was reduced; and now average a few responses each month. All of the biological terrorism incidents that have occurred were in the metropolitan areas. There have been 16 threats in Iowa from 2007-2009. Most of the substances happened in the postal locations. None contained an actual hazardous or toxic substance.

AGRO-TERRORISM – Incidents such as this have occurred in the state of Iowa. Over the past 10 years, Iowa has experienced at least 10 incidents in which animal rights activities have vandalized or released animals in our agricultural facilities. Additionally, there has been vandalism to agricultural facilities or incidents of disgruntled employees causing damage to animals and animal products. There are frequent cases of theft of agricultural machinery, products, and chemical.

CHEMICAL TERRORISM - Iowa has not been immune to acts of terrorism or sabotage. The chemical terrorism history, fortunately, has been limited. We experience at least one event in 2005, where a subject mailed "rat poison" to a number of 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. We have experienced 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. We have experienced many releases of anhydrous ammonia by persons engaged in clandestine drug manufacturing. At least two events occurred in Des Moines between 2007 and 2009 but were later assessed as non-threatening and non-criminal.

CONVENTIONAL TERRORISM - The state of Iowa has experienced many bomb threats in the distant and recent past. 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.

CYBER ATTACK- Cyber-security and critical infrastructure protection are among the most important national security issues facing our country today, and they will only become more challenging in the years to come. Recent attacks on our

infrastructure components have taught us that security has been a relatively low priority in the development of computer software and internet systems. These attacks not only have disrupted electronic commerce, but have also had a deliberating effect on public confidence in the internet.

RADIOLOGICAL TERRORISM – There is no history of radiological terrorism in Iowa. Since there is almost no record of acts of nuclear terrorism, an approach other than the traditional approach to probability of occurrence is needed to estimate the probability.

Vulnerable Locations/Buildings

UNINCORPORATED COUNTY AREA – TERRORISM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	1598	100%	\$127,778,883	\$127,778,883	100%	3540	3540	100%
Commercial	57	57	100%	\$16,815,709	\$16,815,709	100%			100%
Industrial	2	2	100%	\$1,057,800	\$1,057,800		-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Unincorporated County Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$ 16,000,000	
Landfill		X					40acres	\$ 600,000	
Lake Red Haw					X		--	\$ 3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	\$ 6000,000	
Iowa DOT	Hwy 34			X			4800	\$ 480,000	

CHARITON – TERRORISM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	1597	100%	\$99,523,675	\$99,523,675	100%	4321	4321	100%
Commercial	217	217	100%	\$28,798,725	\$28,798,725	100%			100%
Industrial	9	9	100%	\$1,475,384	\$1,475,384	100%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	13	100%						
Government	5	5	100%						
Education	9	9	100%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Structural Inventory

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000	
Auburn Manor, Inc	815 Auburn St		X				6875	\$ 800,000	
SENECA Area on Aging	117 S Grand St		X				6067	\$ 600,000	
Circle of Life Hospice	1010 N 7 th St		X				3044	\$ 600,000	
Kiddie Kampus	East Court St		X				5200	\$ 1,000,000	
Hammer Medical Supply	110 N Grand st			X			7647	\$ 1,300,000	
Chariton Fire Hall		X		X	X		9796	\$ 2,000,000	
Dept of Correctional Services	115 S Main St			X	X				
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000	
Hy-Vee Store	2001 Court Ave			X			22,600	\$ 4,000,000	
ShopKo	1900 Court Ave			X			22,500	\$ 1,400,000	
Dollar General	307 N Grand St			X			8405	\$ 1,000,000	
Lucas Co Sherriff's office		X			X		5016	\$ 1,200,000	
Farmer's Coop	2120 Osceola Ave			X			7200	\$ 5,000,000	
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000	
Kum & Go	335 Main St			X			2400	\$ 600,000	
Elliott Oil Comp	Hwy 34& 1 st St			X			5350	\$ 600,000	
Casey's General Store	418 S 7 th Street			X			10,320	\$1,000,000	
Corydon Oil company	8 th & Court			X			3300	\$ 750,000	
Kum & Go	1155 N 7 th St			X			1736	\$ 450,000	
Sewer Lift Stations		X					120	\$ 100,000	
Historic Courthouse Square		X	X	X	X	X			
North Ridge Assisted Living	1110 N 6 th St		X						
Chariton Nursing & Rehab Center	1214 N 7 th St		X						
Private In-Home Daycare	511 Orchard Ave		X						
Private In-Home Daycare	26986 550 th St		X						
Private In-Home Daycare	1120 N Grand St		X						
Private In-Home Daycare	720 N 7 th St		X						
Private In-Home Daycare	334 N 7 th St		X						
Private In-Home Daycare	1721 Ilion Ave		X						
Private In-Home Daycare	437 Court Ave		X						
Private In-Home Daycare	806 S 7 th St		X						
Private In-Home Daycare	1430 Franklin Ave		X						
Private In-Home Daycare	311 S 12 th St		X						

School Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value
Chariton High School	501 N Grand St		X	X	X		70,000	27,000,000	
Chariton Middle School	1300 N 16 th St		X	X	X		50,000	20,000,000	
Van Allen Elementary	1129 Ashland St		X	X	X		31,000	15,000,000	
Columbus Elementary	1215 Linden Ave		X	X	X		15,500	11,000,000	
The Other Hand, Alternative Ed	1516 Court Ave		X	X	X		1400	250,000	
Bus Barn									

LUCAS COUNTY HEALTH CENTER FACILITIES

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office. Insured value is according to the hospital's insurance policy.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value	Occupancy or capacity
Lucas County Health Center	1200 N 7th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed

DERBY - TERRORISM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	52	100%	\$1,251,043	\$1,251,043	100%	115	115	100%
Commercial	7	7	100%	\$33,725	\$33,725	100%			100%
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-

Derby Structural Inventory

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Comm. Center					X		1800	\$ 180,000	
Private In-Home Daycare	554 Prairie Ave		X						

LUCAS – TERRORISM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	98	100%	\$2,885,880	\$2,885,880	100%	216	216	100%
Commercial	13	13	100%	\$231,717	\$231,717	100%			
Industrial	1	1	100%	\$183,000	\$183,000	-	-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit			100%						
Government			100%						
Education									
Utilities			-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
Fire Hall		X					6000	\$ 600,000	
Water plant		X							
Water tower		X						\$ 1,500,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
Lagoon		X					20acres	\$ 65,000	
Gas & Go				X					
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	
Southern Iowa Petroleum, LLC	Hwys 5 & 34			X			2400	\$ 540,000	
In-Home Private Daycare	506 Vine St			X					

RUSSELL - TERRORISM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	214	100%	\$8,787,186	\$8,787,186	100%	554	554	100%
Commercial	19	19	100%	\$378,610	\$378,610	100%			100%
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	\$320,790	-	-	-	-
Religious / Non-profit	3	3	100%						
Government	2	2	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	\$ 60,000	
Fire Hall		X					1200	\$ 120,000	
Community Bldg					X		2800	\$ 280,000	
Water plant		X					--		
Water tower		X					--	\$ 1,000,000	
City Maintenance/ Storage					X		1860	\$ 100,000	
Lagoon		X					20acres	\$ 100,000	
Public Library/Russell Historical Society Museum	106 S Prairie St					X	2000	\$ 450,000	
D&D Market	114 S Prairie St			X			1859	\$ 260,000	

WILLAMSON – TERRORISM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	73	100%	\$1,231,664	\$1,231,664	100%	152	152	100%
Commercial	2	2	100%	\$41,942	\$41,942	100%			100%
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	2	100%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall								\$ 546,698	\$162,365
Williamson Comm. Center								\$ 546,698	\$162,365

Loss Estimate

The likelihood of terrorism is low in this rural area of the United States. Any event could have significant loss of life and/or property. The greatest risk and potential loss would include the industries that the Iowa Bioprocessing Center with the potential losses in the hundreds of millions of dollars and hundreds of residents who are employed.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
1	3	4	4	12
EVALUATION CRITERIA	DESCRIPTION			SCORE
<i>PROBABILITY</i>	<p>ENEMY ATTACK – The SHMT has evaluated the probability that an energy attack will occur in Iowa is unlikely in any given year. Although Des Moines is the state capitol, county seat, and most populous city and thus a potential target in an all-out attack on the United States, it is unlikely that Iowa would be a primary target during an enemy attack. The U.S. federal government monitors global political global political situations and provides security from international attacks. World events in recent years have greatly changed the nature of enemy attack/war.</p> <p>PUBLIC DISORDER – Although large-scale destructive civil disturbances are rare, the potential is always there for an incident to occur. This is even more true today, where television, radio, and the internet provide the ability to instantly broadcast information (factual or not), in real time, to the entire community. Often times that coverage helps to spread the incident to other, uninvolved or unaffected areas, exacerbating an already difficult situation. This also allows insightful people, previously not involved, to participate in the disturbance for no other reason than to riot, loot, burn, and destruct. Alcohol is often involved in public disorder, especially related to college campuses, sporting events, and concerts. The SHMT has evaluated the probability that a serious public disorder event is unlikely to occur in Iowa in any given year.</p> <p>BIOLOGICAL TERRORISM – The SHMT analysis evaluated the probability that a biological terrorism will possibly occur in Iowa with a probability of unlikely in any given year.</p> <p>AGRO-TERRORISM – The SHMT analysis evaluated the probability that a serious agro terrorism event is unlikely to occur in Iowa in any given year.</p> <p>CHEMICAL TERRORISM - The SHMT analysis evaluated the probability that chemical terrorism will occur in Iowa as unlikely in any given year.</p> <p>CONVENTIONAL TERRORISM - The SHMT analysis evaluated the probability of a high impact conventional terrorism incident occurring in Iowa in any given year to be unlikely.</p> <p>CYBER ATTACK- the SHMT analysis evaluated the probability that a serious impact intrusion will occur in Iowa as unlikely in Iowa any given year.</p> <p>RADIOLOGICAL TERRORISM – with no prior events by which to judge probability, it becomes necessary to consider the technical feasibility of radiological terrorism. Given that the radiation would kill anyone before they could amass enough material to produce a weapon, the threat is relatively low. Technical feasibility is important because whatever is feasible might also be realized and might happen. The threat is relatively low because it is technically infeasible to construct such a weapon for terrorist uses. The SHMT analysis evaluated the probability that radiological terrorism is unlikely to happen or has unlikely probability in any given year.</p>			1
<i>MAGNITUDE /</i>	Since the targets of attacks on critical infrastructure would likely include both facilities in the economy and those in the government. These critical			3

<p><i>SEVERITY</i></p>	<p>infrastructures include information and communication systems; electrical power systems; gas and oil production, storage, and transportation systems; banking and finance organizations; transportation distribution systems; water supply systems; emergency services; and governmental services. Nearly every citizen, business and organization depends on these for normal operation as well as safety and security. If not affected directly, the entire community would be vulnerable through indirect impacts.</p> <p>While the entire state would likely be affected in some sort of way, areas near government buildings, military complexes, and transportation, communication, and fuel facilities would experience the largest impacts. A full-scale attack in the foreseeable future is not likely; however, a limited attack could take place that could potentially threaten target areas. Given the tremendous destructive capability of even one nuclear weapon, the devastation that could occur would be far worse than anything ever experienced in this country.</p> <p>Innocent people are often victims of terrorist activity targeted at certain organizations and activities. Based on the method of delivery, the general public is vulnerable to bioterrorism. State and local agencies developed the Biological Chemical Threat Agent (BCTA) Protocol Model to guide response agencies. The American public is not vaccinated for many of the agents used as weapons by Terrorist groups. Iowa vaccinated volunteers against smallpox at 15 hospitals in early 2003. The US Postal Service installed Bio-Detection Systems (BDS) in 2005-06 in several postal sorting facilities in Iowa to address early detection since many of the threats have used the postal delivery system.</p> <p>Because of the characteristics of the weapons terrorists use, the area can be limited to a room, building, or an entire community. Depending on the agent used and the effectiveness with which it is deployed, contamination can be spread via wind and water. Infections can be spread via human or animal vectors. Because of the variables described above, the geographic extent can become quite broad before the incident is recognized as a terrorist act.</p> <p>Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists. Shielding in the form of sheltering in place can protect people and property from harmful effects. There are a limited number of antidotes available to reduce the vulnerability from chemical agents.</p> <p>Cyber security professionals argue that current approaches are inadequate. With companies increasingly using the internet to connect to suppliers and customers, they say organizations place too much faith in technology to protect their data and do not pay enough attention to security education and awareness. Inadequate security can facilitate access to critical computer systems, allowing them to be sued to conduct attacks. Our society is highly networked and interconnected and an attack could be launched from anywhere in the world.</p> <p>Duration of exposure to the effects of radiological terrorism, distance from the source of radiation and the amount of shielding between source and target determine exposure to radiation. Initial effects will be localized to site of attack; depending on meteorological conditions, subsequent behavior of radioactive contaminants may be dynamic. Given the technical feasibility of radiological terrorism, the severity of an incident would primarily be isolated to the detonation of explosive materials; however the discovery of slightly elevated radiation levels would incite hysteria amongst the uninformed public.</p>	
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	Civil disturbances are often difficult for local communities to handle. There is a fine line between the Constitutional right of individuals and groups to assemble and air their grievances and the overall needs of the community to provide essential services, ensure personal safety of citizens, prevent property damage, and facilitate normal commerce. Fortunately, most demonstrations and large public gatherings are held in a peaceful manner. People can be at risk are the participants and law enforcement officials. Innocent bystanders and their property can also be at risk.	
<i>WARNING TIME</i>	<p>As mentioned above, the U.S. government monitors worldwide political and military activity. The citizens and states of the US would be put on heightened alert during periods of intense political or military conflict. With Iowa's position in the interior of the US there would likely be significant warning of an impending enemy attack.</p> <p>Acts of terrorism can be immediate and often come after little or no warning. 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. However, 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. Because of the networks (formal and informal) that exist to share intrusion attempts and impacts, warnings can be put out in advance to alert those in similar situations to take protective security recommendations such as updating virus protection software, making sure security patches are in place, etc. Warning times can range from no warning to days. Because of our highly involved computer networks and data sharing, bugs, viruses, and worms can proliferate rapidly. Effects of hacking can be instantaneous.</p> <p>Events that incite public disorder can build up over hours, days, or years, and the violent disturbance is a culmination of the long-term situation. Civil disruptions can also escalate very rapidly following events where people are gathered such as sporting events, concerts, and speeches.</p>	4
<i>DURATION</i>	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.	4
	WEIGHTED SCORE	12

Mitigation

Critical Infrastructure Protection (CIP) from terrorism	
Description	Critical Infrastructure Protection will be a prominent part of a community risk assessment & threat assessment. It will identify vulnerabilities and possible targets for terroristic actions. The CIP insures that critical services such as water, electricity, telephones, roads, bridges, etc. in the event of an act of terrorism.
Estimated Cost	Moderate
Timeline/Schedule	Long Term
Responsible Entity	City Council, First Responders, ADLM
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 3.1, 3.2, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, ,Lucas, Russell, Unincorp County, Williamson

Assessment Risk for Terrorism	
Description	Local jurisdictions will develop a through risk and threat assessment that identifies potential vulnerabilities and potential targets for a terroristic attack.
Estimated Cost	Moderate
Timeline/Schedule	Long Term
Responsible Entity	City council, First Responders, ADLM,
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 2.2, 2.3, 3.1, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, ,Lucas, Russell, Unincorp County, Williamson

7. Hazard Profile – Tornado

A tornado is a violently rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of 1 mile wide and 50 miles long (FEMA 386-2 CD).

Description

Tornadoes are among the most unpredictable of weather phenomena. While tornadoes can occur almost anywhere in the world, they are most prevalent in the United States. According to the National Weather Service, about 42 people are killed because of tornadoes each year. Tornadoes can occur in any state but are more frequent in the Midwest, Southeast, and Southwest. Tornado season runs ordinarily from March through August; however, tornadoes can strike at any time of the year if the essential conditions are present.

Thunderstorms and hurricanes spawn tornadoes when cold air overrides a layer of warm air, causing the warm air to rise rapidly. The winds produced from hurricanes, earthquake-induced fires, and wildfires have also been known to produce tornadoes. The frequency of tornadoes in the nation's midsection is the result of the recurrent collision of moist, warm air moving north from the Gulf of Mexico with colder fronts moving east from the Rocky Mountains.

Tornadoes were measured in intensity with the Fujita Scale which was then updated with the Enhanced Fujita Scale (EFS) in 2006. The EFS lowers the Fujita Scale threshold for each category ranging from 1 to 5 with 5 being the most intense with wind speeds in excess of 200 mph for at least 3 seconds (wind gusts). An additional scale is available called the Fujita-Pearson Scale which matches the Fujita Scale ratings and wind speeds with tornado path lengths and widths.

Figure 4: Fujita Scale

ORIGINAL FUJITA SCALE		ENHANCED FUJITA SCALE	
F5	261-318 mph	EF5	+200 mph
F4	207-260 mph	EF4	166-200 mph
F3	158-206 mph	EF3	136-165 mph
F2	113-157 mph	EF2	111-135 mph
F1	73-112 mph	EF1	86-110 mph
F0	<73 mph	EF0	65-85 mph

Source: National Oceanic and Atmospheric Administration, <http://www.srh.noaa.gov/lch/jamb/jambalaya0407-5.php>

Table 2: Tornado Paths - LENGTH and Width

FUJITA-PEARSON TORNADO SCALE				
PEARSON RATING	LENGTH	WIDTH	FUJITA RATING	WIND SPEED
P0	0.3 - 0.9 MILES	6-17 YARDS	F0	40-72 MPH
P1	1.0-3.1 MILES	18-55 YARDS	F1	73-112 MPH
P2	3.2-9.9 MILES	56-175 YARDS	F2	113-157 MPH
P3	10.0-31.0 MILES	176-566 YARDS	F3	158-206 MPH
P4	32.0-99.0 MILES	0.3-0.9 MILES	F4	207-260 MPH
P5	100.0-315.0 MILES	1.0-3.1 MILES	F5	261-318 MPH

Source: <http://www.stormfax.com/fujita.htm>

Past Occurrences & Severity

In the U.S., Iowa is ranked third in the number of tornadoes per 10,000 square miles. From 1950-2010, Iowa averaged 47 twisters per year. In Iowa most tornadoes occur in the spring and summer months, but twisters can and have occurred in every month of the year. Late afternoon to evening hour tornadoes are the most common, but they can occur at any time of the day. According to the National Climactic Data Center, Iowa has had 2,375 tornadoes events from 1980-2010. From 1950-2006, eleven Presidential Declarations of Major Disaster have been declared in Iowa that were related to tornadoes out of 1964 total events. Historically, 40-50 tornadoes are confirmed in Iowa each year.

- a. Injury or death related to tornadoes most often occurs when buildings collapse; people are hit by flying objects or are caught trying to escape the tornado in a vehicle.
- b. Response personnel are exposed to the same risk as the general public when caught in the storm without shelter.
- c. Tornadoes can destroy government facilities just as they could other property. Disruption of critical services can also affect operations. Employees may be affected and unable to attend work-related issues.
- d. Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows; all the way to complete destruction and disintegration of well-constructed structures, infrastructure, and trees.
- e. Tornadoes can impact many critical services, mainly electrical power. Buried services are not as vulnerable, but can be affected by their system components that are above ground.

- f. Tornadoes are naturally occurring phenomena. Damages to the environment could result from spills and other contaminants from the built environment.
- g. Whole towns have been known to be “wiped off the map” such as Greensburg, KS in recent years. Economic impacts can result from direct damages to facilities or business disruption from the lack of critical services such as power, gas, or water.
- h. Debris removal is a vital service that is often too vast for the jurisdiction to do without contractual assistance. These plans should be in place and monitored; a debris management plan is in progress including Lucas County.

Adequate warning is critical to the positive reputation of the jurisdiction. Responding in a timely manner and reconstructing the community is also important. Bringing critical services back on line quickly will ensure the residents can begin their personal recovery process sooner.

Lucas County has had 8 recorded Tornadoes between 1967 and 2014. None of these Tornadoes has exceeded F3 status. A total of eight injuries, \$250 million in property damage.

Vulnerable Locations/Buildings

Lucas County is located in the path known as “Tornado Alley” in the United States in which Tornadoes are most frequent. Tornado damage can be minimal from minor roof damage, broken glass, and windows to the extreme of total destruction. People living in manufactured homes are particularly vulnerable to extreme wind events or Tornadoes. Older homes in deteriorating condition are also vulnerable, however there is no information about the number of homes needing rehabilitated. There are 1417 housing units located in the unincorporated areas of the County. It was acknowledged by the HMGP committee that there are many variables that dictate the vulnerability of structures or injured people. These factors include wind speed, time on the ground, length/width of the cell, population density, building density, age & construction of buildings and time of day. It was determined regardless of the strength; the most vulnerable population is the elderly, very young, people with disabilities, mobile homes, and structures that are prior to 1950’s.

Jurisdiction	Population 65yrs & older		Population 19 years & younger		Population living below poverty guidelines		Residents living with a diagnosed disability	
Unincorporated Co	268	7.5%	910	25.7%	602	17%	637	18%
Chariton	948	21.9%	1166	26.9%	488	11.2%	298	6.8%
Russell	98	17.7%	177	32%	51	15%	32	9.4%
Lucas	43	19.9%	49	22.6%	15	6.9%	35	16.2%
Derby	18	5.6%	29	25.2%	14	12.1%	9	7.8%
Williamson	26	17.1%	41	26.9%	23	15.1%	11	7.2%

Jurisdiction	Number of Mobile Homes		Number of homes built prior to 1960		
Unincorporated Co	161	55.7%	976	29.6%	2010 Census
Chariton	44	2%	1317	62.6%	
Russell	8	3.8%	97	46.5%	
Lucas	16	14.8%	75	69.4%	
Derby	8	12.9%	30	48.3%	
Williamson	52	45.6%	87	76.3%	

UNINCORPORATED COUNTY AREA – TORNADO

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	1598	100%	\$127,778,883	\$127,778,883	100%	3540	3540	100%
Commercial	57	57	100%	\$16,815,709	\$16,815,709	100%			100%
Industrial	2	2	100%	\$1,057,800	\$1,057,800		-	-	-
Agricultural							-	-	-
Religious / Non-profit	5	5							
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Unincorporated County Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$16,000,000	
Landfill		X					40acres	\$ 600,000	
Lake Red Haw					X		--	\$ 3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	\$ 6,000,000	
Iowa DOT	Hwy 34						800	\$ 480,000	

CHARITON – TORNADO

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	1597	100%	\$99,523,675	\$99,523,675	100%	4321	4321	100%
Commercial	217	217	100%	\$28,798,725	\$28,798,725	100%			100%
Industrial	9	9	100%	\$1,475,384	\$1,475,384	100%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	13	100%						
Government	5	5	100%						
Education	9	9	100%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000	
Auburn Manor, Inc	815 Auburn St		X				6875	\$ 800,000	

SENECA Area on Aging	117 S Grand St		X				6067	\$ 600,000	
Circle of Life Hospice	1010 N 7 th St		X				3044	\$ 600,000	
Kiddie Kampus	East Court St		X				5200	\$ 1,000,000	
Hammer Medical Supply	110 N Grand st				X		7647	\$ 1,300,000	
Chariton Fire Hall		X		X	X		9796	\$ 2,000,000	
Dept of Correctional Services	115 S Main St			X	X				
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000	
Hy-Vee Store	2001 Court Ave			X			22,600	\$ 4,000,000	
ShopKo	1900 Court Ave			X			22,500	\$ 1,400,000	
Dollar General	307 N Grand St			X			8405	\$ 1,000,000	
Lucas Co Sherriff's office		X			X		5016	\$ 1,200,000	
Farmer's Coop	2120 Osceola Ave			X			7200	\$ 5,000,000	
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000	
Kum & Go	335 Main St			X			2400	\$ 600,000	
Elliott Oil Comp	Hwy 34 & 1 st St			X			5350	\$ 600,000	
Casey's General Store	418 S 7 th Street			X			10,320	\$1,000,000	
Corydon Oil company	8 th & Court			X			3300	\$ 750,000	
Kum & Go	1155 N 7 th St			X			1736	\$ 450,000	
Sewer Lift Stations		X					120	\$ 100,000	
Historic Courthouse Square		X	X	X	X	X			
North Ridge Assisted Living	1110 N 6 th St		X						
Chariton Nursing & Rehab Center	1214 N 7 th St		X						
Private In-Home Daycare	511 Orchard Ave		X						
Private In-Home Daycare	26986 550 th St		X						
Private In-Home Daycare	1120 N Grand St		X						
Private In-Home Daycare	720 N 7 th St		X						
Private In-Home Daycare	334 N 7 th St		X						
Private In-Home Daycare	1721 Ilion Ave		X						
Private In-Home Daycare	437 Court Ave		X						
Private In-Home Daycare	806 S 7 th St		X						
Private In-Home Daycare	1430 Franklin Ave		X						
Private In-Home Daycare	311 S 12 th St		X						

School Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor's

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value
Chariton High School	501 N Grand St		X	X	X		70,000	\$27,000,000	
Chariton Middle School	1300 N 16 th St		X	X	X		50,000	\$20,000,000	
Van Allen Elementary	1129 Ashland St		X	X	X		31,000	\$15,000,000	
Columbus Elementary	1215 Linden Ave		X	X	X		15,500	\$11,000,000	
The Other Hand, Alternative Ed	1516 Court Ave		X	X	X		1400	\$ 250,000	
Bus Barn									

LUCAS COUNTY HEALTH CENTER FACILITIES

**Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office. Insured value is according to the hospital's insurance policy.

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value	Occupancy or capacity
Lucas County Health Center	1200 N 7th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed

DERBY - Tornado

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	52	100%	\$1,251,043	\$1,251,043	100%	115	115	100%
Commercial	7	7	100%	\$33,725	\$33,725	100%			100%
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-

Derby Structural Inventory

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	
Private In-Home Daycare	554 Prairie Ave		X						

LUCAS – TORNADO

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	98	100%	\$2,885,880	\$2,885,880	100%	216	216	100%
Commercial	13	13	100%	\$231,717	\$231,717	100%			
Industrial	1	1	100%	\$183,000	\$183,000	-	-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit	1	1	100%						
Government			100%						
Education									
Utilities			-	-	-	-	-	-	-

Lucas Structural Inventory

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
Fire Hall		X					6000	\$ 600,000	
Water plant		X							
Water tower		X						\$ 1,500,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
Lagoon		X					20acres	\$ 65,000	
Gas & Go				X					
John L. Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	
Southern Iowa Petroleum, LLC	Hwys 5 & 34			X			2400	\$ 540,000	
In-Home Private Daycare	506 Vine St			X					

RUSSELL – TORNADO

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	214	100%	\$8,787,186	\$8,787,186	100%	554	554	100%
Commercial	19	19	100%	\$378,610	\$378,610	100%			100%
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	3	3	100%						
Government	2	2	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	\$ 60,000	
Fire Hall		X					1200	\$ 120,000	
Community Bldg					X		2800	\$ 280,000	
Water plant		X					--		
Water tower		X					--	\$ 1,000,000	
City Maintenance/ Storage					X		1860	\$ 100,000	
Lagoon		X					20acres	\$ 100,000	
Public Library/Russell Historical Society Museum	106 S Prairie St					X	2000	\$ 450,000	
D&D Market	114 S Prairie St			X			1859	\$ 260,000	

WILLAMSON – TORNADO

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	73	100%	\$1,231,664	\$1,231,664	100%	152	152	100%
Commercial	2	2	100%	\$41,942	\$41,942	100%			100%
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	2	100%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall								\$ 546,698	\$ 162,365
Sewer Lift Station									
Williamson Community Center								\$ 546,698	\$ 162,365

Loss Estimates

Countywide damage was established from the NCDC data base for some hazards up to 65 years. Loss factors were developed specific to the attributes of tornado throughout the region. These factors were able to provide an annual damage estimate by dividing the total loss by number of years of data. Per event damage calculated by dividing total loss by number of events. During the past 48 years, there have been 8 tornado events that caused \$25,425,000 in damage. This estimates \$529,688 annually in tornado damage to Lucas County. This timeframe also experienced \$12,000 in crop damage to create an annual estimated loss of \$250. Iowa State Mitigation Plan estimates an annual average loss of \$404,000.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
2	4	3	1	10

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>In the US, Iowa is ranked third in the number of tornadoes per 10,000 square miles. From 1950-2010, Iowa averaged 47 twisters per year. In Iowa most tornadoes occur in the spring and summer months, but twisters can and have occurred in every month of the year. Late afternoon to evening hour tornadoes are most common, but they can occur at any time of day. According to the National Climactic Data Center, Iowa has had 2,375 tornado events from 1980-2010. There were 11 Presidential Declarations of Major Disaster during 1950-2006.</p> <p>Historically 40-50 tornadoes are confirmed in Iowa per year. Developed areas occupy a growing portion of Iowa and stand a highly likely chance of having a tornado any given year.</p>	2
<i>MAGNITUDE / SEVERITY</i>	<p>Those most at risk from tornadoes include people living in mobile homes, campgrounds, and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to twisters. The elderly, very young and the physically and mentally handicapped are most vulnerable because of the lack of mobility to escape the path of destruction. People who may not understand watches and warnings due to the language barriers are also at risk.</p> <p>Generally the destructive path of a tornado is only a couple hundred feet in width, but stronger tornadoes can leave a path of devastation up to a mile wide. Normally a tornado will stay on the ground for no more than 20 minutes; however, one tornado can touch ground several times in different areas. Large</p>	4

	<p>hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms.</p> <p>Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows to complete destruction and disintegration of well-constructed structures, infrastructure and trees. Tornadoes can impact many critical services, mainly electrical power. Buried services are not as vulnerable but can be affected by their system components that are above ground.</p> <p>Everyone is vulnerable to the powerful forces that accompany a tornado.</p> <p>There are those who are more vulnerable than others. For example:</p> <ul style="list-style-type: none"> • People in automobiles, • People in mobile homes, • People who may not understand warnings due to language barriers, • The elderly and very young, • People with physical or mental impairments. • <p>See each jurisdiction’s respective profiles for demographic information relevant to vulnerable populations. Approximately 55% of rural homes are mobile homes.</p> <p>The most vulnerable populations of each jurisdiction include the young, the elderly, the disabled, and individuals residing in mobile homes. This accounts for approximately more than three-quarters of the rural population.</p> <p>Whole towns have been known to be destroyed. Economic impacts can result from direct damages to facilities or business disruption from the lack of critical services such as power, gas or water.</p> <p>Currently, the severity of tornadoes is measured by intensity based upon the Enhanced Fujita-Pearson scale. This scale rates tornadoes from 0-5 based on wind speed and the extent of damage at the site of impact.</p>	
<i>WARNING TIME</i>	<p>Tornadoes strike with an incredible velocity. Wind speeds may exceed 300 miles per hour and the storm can travel across the ground at more than 70 mph. These winds can uproot trees and structures and turn harmless objects into deadly missiles all in a matter of seconds. The advancement in weather forecasting has allowed watches to be delivered to those in the path of these storms up to hours in advance. The best lead-time for a specific severe storm and tornado is about 30 minutes. Tornadoes have been known to change paths very rapidly, thus limiting the time in which to take shelter. Tornadoes may not be visible on the ground due to blowing dust and driving rain.</p>	3
<i>DURATION</i>	<p>The response to a tornado event is tied to responding to the immediate threat to life and property immediately following the tornado event and in the shelter of affected families and individuals.</p>	1
	WEIGHTED SCORE	10

Mitigation

Generators	
Program/Project Description	Acquisition of mobile and / or fixed generators for use at community buildings used for temporary storm shelters and / or for public facilities
Anticipated Cost	Moderate
Timeline/Schedule	Medium term
Responsible Agency	City Council, critical facility property owners, Board of Directors', or School Board
Mitigation Category	Emergency services, Prevention, Property Protection
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 2.5, 3.1, 3.3, 3.4 (See page 42 or Appendix)
Address High Risk Hazards?	yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Address High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Safe Rooms	
Program/Project Description	Risk to lives can be improved through construction and use of concrete safe rooms in homes and shelter areas of mobile home parks, fairgrounds, shopping malls, & other vulnerable public areas.
Anticipated Cost	Moderate to high – grant dependent
Timeline/Schedule	Long term
Responsible Agency	School Board, Board of Directors
Mitigation Category	Structural project
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 3.1, 3.3 (See page 42 or Appendix)
Address High Risk Hazards?	Yes
Jurisdictions	Chariton

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Storm Warning System	
Description	Acquisition and installation of community early warning system to compliment system at fire station
Estimated Cost	Moderate to high
Timeline/Schedule	Long Term
Responsible Entity	City Council
Mitigation Category	Structural Project
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 3.2 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Demolish & Remove Dilapidated Buildings	
Description	Leverage funds for property owners or cities that are unable to afford to remove/repair/demolish dilapidated structures.
Estimated Cost	Moderate-high
Timeline/Schedule	Ongoing
Responsible Entity	City Council, Property Owners, ADLM
Mitigation Category	Property Protection, Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.4, 2.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Weather Radios	
Description	Encouragement of residents and businesses to obtain NOAA weather radios
Estimated Cost	Voluntary program; approximately \$30 per radio
Timeline/Schedule	Short Term
Responsible Entity	City Council and city residents
Mitigation Category	Prevention and Public Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.2, 3.3, 3.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Temporary Debris Disposal Plan	
Description	Develop policy for temporary debris disposal for city and private property owners for post-disaster clean-up
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Council
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Rehabilitate Older, historic Buildings	
Description	Encourage property maintenance and help leverage funds for property owners unable to afford more significant structural maintenance
Estimated Cost	Minimal to moderate
Timeline/Schedule	Ongoing
Responsible Entity	City, Property Owners
Mitigation Category	Property Protection, Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.3 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Evacuation Plans	
Description	Develop evacuation plans for school, community buildings, and for town
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	City Council and ADLM-Emergency Management
Mitigation Category	Prevention, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.2, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Hazardous Material Disposal	
Description	Develop hazardous materials disposal program incorporating public education, community clean-up days, and household hazardous waste exchange
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	City or Fire Department and Volunteers, ADLM
Mitigation Category	Prevention, Natural Resource Protection, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4 2.5, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Search and Rescue Training for First Responders	
Description	Training Firefighters and other local emergency responders best practices in search and rescue operations
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	Fire Department
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Mass Casualty Preparation	
Description	Develop plan for how to handle mass casualties resulting from hazard events in and near each jurisdiction
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	First Responders, ADLM-Emergency Management
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.2, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Collection & Protection of Vital Records	
Description	Encourage property owners to inventory and protect critical information for improved disaster recovery and minimize disruptions to lives following disaster events; critical information includes titles to property, bank information, insurance documents, wills, copies of prescription medications, family contact information, social security cards, passports, marriage licenses, birth certificates, and other forms of information that may be difficult to replace or needed to document eligibility for disaster aid
Estimated Cost	Voluntary
Timeline/Schedule	Short Term
Responsible Entity	ADLM, first responders, fire departments
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 3.1, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Manufactured Home Tie-Downs	
Description	Encourage incorporated and rural manufactured homes to be secured by tie-downs to the ground. This anchoring can prevent damage and injuries.
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City council, property owners,
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	11, 1.3, 2.1, 2.4, 3.1 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Building Code Enforcement	
Description	Encourage all local governments to adopt and enforce updated building codes to reduce the risk of collapse, failure or injury in the event of a disaster.
Estimated Cost	Moderate
Timeline/Schedule	ongoing
Responsible Entity	City Council, First Responders, ADLM, County Public Health Department
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.4, 2.5, 3.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

8. Hazard Profile – River Flooding

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

Description.

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

Two common terms to describe areas that are prone to flooding are 100-year flood plain and 500-year flood plain. The meaning of these terms are often confused; though they sound like a flood in the designated areas only happens once every 100 or 500 years, this interpretation is incorrect. What the designation actually means is that for a 100-year flood plain, the chance of a flood occurring in any given year is 1% which is statistically about once every 100 years. Likewise, for the 500-year flood plain, the chance is .2% chance of a flood occurring in any given year. Floods may certainly occur more frequently in either flood plain designation, but these would be rare occurrences.

Responding to river flooding often includes sandbagging and working in floodwaters. Response personnel should have current tetanus and hepatitis shots. Rescuing victims often requires rescue from boat. Wearing personal protective gear such as life vests at all times can prevent most injuries related to river flooding.

Past Occurrences & Severity

The most recent serious flooding event in May and June of 2008 resulted in 86 of the State’s 99 counties included in the Governor’s disaster declarations, and 84 begin declared as presidentially declared. The event resulted in 18 fatalities and 106 injuries, the evacuation of approximately 38,000 Iowans and impacting 21,000 housing units. Since 1993 there have been 86 flood events in Lucas County in addition to the Flash Floods previously detailed. There have been no deaths or injuries directly attributed to these events. Of these floods, many impacted an area broader than just Lucas County and so the damages

listed in the total row are distributed among multiple counties. The chart below shows the events occurring in the past five years. There have been 11 events in the past 5 years. Six of these incidents occurred in Russell for an estimate of \$ 100k in property damage. During 2010-2014 \$550k in property damage was reported and more than @20m in crop damage in the unincorporated area.

<u>Location</u>	<u>County/Zone</u>	<u>St.</u>	<u>Date</u>	<u>Type</u>	<u>Dth</u>	<u>Inj</u>	<u>PrD</u>	<u>CrD</u>
RUSSELL	LUCAS CO.	IA	03/08/2009	Flood	0	0	25.00K	0.00K
RUSSELL	LUCAS CO.	IA	03/24/2009	Flood	0	0	25.00K	0.00K
RUSSELL	LUCAS CO.	IA	04/27/2009	Flood	0	0	10.00K	0.00K
LUCAS	LUCAS CO.	IA	04/27/2009	Flood	0	0	20.00K	0.00K
RUSSELL	LUCAS CO.	IA	05/15/2009	Flood	0	0	10.00K	0.00K
RUSSELL	LUCAS CO.	IA	06/08/2009	Flood	0	0	5.00K	10.00K
RUSSELL	LUCAS CO.	IA	07/04/2009	Flood	0	0	10.00K	10.00K
RUSSELL	LUCAS CO.	IA	08/17/2009	Flood	0	0	0.00K	0.00K
RUSSELL	LUCAS CO.	IA	08/27/2009	Flood	0	0	50.00K	10.00K
RUSSELL	LUCAS CO.	IA	10/22/2009	Flood	0	0	0.00K	25.00K
RUSSELL	LUCAS CO.	IA	10/29/2009	Flood	0	0	0.00K	25.00K
RUSSELL	LUCAS CO.	IA	12/25/2009	Flood	0	0	0.00K	0.00K
RUSSELL	LUCAS CO.	IA	03/11/2010	Flood	0	0	10.00K	0.00K
RUSSELL	LUCAS CO.	IA	04/25/2010	Flood	0	0	25.00K	0.00K
NORWOOD	LUCAS CO.	IA	04/25/2010	Flood	0	0	50.00K	0.00K
RUSSELL	LUCAS CO.	IA	05/13/2010	Flood	0	0	5.00K	0.00K
NORWOOD	LUCAS CO.	IA	06/12/2010	Flood	0	0	0.00K	20.000M
CHARITON	LUCAS CO.	IA	06/15/2010	Flood	0	0	150.00K	0.00K
RUSSELL	LUCAS CO.	IA	07/20/2010	Flood	0	0	10.00K	25.00K
RUSSELL	LUCAS CO.	IA	06/27/2011	Flood	0	0	0.00K	0.00K
CHARITON	LUCAS CO.	IA	05/28/2013	Flood	0	0	200.00K	0.00K
RUSSELL	LUCAS CO.	IA	05/29/2013	Flood	0	0	50.00K	0.00K
LUCAS	LUCAS CO.	IA	09/10/2014	Flood	0	0	50.00K	15.00K
Totals:					0	0	705.00K	20.120M

Vulnerable Locations/Buildings

The 100 year floodplain estimates that 4.7% of the county is located in this potential flood zone (“*A HAZUA-MH Assessment of Iowa’s Vulnerability to Flooding*”). Nearly all of this area of concern is located in the rural region of the county. Chariton River flows west to east along the southern half of Lucas County and often experiences flooding during periods of excessive moisture.

Several unincorporated communities are located close to or in low-lying areas around rivers or streams. Because boundaries of the unincorporated communities are not readily available, approximate area of these communities is not given. There are eight rivers and/or creeks that pass through the county that can create a situation of flooding.

Chariton River flows west to east along the southern half of Lucas County and often experiences flooding during periods of excessive moisture. There are 100 miles of road ways at 46 locations that have been affected by flooding in the past. Lucas County has now designed those roads to have a low spot that will wash out before any nearby bridge would suffer damage. This situation may not be ideal for handling flooding situations but it is currently the most cost effective approach at this time.

There are no rivers located in or near the City of Derby.

UNINCORPORATED COUNTY AREA – RIVER FLOODING

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	320	20%	\$127,778,883	\$25,555,777	20%	3540	708	20%
Commercial	57	1	1%	\$16,815,709	\$168,157	1%			
Industrial	2	0	0%	\$1,057,800		0%	-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Unincorporated Critical Facilities At Risk -There are no critical facility structures or businesses at risk.

CHARITON – RIVER FLOODING

The Chariton River passes through the south edge of Chariton and White Breast Creek passes through the south edge of Lucas. The area of Lucas Bottoms, a low-lying wetland that White Breast Creek intersects and frequently floods. There are 2 businesses that are located on the edge of Lucas Bottoms.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	16	1%	\$99,523,675	995,237	1%	4321	43	1%
Commercial	217	2	1%	\$28,798,725	287,987	1%			
Industrial	9	1	1%	\$1,475,384	14,754	1%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	1	1%						
Government	5	0	0%						
Education	9	0	0%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Critical Facilities

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lockridge									
Johnson Trucking									

LUCAS – RIVER FLOODING

White Breast Creek passes through the very south edge of the community. There has been little flooding associated from this creek but there is the potential. This creek does pass through a wetland that is adjacent to State Highway 34. The Lucas Bottoms has had multiple flooding events.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	5	5%	\$2,885,880	\$144,294	5%	216	11	5%
Commercial	13	1	10%	\$231,717	\$23,171	10%			
Industrial	1	0	0%	\$183,000	-	-	-	-	-
Agricultural	-	-	-	\$482,065	-	-	-	-	-
Religious / Non-profit	2	0	0%						
Government	2	0	0%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Lucas Structural Inventory At Risk - There are no critical facilities or businesses at risk in the city limits.

RUSSELL – RIVER FLOODING

Iowa DNR has release the preliminary draft mapping of the flood hazards in Russell (See Appendix 16 & 22). There are two spurs of Honey Creek that enter the city limits from the east side. The southern spur runs along the edge of the residential structures for approximately ten city blocks or 90% the length of the community. The second spur is diagonal in the far southeast corner of the city limits. There are few structures near this creek.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	7	3%	\$8,787,186	\$263,616	3%	554	11	3%
Commercial	19	0	0%	\$378,610	0	0			
Industrial	-						-	-	
Agricultural	-						-	-	-
Religious / Non-profit	3	0	0%						
Government	2	0	0%-----						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory At Risk

There are no critical facilities or businesses at risk in the city limits.

Loss Estimate

Countywide damage was established from the NCDC data base for some hazards up to 65 years. Loss factors were developed specific to the attributes of River Flooding throughout the region. These factors were able to provide an annual damage estimate by dividing the total loss by number of years of data. Per event damage calculated by dividing total loss by number of events. During the past 19 years, approximately 81 flooding events have occurred in Lucas County to cause \$2,990,000 in property damage and \$21,513,000 in crop damage. This indicates an annual loss of approximately \$157,368 in property loss and \$1,132,263 in annual crop loss due to flooding. Iowa State Mitigation Plan estimates an annual average loss of \$11,296,000.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
3	4	4	4	15

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>The flood of 1993 and 2008 are still fresh in the minds of Iowans. Flooding has been a regular and frequent hazard in Iowa. Iowa has been involved in 35 Presidential Declarations of a major disaster related to flooding since 1953. Given the history of this hazard, it is likely that there will be many minor events each year and high likelihood that a major flooding event requiring federal assistance will occur in the next 5 years. While hundreds of homes and businesses have been removed from the floodplain over the last decade, many remain. The SHMT analysis has evaluated the probability that a flooding event will occur in Iowa is classified as highly likely in any given year. Flooding is a regular and frequent hazard in Iowa; in Lucas County, the number of flooding events suggests that there can be 1-2 floods annually. Many floods tend to be along river and stream corridors and impacting limited areas. The runoff water from the northern half of the county enters streams that flow to the north and east to eventually drain into Red Rock Lake in Marion County. The runoff water from the southern portion of the region flows to the south and east to reach Rathbun Lake. White Breast Creek passes through the south edge of Lucas. The area of Lucas Bottoms, a low-lying wetland that White Breast Creek intersects and frequently floods. There are 2 businesses that are located on the edge of Lucas Bottoms.</p> <p>With the projections that Iowa will see an increase in precipitation in the next century of approximately 20% annually, an increase in frequency and severity of floods should be anticipated.</p>	3

<p><i>MAGNITUDE / SEVERITY</i></p>	<p>Flooding impacts include potential loss of life. River flooding does not have as high of risk as does flash flooding because of the slower onset of the river flood.</p> <p>Operations could be disrupted from direct impacts if facilities are in the floodplain and indirectly from loss of critical services to maintain operations. Backup power and other services can eliminate the impact to operations.</p> <p>Personal property can be extensively damaged and destroyed by swift moving water. Facilities and infrastructure can be scoured around and degrading its structural integrity.</p> <p>Damage and disruption of communications, transportation, electric service, and community services are likely in severe cases. Wastewater treatment facilities may be located in the floodplain and thus at high risk of flooding; this is not uncommon around Iowa and eventually results in them being taken offline for a period of time.</p> <p>Hazards of fire, health and transportation accidents; and contamination of water supplies are likely effects of flooding situations as well.</p> <p>Crop and livestock losses and interruption of businesses either from direct flooding or loss of the delivery of critical services can have damaging impacts on the local economy. River flooding can last for weeks and the impacts can last for months and even years following the flood. Economic impacts can be felt with only a couple days of disruption.</p> <p>In River Flooding events, the flood plains and flood zones are at the most risk, but this is not necessarily the case for Flash Floods as detailed previously. Three communities (Chariton, Lucas, & Russell) in the county have flood plain maps and the flood zone boundaries on each are only approximate as of when they were created. However, permanent rivers or streams only pass through two of these communities. The Chariton River passes through the south edge of Chariton and places few structures at risk. The Chariton Community School and Lucas County Health Center are not located near this area (and are on the opposite side of the city). White Breast Creek passes through the south edge of Lucas. The area of Lucas Bottoms, a low-lying wetland that White Breast Creek intersects and frequently floods. There are 2 businesses that are located on the edge of Lucas Bottoms. Additionally, several unincorporated communities are located close to or in low-lying areas around rivers or streams. Because boundaries of the unincorporated communities are not readily available, approximate area of these communities is not given. There are eight rivers and/or creeks that pass through the county that can create a situation of flooding.</p> <p>Given the 1) rolling hill nature of Lucas County, 2) state highways pass through low-lying areas containing rivers or streams, and 3) the limited number of goods and services available in the county, severe flooding would impact most of the county. This was evidenced in the 2008 floods. Some of this impact is limited to traveling inconveniences.</p> <p>FEMA has delineated the probable extent of the 100-year flood hazard areas in most areas. These flood insurance rate maps (FIRMS) show properties affected by the floods that have at least a 1% chance of occurring in any particular year. Generally, these areas are in the floodplain or adjacent areas. Much of these areas are parkland, agricultural, or conservation land. But residential and commercial areas are impacted by river flooding as well. Approximately 10 –</p>	<p>4</p>
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	<p>15% of the county is located in low-lying areas where permanent rivers or streams pass through.</p> <p>Chariton River flows west to east along the southern half of Lucas County and often experiences flooding during periods of excessive moisture. There are 100 miles of road ways at 46 locations that have been affected by flooding in the past. Lucas county has now designed those roads to have a low spot that will wash out before any nearby bridge would suffer damage. This situation may not be ideal for handling flooding situations but it is currently the most cost effective approach at this time. The county has received FEMA disaster assistance to recover and rebuild the roadways.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">Vulnerable Communities</th> </tr> <tr> <th style="text-align: left;">Name</th> <th style="text-align: left;">Approx. Area</th> </tr> </thead> <tbody> <tr> <td>Chariton</td> <td>1-3%</td> </tr> <tr> <td>Lucas</td> <td>5-7%</td> </tr> <tr> <td>Russell</td> <td>3%</td> </tr> <tr> <td>Unincorporated Co</td> <td>20%</td> </tr> </tbody> </table>	Vulnerable Communities		Name	Approx. Area	Chariton	1-3%	Lucas	5-7%	Russell	3%	Unincorporated Co	20%	
Vulnerable Communities														
Name	Approx. Area													
Chariton	1-3%													
Lucas	5-7%													
Russell	3%													
Unincorporated Co	20%													
<i>WARNING TIME</i>	Gauges along streams and gauges throughout the state provide for an early flood warning system. River flooding usually develops over the course of several hours or even days depending on the basin characteristics and the position of the particular reach of a stream. The National Weather Service provides flood forecasts for Iowa. Flood warnings are issued over emergency radio and TV messages as well as the NOAA Weather Radio. People in the paths of river floods may have time to take appropriate actions to limit harm to themselves and their property.	4												
<i>DURATION</i>	The response to the effects of river flooding in Iowa are extensive and required many days to adequately respond to the needs of cities and counties.	4												
	WEIGHTED SCORE	15												

Mitigation

Generators	
Program/Project Description	Acquisition of mobile and / or fixed generators for use at community buildings used for temporary storm shelters and / or for public facilities
Anticipated Cost	Moderate
Timeline/Schedule	Medium term
Responsible Agency	City Council, critical facility property owners, Board of Directors', or School Board
Mitigation Category	Emergency services, Prevention, Property Protection
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 2.5, 3.1, 3.3, 3.4 (See page 42 or Appendix)
Address High Risk Hazards?	yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Address High Risk Hazards?	yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Storm Warning System	
Description	Acquisition and installation of community early warning system to compliment system at fire station
Estimated Cost	Moderate to high
Timeline/Schedule	Long Term
Responsible Entity	City Council
Mitigation Category	Structural Project
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 3.2 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Weather Radios	
Description	Encouragement of residents and businesses to obtain NOAA weather radios
Estimated Cost	Voluntary program; approximately \$30 per radio
Timeline/Schedule	Short Term
Responsible Entity	City Council, and city residents
Mitigation Category	Prevention and Public Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.2, 3.3, 3.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Consider CRS Participation	
Description	Explore feasibility of City participating in Community Rating System for enhanced flood protection
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Council,
Mitigation Category	Property Protection, Prevention
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 3.1 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Flood proofing (wet or dry)	
Description	Encourage property owner use of flood proofing techniques to reduce potential flood-related damages such as water-proofing basement walls, structural modifications allowing flood waters to pass through or around structures without causing damage (as part of remodeling or disaster related repairs), use of water- / mold-resistant paints, etc.
Estimated Cost	Minimal to high depending on structure and techniques
Timeline/Schedule	Short Term
Responsible Entity	City Council (encouragement) and Property Owners (execution)
Mitigation Category	Public Education and Awareness, Structural Projects, Prevention
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Storm water Management	
Description	Develop a storm water management ordinance to minimize impacts on storm water system and to minimize Flash Flooding impacts; may include artificial erosion control, creek bank stabilization, erosion resistant planting on steep slopes (deep root plants) to slow and help infiltrate storm water, terracing hillsides, grading techniques
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Council,
Mitigation Category	Prevention, Natural Resource Protection
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Flood Insurance	
Description	Encourage property owner purchase of flood insurance
Estimated Cost	Volunteer
Timeline/Schedule	Ongoing
Responsible Entity	City Council and Property Owners
Mitigation Category	Property Protection
Related Goals/Objectives	1.1, 2.1, 2.2, 2.3, 2.4, 3.1 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Lucas

Temporary Debris Disposal Plan	
Description	Develop policy for temporary debris disposal for city and private property owners for post-disaster clean-up
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Councils,
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Evacuation Plans	
Description	Develop evacuation plans for school, community buildings, and for town
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	City Councils and ADLM-Emergency Management
Mitigation Category	Prevention, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.2, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Search and Rescue Training for First Responders	
Description	Training Firefighters and other local emergency responders best practices in search and rescue operations
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	Fire Department
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Collection & Protection of Vital Records	
Description	Encourage property owners to inventory and protect critical information for improved disaster recovery and minimize disruptions to lives following disaster events; critical information includes titles to property, bank information, insurance documents, wills, copies of prescription medications, family contact information, social security cards, passports, marriage licenses, birth certificates, and other forms of information that may be difficult to replace or needed to document eligibility for disaster aid
Estimated Cost	Voluntary
Timeline/Schedule	Short Term
Responsible Entity	ADLM, first responders, fire departments
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 3.1, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Manufactured Home Tie-Downs	
Description	Encourage incorporated and rural manufactured homes to be secured by tie-downs to the ground. This anchoring can prevent damage and injuries.
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City council, property owners,
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	11, 1.3, 2.1, 2.4, 3.1 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Acquisition or relocation of buildings	
Description	Utilize disaster recovery funds or pre-disaster mitigation funds to acquire properties in floodplains or relocation of buildings outside of floodplains
Estimated Cost	Moderate to high
Timeline/Schedule	Ongoing
Responsible Entity	Chariton City Council, Lucas City Council, Lucas BOS
Mitigation Category	Prevention, property protection
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdiction	Chariton, Lucas, Unincorp County

NFIP Participation	
Description	Communities will consider or continue participating with the National Flood Insurance Program (NFIP).
Estimated Cost	Minimal
Timeline/Schedule	Ongoing
Responsible Entity	Chariton City Council, Lucas City Council
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4, (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdiction	Chariton, Lucas

9. Hazard Profile – Radiological

This hazard encompasses the following consolidated hazards from 2007 mitigation plan: fixed radiological incident and transportation radiological incident. This includes an incident resulting in a release of radiological material in transport or at a fixed facility to include power plants, hospitals, laboratories, and the like.

Description.

FIXED RADIOLOGICAL INCIDENT - An incident resulting in a release of radiological material at a fixed facility to include power plants, hospitals, laboratories and the like is a fixed radiological incident. Although the term “nuclear accident” has no strict technical definition, it generally refers to events involving the release of significant levels of radiation. Most commercial nuclear facilities in the United States were developed in the mid-1960 and are designed to withstand aircraft attack. Therefore, they should withstand most natural hazards even though they may not have been specifically designed for those forces. Emergency classifications are divided into four categories. Each calls for a response from plant and government personnel. From least to most severe, the classifications are:

- Unusual Event
- Alert
- Site Area Emergency
- General Emergency

TRANSPORTATION RADIOLOGICAL INCIDENT – This is described as an incident resulting in a release of radioactive material during transportation. Transportation of radioactive materials through Iowa over the interstate highway system is considered a radiological hazard. The transportation of radioactive material by any means of transport is licensed and regulated by the federal government. When these materials are moved across Iowa highways, Iowa officials are notified and appropriate escorts are provided. As a rule there are two categories of radioactive materials that are shipped over the interstate highways. Low level waste consists primarily of materials that have been contaminated by low level radioactive substances, but pose no serious threat except through long term exposure. These materials are shipped in sealed drums within placarded trailers. The danger to the public is no more than wide array of other hazardous materials. High-level waste, usually in the form of spent fuel from nuclear plants, is transported in specially constructed casks that are built to withstand a direct hit from a locomotive.

Past Occurrences & Severity

FIXED RADIOLOGICAL INCIDENT – Since 1990, the Quad Cities Nuclear Power Plant has had 17 Unusual Events, 7 Alerts, and no Site Area Emergencies or General Emergencies. Since 1990, the Cooper Nuclear Power Plant has had 18 Unusual Events, 1 Alert, and no Site Area Emergencies or General Emergencies. Since 1990, Ft. Calhoun Nuclear Power Plant has had 17 Unusual Events, 2 Alerts, and no Site Area Emergencies or General Emergencies.

TRANSPORTATION RADIOLOGICAL INCIDENT – Since 1990, hundreds of shipments have been made through Iowa. There have been no occurrences of a radiological incident in Iowa. Transportation accidents are the most common type of incident involving radioactive materials because of the sheer number of radioactive shipments. Rail and highway routes for the shipment of radioactive waste have been identified and mapped. The only route that effects Lucas county would be the Burlington Northern Santa Fe rail line crossing east to west and near or through the communities of Russell, Chariton, and Lucas.

Vulnerable Locations/Buildings

FIXED RADIOLOGICAL INCIDENT – There are no fixed radiological facilities located in Lucas County.

TRANSPORTATION RADIOLOGICAL INCIDENT – The maximum population and building exposure to transportation of radiological materials is shown in the chart below. The county Areas of particular vulnerability would be those located near the rail system. The communities of Russell, Chariton, and Lucas all have the Burlington Northern Santa Fe rail road passing through within the each jurisdictions city limits. Highway 14 transports traffic north and south across the county, as well as highway 65 operating 9 miles west of highway 14 in Lucas County. Highway 34 extends east and west through Lucas County and passes through Chariton on the very south edge of Chariton’s city limits as a 4 lane highway for approximately 3 miles. It also extends to bypass the city of Lucas. Highway 14 passes through the heart of Chariton’s residential area and near Williamson on the north edge of the county. Additional risks of transportation of radiological material can occur along the rail lines in Lucas County.

Radiological materials could be transported by rail line or state highways in Lucas County. There are two rail lines that intersect Lucas County. The rails are owned by Burlington Northern and Union Pacific. Burlington Northern cross-sections the county from East to West. Union Pacific operates tracks that cross the county from north to south. Derailments are also possible, while major derailments are less likely. There are three State Highways acknowledged in Lucas County. Highways 65 and 14 offer transportation north to south through the county. Highway 65 extends 47 miles and passes near the communities of Lucas and Derby but doesn’t enter either city limit. State highway 14 is approximately 40 miles in length from the south edge of the county, through the City of Chariton, and near the city of Williamson. Iowa State Highway 34 passes through the county from west boarder to east county line border. Highway 34 passes near Russell and Lucas but doe enter the city limits of Chariton on its 46 miles of transportation.

UNINCORPORATED COUNTY AREA – TRANSPORTATION RADIOLOGICAL INCIDENT

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	80	5%	\$127,778,883	\$63,889,442	5%	3540	177	5%
Commercial	57	1	1%	\$16,815,709	\$168,157	1%			
Industrial	2	0	0%	\$1,057,800	0	0%	-	-	-
Agricultural			15%				-	-	-
Religious / Non-profit									

Critical Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	16,000,000	
Landfill		X					40acres	600,000	
Lake Red Haw					X		--	3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	6000,000	
Iowa DOT	Hwy 34						4800	480,000	

CHARITON – TRANSPORTATION OF RADIOLOGICAL INCIDENT

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	319	20%	\$99,523,675	28,861,866	20%	4321	864	20%
Commercial	217	43	20%	\$28,798,725	5,759,745	20%			
Industrial	9	2	20%	\$1,475,384	295,077	20%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	3	20%						
Government	5	1	20%						
Education	9	2	20%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Critical Facilities

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000	
Auburn Manor, Inc	815 Auburn St		X				6875	\$ 800,000	
SENECA Area on Aging	117 S Grand St		X				6067	\$ 600,000	
Circle of Life Hospice	1010 N 7 th St		X				3044	\$ 600,000	

Kiddie Kampus	East Court St		X				5200	\$ 1,000,000	
Hammer Medical Supply	110 N Grand st			X			7647	\$ 1,300,000	
Lucas County Health Center	1200 N 7th St	X	X	X	X		84,000 sq ft	\$ 26,356,000	
Chariton Fire Hall		X		X	X		9796	\$ 2,000,000	
Dept of Correctional Services	115 S Main St			X	X				
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000	
Hy-Vee Store	2001 Court Ave			X			22,600	\$ 4,000,000	
ShopKo	1900 Court Ave			X			22,500	\$ 1,400,000	
Dollar General	307 N Grand St			X			8405	\$ 1,000,000	
Lucas Co Sherriff's office		X			X		5016	\$ 1,200,000	
Farmer's Coop	2120 Osceola Ave			X			7200	\$ 5,000,000	
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000	
Kum & Go	335 Main St			X			2400	\$ 600,000	
Elliott Oil Comp	Hwy 34 & 1st St			X			5350	\$ 600,000	
Casey's General Store	418 S 7th Street			X			10,320	\$ 1,000,000	
Corydon Oil company	8th & Court			X			3300	\$ 750,000	
Kum & Go	1155 N 7th St			X			1736	\$ 450,000	
Sewer Stations Lift		X					120	\$ 100,000	
Historic Courthouse Square		X	X	X	X	X			

DERBY – TRANSPORTATION OF RADIOLOGICAL INCIDENT

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	26	50%	\$625,522			115	50%	58
Commercial	7	4	57%	\$16,863					
Industrial	-	-	-				-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	-	-							
Government	-	-							
Education	-	-	-	-	-	-	-	-	-
Utilities	-	-	-	-	-	-	-	-	-

Derby Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	

LUCAS – TRANSPORTATION OF RADIOLOGICAL INCIDENT

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	25	25%	\$2,885,880	\$721,470	25%	216	54	25%
Commercial	13	3	25%	\$231,717	\$57,939	25%			
Industrial	1	1	100%	\$183,000	\$183,000	100%	-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit			100%						
Government			100%						
Education									
Utilities			-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
Fire Hall		X					6000	\$ 600,000	
Water plant		X							
Water tower		X						\$ 1,500,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
Lagoon		X					20acres	\$ 65,000	
Gas & Go				X					
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	
Southern Iowa Petroleum, LLC	Hwys 5 & 34			X			2400	\$ 540,000	

RUSSELL - TRANSPORTATION OF RADIOLOGICAL INCIDENT

Burlington Northern Santa Fe is the rail line that crosses the northern half of Russell from east to west. The community was built around the rail line and therefore has multiple structures and homes within 50 yards of the track line. Businesses at risk include the bank, insurance agency and abandon historical structures.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	109	50%	\$8,787,186	\$4,393,593	50%	554	277	50%
Commercial	19	10	50%	\$378,610	\$189,305	50%			
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	3	2	50%						
Government	2	1	50%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Community Bldg					X		2800	\$ 280,000	

WILLAMSON – TRANSPORTATION OF RADIOLOGICAL INCIDENT

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	37	50%	\$1,231,664	\$615,822	50%	152	76	50%
Commercial	2	1	50%	\$41,942	\$20,971	50%			
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	1	50%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor's

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall								\$ 546,698	\$ 162,365
Sewer Lift Station									
Williamson Community Center								\$ 546,698	\$ 162,365

Loss Estimates

There are no fixed radiological facilities in Lucas County for any potential loss. The estimated loss for a transportation radiological is difficult to predict without any history for comparison.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
1	4	4	4	13
EVALUATION CRITERIA	DESCRIPTION			SCORE
<i>PROBABILITY</i>	<p>FIXED RADIOLOGICAL INCIDENT – Operators of facilities that use radioactive materials and transporters of radioactive waste are circumspect in the packaging, handling and shipment of the radioactive waste and since they are closely regulated by a variety of federal, state, and local organizations, the likelihood of an incident is remote. The SHMT analysis has evaluated the probability of a fixed radiological incident occurring in Iowa as unlikely in any given year. – Iowa has one nuclear power plant located within its borders; The Duane Arnold Energy Center (DAEC) is located near Palo in Linn County. Three additional nuclear facilities border Iowa. These facilities are located across the Missouri River north of Omaha, NE and south of Nebraska City, NE, as well as across the Mississippi River at the Quad Cities Nuclear Power Plant.</p> <p>Anecdotal evidence suggests that meth use and production is not uncommon in Lucas County. Chemical spills can occur anytime there is a traffic accident as oil, gasoline, and other fluids used in vehicles are released. Dumping of household cleaners, paints, and old oil can happen at any time and are more likely in areas where people do not understand hazardous materials laws. A number of homes 1.9% in Lucas County use LP Gas for heating fuel. Liquid petroleum is not by nature toxic, but can cause asphyxiation through oxygen deprivation. LP Gas is heavier than air so it will sink to the lowest places possible and is flammable. Stores of anhydrous ammonia in the county pose health and safety threats to potentially large areas of the county and are potential targets for meth producers as a source of raw materials.</p> <p>TRANSPORTATION RADIOLOGICAL INCIDENT – Operators of facilities that use radioactive materials and transporters of radioactive waste are circumspect in the packaging, handling, and shipment of the radioactive waste and since they are closely regulated by a variety of federal, state, and local organizations, the likelihood of an incident is remote. The SHMT has evaluated the probability that a transportation radiological incident is unlikely in any given year, including Lucas county. The only route that effects Lucas county would be the Burlington Northern Santa Fe rail line crossing east to west and near or through the communities of Russell, Chariton, and Lucas.</p>			1
<i>MAGNITUDE / SEVERITY</i>	<p>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. In over 50 years of nuclear power production in the US, no deaths or injuries from radiation have been recorded among the general public.</p> <p>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 can be a health and</p>			4

	<p>safety consideration because of its ability to damage human cells biologically. 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. Those working with or near sources of radiation are at a greater risk than the general citizens of this state.</p> <p>Other than a transportation incident involving large amounts of high-level radioactive materials, radiation exposure, will be limited to much localized areas. Time, distance and shielding minimize radiation exposure to the body. Nuclear radiation above normal levels can be a health and safety consideration because of its ability to damage human cells biologically as well as long-lasting effect on the environment.</p>	
<i>WARNING TIME</i>	<p>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.</p> <p>A radiological event in Iowa could result from an incident in handling or transporting radioactive materials. This accident could occur with little or no warning.</p>	4
<i>DURATION</i>	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.	4
	WEIGHTED SCORE	13

Mitigation

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Address High Risk Hazards?	yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term

Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Local Hazardous Materials Capabilities	
Description	Encourage establishment of local hazardous materials team and / or support training for local first responders
Estimated Cost	Moderate to high
Timeline/Schedule	Medium to Long Term
Responsible Entity	City Council and fire department (in partnership with ADLM and / or County)
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 3.1, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Evacuation Plans	
Description	Develop evacuation plans for school, community buildings, and for town
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	City Council and ADLM-Emergency Management
Mitigation Category	Prevention, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.2, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Hazardous Material Disposal	
Description	Develop hazardous materials disposal program incorporating public education, community clean-up days, and household hazardous waste exchange
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	City or Fire Department and Volunteers, ADLM
Mitigation Category	Prevention, Natural Resource Protection, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4 2.5, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Search and Rescue Training for First Responders	
Description	Training Firefighters and other local emergency responders best practices in search and rescue operations
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	Fire Department
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Mass Casualty Preparation	
Description	Develop plan for how to handle mass casualties resulting from hazard events in and near each jurisdiction
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	First Responders, ADLM-Emergency Management
Mitigation Category	Emergency Services

Related Goals/Objectives	1.1, 1.2, 2.2, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

10. Hazard Profile – Flash Flooding

A flood is caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours. Flash floods are usually characterized by raging torrents after heavy rains that rip through river beds, urban streets, or mountain canyons sweeping everything before them. They can occur within minutes or a few hours of excessive rainfall. They can also occur even if no rain has fallen, for instance after a levee or dam has failed, or after a sudden release of water by a debris or ice jam (National Weather Service).

Description

Flooding causes more damage in the United States than any other severe weather related event, an average of \$5 billion a year. Flooding can occur in any of the 50 states or U.S. territories at any time of the year. Flash flooding can occur anywhere and is not confined to or near flood plains; once the soil is saturated, water will wash over it to lower lying areas. Damage is likely to be more severe in lower lying areas, but can occur at higher ground as well.

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

Two common terms to describe areas that are prone to flooding are 100-year flood plain and 500-year flood plain. The meaning of these terms are often confused; though they sound like a flood in the designated areas only happens once every 100 or 500 years, this interpretation is incorrect. What the designation actually means is that for a 100-year flood plain, the chance of a flood occurring in any given year is 1% which is statistically about once every 100 years. Likewise, for the 500-year flood plain, the chance is .2% chance of a flood occurring in any given year. Floods may certainly occur more frequently in either flood plain designation, but these would be rare occurrences.

Flash floods do not always occur in flood plains, during heavy downpours the capacity of the soil to absorb rain can be overwhelmed leading to water accumulating and running off of the surface of the land. Similarly with compaction of soil due to build infrastructure such as roads and buildings heavy rain is limited in its local soil infiltration capacity leading to runoff. This runoff can accumulate very quickly resulting in flash flooding.

Past Occurrences & Severity

Floods are the most common and widespread of all-natural disasters except fire. In Iowa, as much as 21 inches of rain has fallen in a 24 hour period. The latest significant event to affect Iowa occurred in June/July of 2008. This event resulted in a Presidential Disaster Declaration due to widespread personal and physical property losses. Since then, many flash flood events have occurred across Iowa though mostly localized events. The National Climatic Data Center lists 1,628 flash flooding/urban or small stream flooding events from 1993-2009. Between 1993 and 2006 there have been seven (7) deaths and thirteen (13) injuries related to flash flooding in Iowa.

- a. Flash floods can result in death and injury, typically to individuals caught either in vehicles swept off of roads or who may be in low-lying areas when fast moving water moves through

- b. Flash floods can present a challenge to first responders by limiting access to a site or by requiring alternative modes of access such as by boat or helicopter; special training is often necessary for such rescues
- c. Continuity of operations can be affected depending on the facilities impacted, transportation impacts, and delays in government responses
- d. Property can be impacted either by being damaged by the force of flowing water, water damage inside buildings, and compromises to structural integrity due to erosion
- e. Flash floods can quickly inundate areas thought to be out of flood-prone areas. Loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock damage and loss and interruption of business are common impacts from flash flooding.
- f. Hazards of fire, health and transportation accidents, and contamination of water supplies are likely effects of flash flooding situations. Materials swept away by flood waters can contaminate and leave a lasting impact on the environment.
- g. Most impacts are indirect due to disruption of business and damage to infrastructure on which industry and services rely upon.

Flash floods can be damaging to the reputation of the community if proper notification and warning are not given. Often times the victim will blame development or other changes in the community as the cause of the flooding on their property.

Since 1993, there have been 16 recorded Flash Flood events in Lucas County. These Flash Flood events caused \$3M in property damage with no injuries or loss of life reported. About \$100 thousand in crop damage has resulted from these events. The floods of 2008 and 2010 have created extensive damage throughout the rural portions of the county. The Lucas county engineer indicates that there were 46 locations that the rural roads suffered some damage due to Flash Flooding. Eleven events have occurred in the past five years. The communities of Chariton, Russell and Williamson more commonly experience flash flooding events. The chart below provides a summary of NCDC recorded Flash Floods; property and crop damages are in thousands of dollars during the past five years:

<u>Location</u>	<u>County/Zone</u>	<u>St.</u>	<u>Date</u>	<u>Type</u>	<u>Dth</u>	<u>Inj</u>	<u>PrD</u>	<u>CrD</u>
<u>CHARITON</u>	LUCAS CO.	IA	07/07/2010	Flash Flood	0	0	50.00K	0.00K
<u>CHARITON</u>	LUCAS CO.	IA	07/07/2010	Flash Flood	0	0	100.00K	0.00K
<u>CHARITON</u>	LUCAS CO.	IA	07/07/2010	Flash Flood	0	0	250.00K	0.00K
<u>CHARITON</u>	LUCAS CO.	IA	07/07/2010	Flash Flood	0	0	250.00K	0.00K
<u>CHARITON</u>	LUCAS CO.	IA	07/20/2010	Flash Flood	0	0	1.000M	100.00K
<u>RUSSELL</u>	LUCAS CO.	IA	05/28/2013	Flash Flood	0	0	50.00K	0.00K
<u>RUSSELL</u>	LUCAS CO.	IA	05/28/2013	Flash Flood	0	0	50.00K	0.00K
<u>WILLIAMSON</u>	LUCAS CO.	IA	05/28/2013	Flash Flood	0	0	50.00K	0.00K
<u>CHARITON</u>	LUCAS CO.	IA	07/21/2013	Flash Flood	0	0	250.00K	0.00K
<u>WILLIAMSON</u>	LUCAS CO.	IA	08/23/2014	Flash Flood	0	0	25.00K	0.00K
<u>LUCAS</u>	LUCAS CO.	IA	09/10/2014	Flash Flood	0	0	50.00K	25.00K
Totals:					0	0	2.125M	125.00K

Vulnerable Locations/Buildings

The table below summarizes the maximum population and building exposure for flood events. The estimate of maximum population and building exposure based on an estimate of the Special Flood Hazard Areas of the unincorporated county. Lucas County LEPC specifically sites the particular areas of concern around the City of Chariton lie on the outer edge of the community. The Pin Oak Marsh land ground located south Highway 14 is a region that often floods. The Chariton River flows on the edge of the wet lands which can collect the overflow of the river. The wetland lies on both sides of Highway 14. The second region of wet land occurs east of Chariton along highway 34. The highway touches the edge of Lake Ellis, Lake Morris and Red Haw Lake. Excessive moisture collects along the roadway of Highway 34 that could cause flooding and damage. Chariton River flows west to east along the southern half of Lucas County and often experiences flooding during periods of excessive moisture. There are 100 miles of road ways at 46 locations that have been affected by flooding in the past. Lucas County has now designed those roads to have a low spot that will wash out before any nearby bridge would suffer damage.

Chariton River flows west to east along the southern half of Lucas County and often experiences flooding during periods of excessive moisture. There are 100 miles of road ways at 46 locations that have been affected by flooding in the past. Lucas County has now designed those roads to have a low spot that will wash out before any nearby bridge would suffer damage. This situation may not be ideal for handling flooding situations but it is currently the most cost effective approach at this time. The county is receiving FEMA disaster assistance to recover and rebuild the roadways.

UNINCORPORATED COUNTY AREA – FLASH FLOODING

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	559	35%	\$127,778,883	\$44,722,609	35%	3540	1239	35%
Commercial	57	20	35%	\$16,815,709	\$5,885,498	35%			
Industrial	2	0	0%	\$1,057,800	0		-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									

Unincorporated County Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Lake Red Haw					X		--	\$3,000,000	

CHARITON – FLASH FLOODING

Committee members have indicated the locations of flash flooding usually impact the areas of Court Ave from 13th – 17th Street and Illion Avenue & 13th Street.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	399	25%	\$99,523,675	24,880,919	25%	4321	1080	25%
Commercial	217	11	5%	\$28,798,725	1,439,936	5%			
Industrial	9	1	1%	\$1,475,384	14,754	1%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	1	1%						
Government	5	1	1%						
Education	9	1	1%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Critical Facilities

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Apartment Building	Court Ave		X						
Bowling Alley									
Pure Apathy									

School Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value
Chariton High School	501 N Grand St		X	X	X		70,000	\$27,000,000	
Chariton Middle School	1300 N 16 th St		X	X	X		50,000	\$20,000,000	
Van Allen Elementary	1129 Ashland St		X	X	X		31,000	\$15,000,000	
Columbus Elementary	1215 Linden Ave		X	X	X		15,500	\$11,000,000	
The Other Hand, Alternative Ed	1516 Court Ave		X	X	X		1400	\$ 250,0000	
Bus Barn									

LUCAS COUNTY HEALTH CENTER FACILITIES

**Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office. Insured value is according to the hospital’s insurance policy.

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value	Occupancy or capacity
Lucas County Health Center	1200 N 7 th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed

DERBY – FLASH FLOODING

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	1	1%	\$1,251,043	\$12,510	1%	115	1	1%
Commercial	7	1	1%	\$33,725		1%			
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	-	-							
Government	-	-							
Education	-	-	-	-	-	-	-	-	-
Utilities	-	-	-	-	-	-	-	-	-

Derby Structural Inventory at Risk – There are no critical facilities or businesses at risk in the city.

LUCAS – FLASH FLOODING

The City of Lucas frequently experiences Flash Flooding along the White Breast Creek. This creek flows from the North central portion of the county down to the southwest corner and touches the south edge Lucas city limits. Portions of this creek will exceed the banks when there is a 2-3 inch rainfall. The Lucas Bottoms is a low-lying wetland that is just south the Lucas and is adjacent to State Highway 34. White Breast Creek follows through this wetland and can contribute to a Flash Flooding event. There are two businesses that are located on the edge of the wetland that are at risk to experiencing an event. The FIRM for the community of Lucas indicate the likelihood for flooding to occur along State Highway 34 near the Lucas Bottoms Wetland area.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	20	20%	\$2,885,880	\$577,176	20%	216	43	20%
Commercial	13	3	20%	\$231,717	\$46,343	20%			
Industrial	1	0	0%				-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit									
Government									
Education									
Utilities		-	-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Kent Construction	Hwy 34								
Lagoons		X							

RUSSELL – FLASH FLOODING

The FIRM for Russell (as seen in Appendix 22) indicates flooding potential for the western portion of the city due to Honey Creek that enters the community from the southwestern boundary and extends up to Garfield Street. There are four city streets that cross the stream and create a potential for Flash Flooding. The 500-600 block of South Prairie Street experiences inundation as well. An additional stream enters the south central boundary near Smith Street. It then crosses northeast through the city for a short distance to cross Shaw Street.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	6	25%	\$8,787,186	\$2,196,797	25%	554	139	25%
Commercial	19	0	0%	\$378,610	\$0	0%			
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	3	0	0%						
Government	2	0	0%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory at Risk – There are no critical facilities or businesses that are at risk.

WILLAMSON – Flash Flooding

Flash Flooding occurs as a result of heavy rains over a short period of time and occurs without sufficient warning for the communities or individuals to take emergency protective measures. There are only a couple of locations that experience flash flooding.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	4	5%	\$1,231,664	\$61,583	5%	152	8	5%
Commercial	2	0	0%	\$41,942					
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	0	0%						
Government	1	0	0%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Williamson Structural Inventory at Risk – There are no critical facilities or businesses that are at risk.

Loss Estimate

Countywide damage was established from the NCDC data base for some hazards up to 65 years. Loss factors were developed specific to the attributes of Flash Flooding throughout the region. These factors were able to provide an annual damage estimate by dividing the total loss by number of years of data. Per event damage calculated by dividing total loss by number of events. During the past 15 years, approximately 10 flash flooding events have occurred in Lucas County. The loss from these events totaled \$2,525,000. This indicates an annual estimated loss of \$168,333. This timeframe also had \$175,000 in crop damage due to flash flooding. This would be an estimated \$11,667 annually in crop loss. Iowa State Mitigation Plan estimates an annual average loss of \$169,000.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
3	2	4	2	11

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>Floods are the most common and widespread of all-natural disasters except fire. The National Climatic Data Center lists 1,628 flash flooding/urban or small stream flooding events from 1993-2009.</p> <p>As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Urbanization increases runoff two (2) to six (6) times over what would occur on natural terrain. Portions of Iowa are very developed with significant amounts of impervious surfaces, as more development occur in the watersheds; the amount of runoff produced also increases. If measure are not taken to reduce the amount of runoff (or slow its movement), flash floods will continue to occur and may possibility increase.</p> <p>In certain area, aging storm sewers were not designed to carry the capacity currently needed to handle the increased storm runoff. This combined with rainfall trends (that are moving upwards) and rainfall extremes (that are patterning higher) all demonstrate the high likelihood yet, unpredictable nature of flash flooding in the state.</p> <p>Particular areas of concern around the City of Chariton lie on the outer edge of the community. The Pin Oak Marsh land ground located south Highway 14 is a region that often floods. The Chariton River flows on the edge of the wet lands which can collect the overflow of the river. The wetland lies on both sides of Highway 14. The second region of wet land occurs east of Chariton along highway 34. The highway touches the edge of Lake Ellis, Lake Morris and Red Haw Lake. Excessive moisture collects along the roadway of highway 34 that could cause flooding and damage. Chariton River flows west to east along the southern half of Lucas County and often experiences flooding during periods of excessive moisture. There are 100 miles of road ways at 46 locations that have been affected by flooding in the past. Lucas county has now designed those roads to have a low spot that will wash out before any nearby bridge would suffer damage. This situation may not be ideal for handling flooding situations but it is currently the most cost effective approach at this time. The county is receiving</p>	3

	<p>FEMA disaster assistance to recover and rebuild the roadways.</p> <p>The SHMT evaluation concluded that it is highly likely that flash flood will affect Iowa in any given year. All team members can relate to a flooding situation, making it easy to evaluate. Iowa experiences numerous flooding events yearly and all too often deaths and injuries occur. With three reported Flash Flooding events occurring in Lucas County in the last five years, the probability of future Flash Floods is likely. Approximately one Flash Flood has occurred in Lucas County per year and given the nature of Flash Floods, one or more can be expected in the next 10 years. The State hazard mitigation plan suggests that there is a 60% chance of a Flash Flood in Iowa in the next year. Climate change projections for Iowa suggest that Iowa is and will become wetter with increased precipitation which contributes to Flash Floods</p>	
<p><i>MAGNITUDE / SEVERITY</i></p>	<p>Flash flooding can occur anywhere and is not confined to or near flood plains; once the soil is saturated, water will wash over it to lower lying areas. Damage is likely to be more severe in lower lying areas, but can occur at higher ground as well.</p> <p>Flash flooding is an extremely dangerous form of flooding which can reach full peak in only a few minutes and allows little or no time for protective measures to be taken by those in its path. Flash flood waters move at very fast speeds and can roll boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. Flash flooding often results in higher loss of life, both human and animal, than slower developing river and stream flooding.</p> <p>Areas in a floodplain, downstream from a dam or levee or in low-lying areas can certainly be impacted. People and property 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 significant rainfall. Unlike areas impacted by a river/stream flood, flash floods can impact areas a good distance from the stream itself. Flash flood prone areas are not particularly those areas adjacent to rivers and streams. Streets can become swift moving rivers and basements can become dangerous if people are trapped in them.</p> <p>Rescuers are at significant risk when attempting to work in swift moving floodwaters associated with flash flooding.</p> <p>Personal property can be extensively damaged and destroyed by swift moving water. Facilities and infrastructure can be scoured around and degrading its structural integrity. Because flash flood water is off premises quickly, damages related to standing water is limited, but the current associated with flash floods cause abrasive type damages such as erosion and undercutting.</p> <p>Flash floods can quickly inundate areas thought to be out of a flood-prone area. Loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock damage and loss and interruption of business are common impacts from flash flooding.</p>	2
<p><i>WARNING TIME</i></p>	<p>Flash floods are somewhat unpredictable, but there are factors that can point to the likelihood of flood's occurring in an area. Flash floods occur with a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by and ice jam. Weather surveillance radar is being used to improve monitoring capabilities of intense rainfall. Knowledge of the watershed characteristics, modelling, monitoring, and warning systems increase the</p>	4

	predictability of flash floods. Depending on the location in the watershed, warning times can be increased.	
<i>DURATION</i>	The response time to the effects of flash flooding in Iowa is short in duration due to the nature of the hazard.	2
	WEIGHTED SCORE	11

Mitigation

Storm water Management	
Description	Develop a storm water management ordinance to minimize impacts on storm water system and to minimize Flash Flooding impacts; may include artificial erosion control, creek bank stabilization, erosion resistant planting on steep slopes (deep root plants) to slow and help infiltrate storm water, terracing hillsides, grading techniques
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Council,
Mitigation Category	Prevention, Natural Resource Protection
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Evacuation Plans	
Description	Develop evacuation plans for school, community buildings, and for town
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	City Council and ADLM-Emergency Management
Mitigation Category	Prevention, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.2, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Flood proofing (wet or dry)	
Description	Encourage property owner use of flood proofing techniques to reduce potential flood-related damages such as water-proofing basement walls, structural modifications allowing flood waters to pass through or around structures without causing damage (as part of remodeling or disaster related repairs), use of water- / mold-resistant paints, etc.
Estimated Cost	Minimal to high depending on structure and techniques
Timeline/Schedule	Short Term
Responsible Entity	City Council(encouragement) and Property Owners (execution)
Mitigation Category	Public Education and Awareness, Structural Projects, Prevention
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Storm Warning System	
Description	Acquisition and installation of community early warning system to compliment system at fire station
Estimated Cost	Moderate to high
Timeline/Schedule	Long Term
Responsible Entity	City Council
Mitigation Category	Structural Project
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 3.2 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Address High Risk Hazards?	yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Acquisition or relocation of buildings	
Description	Utilize disaster recovery funds or pre-disaster mitigation funds to acquire properties in floodplains or relocation of buildings outside of floodplains
Estimated Cost	Moderate to high
Timeline/Schedule	Ongoing
Responsible Entity	Chariton City Council, Lucas City Council, Lucas BOS
Mitigation Category	Prevention, property protection
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdiction	Chariton, Lucas, Unincorporated County

NFIP Participation	
Description	Communities will consider or continue participating with the National Flood Insurance Program (NFIP).
Estimated Cost	Minimal
Timeline/Schedule	Ongoing
Responsible Entity	Chariton City Council, Lucas City Council
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdiction	Chariton, Lucas

11. Hazard Profile –Drought

A period of prolonged lack of precipitation for weeks at a time producing severe dry conditions.

Description

There are three types of drought conditions that are relevant to Iowa:

METEOROLOGIC DROUGHT: which refers to precipitation deficiency;

HYRDOLOGICAL DROUGHT: which refers to declining surface water and groundwater supplies;

AGRICULTURAL DROUGHT: which refers to soil moisture deficiencies.

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

Past Occurrences & Severity

According to the National Climatic Data Center, Iowa has had twenty (20) periods of drought from 1980-2009. During the period from 1980 to 2009, there was \$2.010 billion in crop damages resulting from drought periods. The most common trend was the consistency of drought periods during the months of July through August; out of the twenty (20) periods, nine (9) of them were between July and August. While some may have been more severe than others, agricultural areas were impacted much more than the metropolitan areas were impacts were indirect.

Regionally, the East Central and Southeast portion of Iowa has experienced at least eight droughts in the last ten years. Mid- to South Central Iowa has experienced five to seven droughts since 1995, followed by the Northwest to North Central areas of Iowa experiencing three or four recorded events. The Southwest and Northeast portions of the State have not been as significantly impacted s other areas. The following map depicts a county level record of drought occurrences since 1995.

Drought is a naturally occurring hazard that occurs about every 20 years. The environmental impacts are usually short-term (resilient) and the natural environment is used to drought cycles. Drought more directly affects agricultural crops, livestock, natural vegetation, wildlife, and stream flows (fish and aquatic vegetation).

There have been 11 droughts affecting Lucas County since 1995 when the first recorded drought occurred. No deaths or injuries are associated with these events; however \$645.15 million in property damage resulted from the most recent drought in August of 2003. A combined total of \$1.5 billion in crop damage is recorded among the 11 events. All of these recorded events included multiple counties thus the costs of damages are dispersed. The following events have occurred in Lucas County during the past five years as documented by NOAA:

<u>Location</u>	<u>County/Zone</u>	<u>St.</u>	<u>Date</u>	<u>Type</u>	<u>Dth</u>	<u>Inj</u>	<u>PrD</u>	<u>CrD</u>
LUCAS (ZONE)	LUCAS (ZONE)	IA	07/01/2012	Drought	0	0	0.00K	90.000M
LUCAS (ZONE)	LUCAS (ZONE)	IA	08/01/2012	Drought	0	0	0.00K	6.000M
LUCAS (ZONE)	LUCAS (ZONE)	IA	09/01/2012	Drought	0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	10/01/2012	Drought	0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	08/01/2013	Drought	0	0	0.00K	21.000M
Totals:					0	0	0.00K	117.000M

Vulnerable Locations/Buildings

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

A severe drought, such as the event in 1988-1990 would have the greatest impact on agriculture crops, livestock, wildlife, and stream flows, as well as, the entire community. The agricultural would be the most severely impacted. Increased demand for water and electricity could result in shortages and rationing. The number and severity of fires may also increase.

The result of the drought on the economic impact would depend on the severity and length of the drought. A severe drought would have the greatest impact, but any reduction in agricultural income could result in reduced revenues for the agricultural and retail and service sectors. According to the 2012 Agricultural Census, Lucas County had 72,100 harvested acres of land in farms in Lucas County by 177,342 acres of land on farmsteads. . The committee noted that these are statewide numbers and include the central section of the state which was the most severely damage

Droughts rarely result in the loss of life, although the high heats that contribute to the droughts may also contribute to heat related illnesses and even death. In addition, property damage is not a direct impact of droughts, but drought conditions that may increase the fire hazard could be an indirect impact.

Loss Estimate

Countywide damage was established from the NCDC data base for some hazards up to 65 years. Loss factors were developed specific to the attributes of Drought throughout the region. These factors were able to provide an annual damage estimate by dividing the total loss by number of years of data. Per event damage calculated by dividing total loss by number of events. During the past 16 years, approximately 10 events have caused \$12,650,000 in property damage and \$97,650,000 in crop damage due to drought. This indicates an annual loss of approximately \$790,625 in property damage and \$6,103,125 in crop damage annually in Lucas County. Iowa State Mitigation Plan estimates an annual average loss of \$7,822,000.

Hazard Scoring & Rankings

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
2	2	1	4	9

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	Drought is part of normal climate fluctuations. Climatic variability can bring dry conditions to the region for up to years at a time. Research and observations of the El Nino/La Nina climatic events are resulting in more predictable climatic forecasts. The committee discussions indicated that moderate forms of drought can be experienced on any given year as the entire Midwest often experiences that accompanying high summer temperatures. Members agreed that this profile had more of the intention of severe drought and major agricultural damage. The SHMT analysis evaluated the statewide probability of future droughts in Iowa in the order of magnitude of between -3.0 to -3.9 Palmer drought severity index (severe drought event) at between 10% and 20% probability in any given year.	2
<i>MAGNITUDE / SEVERITY</i>	<p>Those dependent on rain would be the most vulnerable to a drought. This means that agriculture, agribusiness, and consumers (if the drought lasted long enough or impacted a large area) would be impacted. A drought limits the ability to produce goods and provide services. Because citizens draw their drinking water from surface water and groundwater sources, a prolonged severe drought may impact all citizens if there were to be a dramatic drop in the stream flow coupled with the drop in the water table.</p> <p>Fire suppression can also become a problem due to the dryness of the vegetation and possible lack of water. This would be most threatening to older buildings. While the water supply for all of Lucas County (less City of Chariton) comes from Rathbun Lake, a prolonged, severe drought could compromise the best efforts of Fire Departments in fighting fires anywhere in town. A severe drought would also compromise the safety of Chariton because the water supply comes from Lake Ellis and Lake Morris.</p> <p>A drought would likely affect the state of Iowa if not the Midwest as a whole. Because of the dependence on precipitation and water, the agricultural community would be impacted the most. The agricultural areas would be most adversely impacted, but the entire state would likely feel at least some impact.</p> <p>Few if any health impacts to people in the affected area because of secondary sources of water. Drought in the US seldom results directly in the loss of life. Health impacts would more significant on livestock without auxiliary water supplies.</p> <p>Property losses would be limited to livestock and crops to the agricultural community. Facilities would not be impacted. Infrastructure could be affected in areas of expansive soils due to drying soils, lower water levels around dams, etc. Delivery of services would be limited to source water delivery and those services that consume large amounts of water.</p> <p>Drought can lead to large and damaging impacts to the agricultural economy. Because of Iowa's reliance on the agricultural economy, the economic and financial impacts would certainly ripple out into other sectors. Rural areas can be especially affected by long-term drought. If restrictions are put on manufacturers</p>	2

	that use large amounts of water, the local economy can be impacted that way as well.	
<i>WARNING TIME</i>	Drought warning is based on a complex interaction of many different variables, water uses, and consumer needs. Drought warning is directly related to the ability to predict the occurrence of atmospheric conditions that produce the physical aspects of drought, primarily precipitation and temperature. There are so many variables that can affect the outcome of climatic interactions, and it is difficult to predict a drought in advance. In fact, an area may already be in a drought before it is recognized. While the warning of the drought may not come until the drought is already occurring, the secondary effects of a drought may be predicted and warned against weeks in advance.	1
<i>DURATION</i>	According to Iowa's drought history, most droughts that affect Iowa occur for at least a month at a time.	4
	WEIGHTED SCORE	9

Mitigation

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5(See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

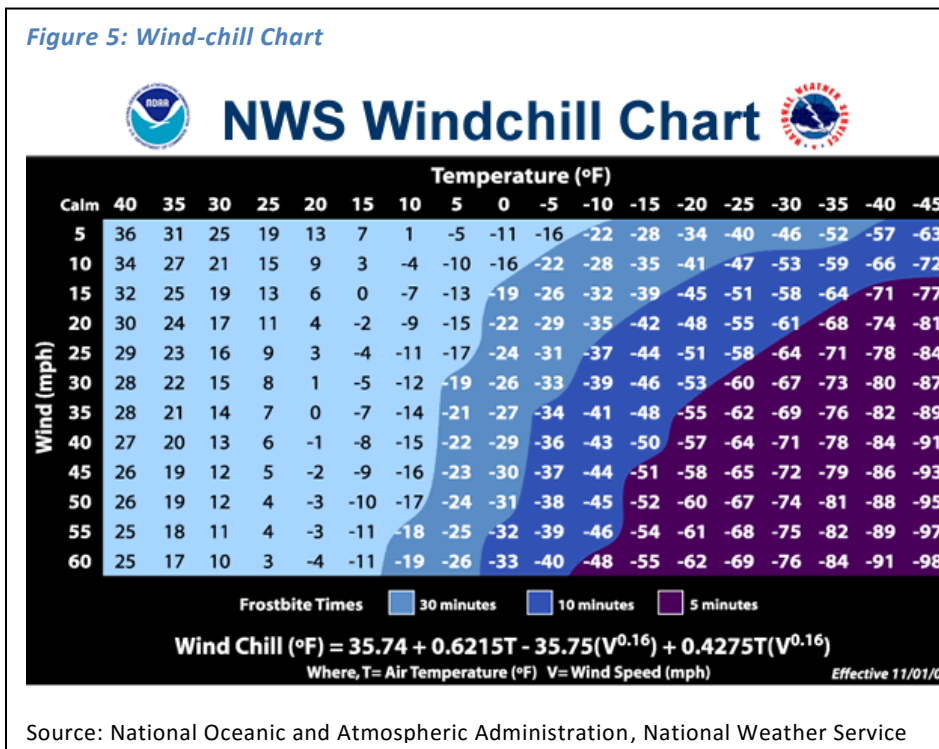
Water Storage or Saving Plans	
Description	Develop plan for water storage for back-up and to supplement Rathbun Rural Water, develop policy or program for helping residents reduce water demand using measures such as low-flow toilets and showerheads and landscaping
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	ADLM, City Council
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 2.5, 3.1, 3.3, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

12. Hazard Profile – Severe Winter Storm

Severe winter weather conditions that affect day-to-day activities. These can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold.

Description

Winter storms are common during the winter months of October through April. The various types of extreme winter weather cause considerable damage. Heavy snows cause immobilized transportation systems, downed trees and power lines, collapsed buildings, and loss of livestock and wildlife. Blizzard conditions are winter storms which last at least three hours with sustained wind speeds of 35 mph or more, reduced visibility of 1/4 mile or less, and white-out conditions. Heavy snows of more than six inches in a 12-hour period or freezing rain greater than 1/4 inch accumulation causing hazardous conditions in the community can slow or stop the flow of vital supplies as well as disrupting emergency and medical services. Loose snow begins to drift when the wind speed reaches 9 to 10 mph under freezing conditions. The potential for some drifting is substantially higher in open country than in urban areas where buildings, trees, and other features obstruct the wind. Ice storms result in fallen trees, broken tree limbs, downed power lines and utility poles, fallen communications towers, and impassable transportation routes. Severe ice storms have caused total electric power losses over large areas of Iowa and rendered assistance unavailable to those in need due to impassable roads. Frigid temperatures and wind chills are dangerous to people, particularly the elderly and the very young. Dangers include frostbite or hypothermia. Water pipes, livestock, fish and wildlife, and pets are also at risk from extreme cold and severe winter weather.



Past Occurrences & Severity

Since 1993, Iowa has had 1,221 recorded winter storms; including heavy snow, ice storm, blizzards or extreme wind-chills. In Iowa's history, there are many accounts where large numbers of death are due to the cold and blizzards. While we are not as vulnerable as the early settlers were, there are recent accounts of multiple deaths from snowstorms and extreme cold around the state. Between 1993 and March of 2010, there have been 25 injuries and 12 deaths due to winter weather (data provided by the National Climactic Data Center).

Seven winter storm related Presidential Declarations for Major Disaster have been declared in Iowa since 1990, the first declaration occurred in 1991 resulting from an ice storm that affected 16 counties. Extensive damage occurred to power lines, including the collapse of numerous high-tension towers in north-central Iowa. The second declaration occurred in 1997 resulting from a severe winter storm that affected 13 counties.

The third and fourth declaration occurred in 2007 affecting 66 counties. The third declaration affected 48 counties and the fourth declaration affected 23 counties with five (5) counties counted in both declarations. These declarations resulted from a major winter storm with ice and heavy snow combined with strong winds gusting to 50-55mph causing blizzard conditions. Some areas in Iowa received 16 inches of snow and coupled with the strong winds caused already weakened ice lined power lines to crumble and interstate highways to close due to drifting snow. This situation left approximately 250,000 plus Iowa citizens without electricity for ten plus days. In central Iowa, one county had twenty (20) miles of downed power poles that snapped due to power lines being coated with inches of ice coupled with the strong winds; high-tension towers collapsed. Due to the severity of the winter blizzard, the Governor signed a Governor’s Emergency Declaration for all 99 counties in Iowa.

The remaining three declarations occurred in January of 2008, affecting 30 counties in southern Iowa and the remaining two occurred in late February 2010, impacting 27 counties, in early March 2010, impacting 27 counties in western Iowa.

There have been 52 recorded snow and ice events in Lucas County since 1993 including freezing rain, snow, ice storms, and winter storms. Six deaths are associated with these events and property damage totaling \$42.36 million in personal property and 65million crop damage are recorded. In 1995 two snow events that affected Lucas County, were recorded for a larger part, or all of Iowa totaling \$600 thousand in property damage for all included areas. Since 1994 there were 11 periods of extreme cold or extreme wind chill amounting to \$1.8 million in property damages and \$281 million in crop damages. Only one death is associated with these events.

Winter storms are a particular challenge for all small cities in southern Iowa. The strain they place on municipal budgets to clear transportation routes, on area utilities to repair damaged facilities, including power lines, and to homeowners and businesses to repair and maintain property can be significant.

There have been three severe winter storms documented by NOAA during the past five years. None caused extensive damage.

<u>Location</u>	<u>County/Zone</u>	<u>St.</u>	<u>Date</u>	<u>Type</u>	<u>Dth</u>	<u>Inj</u>	<u>PrD</u>	<u>CrD</u>
LUCAS (ZONE)	LUCAS (ZONE)	IA	01/06/2010	Winter Storm	0	0	25.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	01/29/2013	Winter Storm	0	0	25.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	02/04/2014	Winter Storm	0	0	0.00K	0.00K
Totals:					0	0	50.00K	0.00K

Vulnerable Locations/Buildings

The entire planning area is vulnerable to the effects of Severe Winter Storms. Winter storms tend to make driving more treacherous and can impact the response time of emergency vehicles. The probability of utility and infrastructure abruption or outages, increases during winter storms due to freezing rain accumulation on power lines. Elderly populations are especially vulnerable to the impacts of winter storms. Winter storms increase wear and tear on roadways also, but it is difficult to determine the amount of the expenses to maintain or recover from a storm.

Buildings with overhanging tree limbs are more vulnerable to damage during winter storms. Businesses experience loss of income as a result of closure due to power outages. Overhead power lines and infrastructure are also vulnerable to damages from winter storms. The weight from of the ice accumulation creates damage to power lines, as well as, damage to the lines and equipment from falling trees and/or tree limbs due to the weight. Potential losses would include the cost of repair or replacement of damaged facilities and lost economic opportunities. Secondary effects of loss of power could include ruptured water pipes in homes without electricity. Public safety hazards also include risk of electrocution from downed power lines. Specific amounts of estimated losses are not available due to the complexity and multiple variables with this hazard. The loss of use estimates are provided in the table below and were calculated using FEMA’s publication “*What is a Benefit? Guidance*

on Benefit-Cost Analysis of Hazard Mitigation Project, June 2009". The loss of use is provided in the heading s the loss of use cost per person per day of loss. The estimated loss of use provided for each jurisdiction represents the loss of service of the indicated utility for one day for 10 percent of the population. It is understood that in rural areas the typical loss of use may be for a longer period of time and a larger percentage of the population. These figures do not take into account the physical damage to utility equipment and infrastructure.

Jurisdiction	Population (2010)	Estimated Affected Population (10%)	Electric loss of use estimates @ \$128/person/day
Unincorporated	3540	354	\$45,312/day
Chariton	4321	432	\$55,296
Derby	115	12	\$1,538
Lucas	216	22	\$2,816
Russell	554	55	\$7,040
Williamson	152	15	\$1920

2010 US Census

It is difficult to estimate the precise totals of damage to Lucas County because of the widespread nature of Severe Winter Storms. The population most vulnerable and are most at risk to Severe Winter Storms are the elderly. The following table summarizes the number of residents that are over 65 years and what percentage of the county this comprises.

Location	Population over 75yrs	Percentage of Population over 75yrs
Unincorporated county	268	7.5%
Chariton	568	13%
Derby	9	7.8%
Lucas	18	8.3%
Russell	98	17.7%
Williamson	43	19.9%

2010 US Census

UNINCORPORATED COUNTY AREA – SEVERE WINTER STORMS

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	1598	100%	\$127,778,883	\$127,778,883	100%	3540	3540	100%
Commercial	57	57	100%	\$16,815,709	\$16,815,709	100%	-	-	100%
Industrial	2	2	100%	\$1,057,800	\$1,057,800	-	-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Unincorporated County Structural Inventory

**Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$16,000,000	
Landfill		X					40acres	\$ 600,000	
Lake Red Haw					X		--	\$ 3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	\$6,000,000	
Iowa DOT	Hwy 34						4800	\$ 480,000	

CHARITON – SEVERE WINTER STORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	1597	100%	\$99,523,675	\$99,523,675	100%	4321	4321	100%
Commercial	217	217	100%	\$28,798,725	\$28,798,725	100%			100%
Industrial	9	9	100%	\$1,475,384	\$1,475,384	100%			-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	13	100%						
Government	5	5	100%						
Education	9	9	100%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	\$500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	\$1,500,000	
Auburn Manor, Inc	815 Auburn St		X				6875	\$800,000	
SENECA Area on Aging	117 S Grand St		X				6067	\$600,000	
Circle of Life Hospice	1010 N 7 th St		X				3044	\$600,000	
Kiddie Kampus	East Court St		X				5200	\$1,000,000	
Hammer Medical Supply	110 N Grand st			X			7647	\$1,300,000	
Chariton Fire Hall		X		X	X		9796	\$2,000,000	
Dept of Correctional Services	115 S Main St			X	X				
Lucas County Courthouse		X			X	X	11868	\$6,000,000	
Hy-Vee Store	2001 Court Ave			X			22,600	\$4,000,000	
ShopKo	1900 Court Ave			X			22,500	\$1,400,000	
Dollar General	307 N Grand St			X			8405	\$1,000,000	
Lucas Co Sherriff's office		X			X		5016	\$1,200,000	
Farmer's Coop	2120			X			7200	\$5,000,000	

	Osceola Ave								
Casey's General Store	1421 Court Ave			X			2376	\$560,000	
Kum & Go	335 Main St			X			2400	\$600,000	
Elliott Oil Comp	Hwy 34 & 1st St			X			5350	\$600,000	
Casey's General Store	418 S 7th Street			X			10,320	\$1,000,000	
Corydon Oil company	8th & Court			X			3300	\$750,000	
Kum & Go	1155 N 7th St			X			1736	\$450,000	
Sewer Stations Lift		X					120	\$100,000	
Historic Courthouse Square		X	X	X	X	X			
North Ridge Assisted Living	1110 N 6th St		X						
Chariton Nursing & Rehab Center	1214 N 7th St		X						
Private In-Home Daycare	511 Orchard Ave		X						
Private In-Home Daycare	26986 550th St		X						
Private In-Home Daycare	1120 N Grand St		X						
Private In-Home Daycare	720 N 7th St		X						
Private In-Home Daycare	334 N 7th St		X						
Private In-Home Daycare	1721 Ilion Ave		X						
Private In-Home Daycare	437 Court Ave		X						
Private In-Home Daycare	806 S 7th St		X						
Private In-Home Daycare	1430 Franklin Ave		X						
Private In-Home Daycare	311 S 12th St		X						

School Facilities *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value
Chariton High School	501 N Grand St		X	X	X		70,000	\$27,000,000	
Chariton Middle School	1300 N 16th St		X	X	X		50,000	\$20,000,000	
Van Allen Elementary	1129 Ashland St		X	X	X		31,000	\$15,000,000	
Columbus Elementary	1215 Linden Ave		X	X	X		15,500	\$11,000,000	
The Other Hand, Alternative Ed	1516 Court Ave		X	X	X		1400	\$ 250,0000	
Bus Barn									

LUCAS COUNTY HEALTH CENTER FACILITIES

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office. Insured value is according to the hospital’s insurance policy.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value	Occupancy or capacity
Lucas County Health Center	1200 N 7th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed

DERBY - SEVERE WINTER STORMS

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	52	100%	\$1,251,043	\$1,251,043	100%	115	115	100%
Commercial	7	7	100%	\$33,725	\$33,725	100%			100%
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	-	-							
Government	-	-							
Education	-	-	-	-	-	-	-	-	-
Utilities	-	-	-	-	-	-	-	-	-

Derby Structural Inventory

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	
Private In-Home Daycare	554 Prairie Ave		X						

LUCAS – SEVERE WINTER STORMS

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	98	100%	\$2,885,880	\$2,885,880	100%	216	216	100%
Commercial	13	13	100%	\$231,717	\$231,717	100%			
Industrial	1	1	100%	\$183,000	\$183,000	-	-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit			100%						
Government			100%						
Education									
Utilities			-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
Fire Hall		X					6000	\$ 600,000	
Water plant		X							
Water tower		X						\$1,500,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
Lagoon		X					20acres	\$ 65,000	
Gas & Go				X					
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	
Southern Iowa Petroleum, LLC	Hwys 5 & 34			X			2400	\$ 540,000	
In-Home Private Daycare	506 Vine St			X					

RUSSELL – SEVERE WINTER STORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	214	100%	\$8,787,186	\$8,787,186	100%	554	554	100%
Commercial	19	19	100%	\$378,610	\$378,610	100%			
Industrial	-		-			-	-	-	-
Agricultural	-		-	-		-	-	-	-
Religious / Non-profit	3	3	100%						
Government	2	2	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	\$ 60,000	
Fire Hall		X					1200	\$ 120,000	
Community Bldg					X		2800	\$ 280,000	
Water plant		X					--		
Water tower		X					--	\$ 1,000,000	
City Maintenance/ Storage					X		1860	\$ 100,000	
Lagoon		X					20acres	\$ 100,000	
Public Library/Russell Historical Society Museum	106 S Prairie St					X	2000	\$ 450,000	

WILLAMSON – SEVERE WINTER STORMS

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	73	100%	\$1,231,664	\$1,231,664	100%	152	152	100%
Commercial	2	2	100%	\$41,942	\$41,942	100%			
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	2	100%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall								\$ 546,698	\$ 162,365
Sewer Lift Station									
Williamson Community Center								\$ 546,698	\$ 162,365

Loss Estimate

Countywide damage was established from the NCDC data base for some hazards up to 65 years. Loss factors were developed specific to the attributes of Severe Winter Storms throughout the region. These factors were able to provide an annual damage estimate by dividing the total loss by number of years of data. Per event damage calculated by dividing total loss by number of events. During the past 16 years, 12 severe winter storm events have caused \$209,900 in property damage. This calculates annual loss of \$13,119 for Lucas County. Iowa State Mitigation Plan estimates an annual average loss of \$11,000.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
3	3	2	3	11

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>Winter storms regularly move easterly and use both the southward plunge of arctic cold air from Canada and the northward flow of moisture from the Gulf of Mexico to produce heavy snow and sometimes blizzard conditions in Iowa and other parts of the Midwest. The cold temperatures, strong winds, and heavy precipitation are the ingredients of winter storms. Most counties can usually expect 2 or 3 winter storms a season with an extreme storm every 3 to 5 years on average (more in the northwest, fewer in the southeast). A snowfall of six inches or more from one storm only occurs in 49% of Iowa winters, while a large winter storm event of 10 inches or more will occur about once every 3 years.</p>	3
<i>MAGNITUDE / SEVERITY</i>	<p>Hazardous driving conditions due to snow and ice on highways and bridges lead to many traffic accidents. The leading cause of death during winter storms is transportation accidents. About 70% of winter-related deaths occur in automobiles and about 25% are people caught out in the storm. The majority of these are males over 40 years of age. Emergency services such as police, fire, and ambulance are unable to respond due to road conditions. Emergency needs of remote or isolated residents for food or fuel, as well as for feed, water and shelter for livestock are unable to be met. People, pets, and livestock are also susceptible to frostbite and hypothermia during winter storms. Those at risk are primarily either engaged in outdoor activity (shoveling snow, digging out vehicles, or assisting stranded motorists), or are the elderly or very young. Schools often close during extreme cold or heavy snow conditions to protect the safety of children and bus drivers. Citizens' use of kerosene heaters and other alternative forms of heating may create other hazards such as structural fires and carbon monoxide poisoning.</p> <p>Severe winter storms can lead to injury and death through traffic accidents or to individuals that may be caught outdoors. Cold temperature impacts on agriculture are frequently discussed in terms of frost and freeze impacts early or late in growing seasons and unprotected livestock. Response personnel are exposed to cold temperatures and traffic accidents when responding to the victim's needs.</p> <p>Immobilized transportation (including emergency vehicles), downed trees and electrical wires, building and communication tower collapse, and bodily injury/death are just a few of the impacts of a severe winter storm. Vehicle batteries and diesel engines are stressed and the fuel often gels in extreme cold weather. This impacts transportation, trucking, and rail traffic.</p> <p>Fire during winter storms presents a great danger because water supplies may freeze and firefighting equipment may not function effectively, or personnel and equipment may be unable to get to the fire. If power is out, interiors of homes become very cold and lead to pipes freezing and possibly bursting. Rivers and lakes freeze and subsequent ice jams threaten bridges and can close major highways. Ice jams can also create flooding problems when temperatures begin</p>	3

	to rise. Ice coating of one-fourth inch in thickness is heavy enough to damage trees, overhead wires, and similar objects and to produce widespread power outages. Buried water pipes can burst causing massive ice problems and loss of water and subsequent evacuations during sub-zero temperatures.	
<i>WARNING TIME</i>	The National Weather Service (NWS) has developed effective weather advisories that are prompted and widely distributed. Radio, TV, and weather alert radios provide the most immediate means to do this. Accurate information is made available to public officials and the public up to days in advance. Notifications made by the National Weather Service include winter storm watch, winter storm warning, blizzard warning, winter weather advisory, and a frost/freeze advisory.	2
<i>DURATION</i>	Severe winter storms in Iowa and the response to these declared events are tied to multiple storms necessitating large expenses to cities for snow removal and road service. The associated losses and dangers of electrical outages to rural areas further compounds the duration of responding to a major storm event.	3
	WEIGHTED SCORE	11

Mitigation

Generators	
Program/Project Description	Acquisition of mobile and / or fixed generators for use at community buildings used for temporary storm shelters and / or for public facilities
Anticipated Cost	Moderate
Timeline/Schedule	Medium term
Responsible Agency	City Council, critical facility property owners, Board of Directors', or School Board
Mitigation Category	Emergency services, Prevention, Property Protection
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 2.5, 3.1, 3.3, 3.4 (See page 42 or Appendix)
Addresses High Risk Hazard?	yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

New Storm Shelter/ Cooling or Heating Shelter	
Program/Project Description	Construction of comprehensive storm shelter to Tornado Safe Room standards to serve as a temporary shelter for multiple hazards as often a Church, Community Center, Legion Hall, City Hall, and School are currently utilized as needed
Anticipated Cost	Moderate to high – grant dependent
Timeline/Schedule	Long term
Responsible Agency	City Council
Mitigation Category	Structural project
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.3 (See page 42 or Appendix)
Addresses High Risk Hazard?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Public Education and Outreach	
Description	Develop hazard education and outreach program to help Lucas County residents understand meaning of hazard warnings and self-protection measures
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	ADLM emergency management, fire departments/first responders
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Storm Warning System	
Description	Acquisition and installation of community early warning system to compliment system at fire station
Estimated Cost	Moderate to high
Timeline/Schedule	Long Term
Responsible Entity	City Council
Mitigation Category	Structural Project
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 3.2 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Weather Radios	
Description	Encouragement of residents and businesses to obtain NOAA weather radios
Estimated Cost	Voluntary program; approximately \$30 per radio
Timeline/Schedule	Short Term
Responsible Entity	City Councils, Board of Supervisors and city residents
Mitigation Category	Prevention and Public Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.2, 3.3, 3.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Storm water Management	
Description	Develop a storm water management ordinance to minimize impacts on storm water system and to minimize Flash Flooding impacts; may include artificial erosion control, creek bank stabilization, erosion resistant planting on steep slopes (deep root plants) to slow and help infiltrate storm water, terracing hillsides, grading techniques
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Council,
Mitigation Category	Prevention, Natural Resource Protection
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Burying Power Lines	
Description	Encourage burying of power lines to new construction and upon significant maintenance or upgrades of existing power supply
Estimated Cost	Minimal (for City), Moderate to High (for power companies)
Timeline/Schedule	Long Term
Responsible Entity	City Council, Power Companies,
Mitigation Category	Property Protection, Structural Projects
Related Goals/Objectives	1.1, 1.3, 2.3 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Unincorp County

Temporary Debris Disposal Plan	
Description	Develop policy for temporary debris disposal for city and private property owners for post-disaster clean-up
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Councils,
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Snow Fences / Barriers	
Description	Encourage development of snow fences or barriers to block drifting snow from blocking critical access routes or from building entrances ranging from artificial to vegetative barriers
Estimated Cost	Voluntary
Timeline/Schedule	Short Term
Responsible Entity	Property Owners, City Council's
Mitigation Category	Prevention, Natural Resource Protection
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Unincorp County

Maintenance of Heating / Cooling Systems	
Description	Encourage property owner maintenance of heating and cooling systems and maintenance of heating and cooling systems in community buildings
Estimated Cost	Minimal to moderate
Timeline/Schedule	Short Term
Responsible Entity	City Maintenance and Property Owners
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.3, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Tree Management/Trimming	
Description	Encourage private home owners, businesses, and jurisdictions to regularly perform tree trimming and maintenance to prevent limb breakage and for safeguarding nearby utility lines.
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City council, property home owners, utility companies
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 2.1, 2.3, 3.1 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Building Code Enforcement	
Description	Encourage all local governments to adopt and enforce updated building codes to reduce the risk of collapse, failure or injury in the event of a disaster.
Estimated Cost	Moderate
Timeline/Schedule	ongoing
Responsible Entity	City Council, First Responders, ADLM, County Public Health Department
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.4, 2.5, 3.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Derby, Lucas, Russell, Williamson

13. Hazard Profile – Grass or Wild Land Fire

WILDFIRE: An uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures (FEMA).

GRASS FIRE: An uncontrolled fire in a grassy area.

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

Description

According to FEMA, fire is the fourth largest accidental killer in the United States and the most common disaster experienced by Americans. Most fire deaths occur as a result of fires beginning in the late evening, when people are sleeping. In addition, 84% of fires are accidental, the remaining percentage are set intentionally.

Fires may also occur as a secondary effect from an initial disaster, such as lightning, high winds, tornadoes, or transportation disasters.

Grass and wildfires can occur when conditions are favorable such as during periods of drought when natural vegetation would be drier and subject to combustibility.

Past occurrences & severity

For most grass or wildfires, the number of people or properties impacted would be negligible. However, firefighters are vulnerable to health hazards resulting from the fires themselves as well as the physical stresses of fighting such fires. According to the National Interagency Fire Center, there have been 1,244 wildfires spanning 30,370 acres and 1,274 prescribed fires spanning 8,951 acres from 2002-May 31, 2010 in Iowa. These numbers, along with those reported in the Rocky Mountain region consist of only 3-4% of the reported national incidents and encompass 2-4% of total acres burned. There have been no recorded grass or wildfires in the NCDC database in Lucas County currently; however the risk does exist especially if droughts affect the area. Anecdotal evidence suggests that there have been many grass or wildfires in Lucas County despite the lack of documentation. Local fire department personnel indicate occurrence with structure fires is common but there has not been a documentation process.

Vulnerable Locations/Buildings

The table below summarized the maximum population and building exposure to Grass or Wildfire. Older structures with dated electrical systems that are not built to fire codes are at a particular risk. When a fire is occurring, it was acknowledged by the HMGP committee, that elderly, children and people with disabilities are at greatest risk of death due to the fire. However, the unincorporated region has a low population density and the risk is very low. Agricultural land where CRP land is burned and rural areas where debris is burned are very vulnerable to a Grass or Wildfire. There have been no recorded grass or wildfires in the NCDC database in Lucas County currently; however the risk does exist especially if droughts affect the area. Anecdotal evidence suggests that there have been grass or wildfires in Lucas County despite the lack of documentation. Committee members spoke with their respective fire departments and discovered that many have heard stories of Grass fires long ago but none are able to recall recent occurrences within the past 20 years or find documentation to support. The committee did agree that agricultural areas where CRP land is burned, rural areas where debris is burned and the wild land-urban interface areas are the most vulnerable. Of the approximate 171,150 acres in farms 53% is cropland, 12% woodland, 26% pasture, and approximately 8% for other uses. The HMGP committee estimated approximately 50% of residential structures, commercial structures, and industrial structures are in the Grass or Wildfire Hazard Area.

UNINCORPORATED COUNTY AREA – GRASS OR WILD LAND FIRE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	799	50%	\$127,778,883	\$63,889,441	50%	3540	1770	50%
Commercial	57	29	50%	\$16,815,709	\$8,407,854	50%			
Industrial	2	1	50%	\$1,057,800	\$528,900	50%	-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$16,000,000	
Landfill		X					40acres	\$ 600,000	
Lake Red Haw					X		--	\$ 3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	\$ 6,000,000	
Iowa DOT	Hwy 34			X			4800	\$ 480,000	

CHARITON – GRASS OR WILD LAND FIRES

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	399	25%	\$99,523,675	\$24,880,919	25%	4321	1080	25%
Commercial	217	54	25%	\$28,798,725	\$7,199,681	25%			
Industrial	9	2	25%	\$1,475,384	\$368,846	25%	-	-	-
Agricultural	-						-	-	-
Religious / Non-profit	13	3	25%						
Government	5	1	25%						
Education	9	2	25%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Critical Facilities

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000	
Auburn Manor, Inc	815 Auburn St		X				6875	\$ 800,000	
SENECA Area on Aging	117 S Grand St		X				6067	\$ 600,000	
Circle of Life Hospice	1010 N 7 th St		X				3044	\$ 600,000	
Kiddie Kampus	East Court St		X				5200	\$ 1,000,000	
Hammer Medical Supply	110 N Grand st			X			7647	\$ 1,300,000	
Chariton Fire Hall		X		X	X		9796	\$ 2,000,000	
Dept of Correctional Services	115 S Main St			X	X				
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000	
Hy-Vee Store	2001 Court Ave			X			22,600	\$ 4,000,000	
ShopKo	1900 Court			X			22,500	\$ 1,400,000	

	Ave								
Dollar General	307 N Grand St			X			8405	\$ 1,000,000	
Lucas Co Sherriff's office		X			X		5016	\$ 1,200,000	
Farmer's Coop	2120 Osceola Ave			X			7200	\$ 5,000,000	
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000	
Kum & Go	335 Main St			X			2400	\$ 600,000	
Elliott Oil Comp	Hwy 34 & 1st St			X			5350	\$ 600,000	
Casey's General Store	418 S 7th Street			X			10,320	\$ 1,000,000	
Corydon Oil company	8th & Court			X			3300	\$ 750,000	
Kum & Go	1155 N 7th St			X			1736	\$ 450,000	
Sewer Lift Stations		X					120	\$ 100,000	
Historic Courthouse Square		X	X	X	X	X			
Private In-Home Daycare	1430 Franklin Ave		X						
Private In-Home Daycare	311 S 12th St		X						
Private In-Home Daycare	806 S 7th St		X						
Private In-Home Daycare	1721 Ilion Ave		X						
Private In-Home Daycare	1120 N Grand St		X						

School Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value
Chariton High School	501 N Grand St		X	X	X		70,000	\$27,000,000	
Chariton Middle School	1300 N 16th St		X	X	X		50,000	\$20,000,000	
Van Allen Elementary	1129 Ashland St		X	X	X		31,000	\$15,000,000	
Columbus Elementary	1215 Linden Ave		X	X	X		15,500	\$11,000,000	
The Other Hand, Alternative Ed	1516 Court Ave		X	X	X		1400	\$ 250,0000	
Bus Barn									

Lucas County Health Center

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value	Occupancy or capacity
Lucas County Health Center	1200 N 7th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed

DERBY - GRASS OR WILD LAND FIRE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	13	25%	\$1,251,043	\$312,761	25%	115	29	25%
Commercial	7	2	35%	\$33,725	\$11,804	35%			
Industrial	-	-	-			-	-	-	
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	-	-							
Government	-	-							
Education	-	-		-	-	-	-	-	-
Utilities	-	-		-	-	-	-	-	-

Derby Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	
Private In-Home Daycare	554 Prairie Ave		X						

RUSSELL – GRASS OR WILD LAND FIRE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	6	25%	\$8,787,186	\$2,196,797	25%	554	139	25%
Commercial	19	5	25%	\$378,610	\$94,653	25%			
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	3	1	10%						
Government	2	1	10%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Community Bldg					X		2800	\$ 280,000	
D&D Market	114 S Prairie St			X			1859	\$ 260,000	

WILLAMSON – GRASS OR WILD LAND FIRE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	18	25%	\$1,231,664	\$307,916	25%	152	38	25%
Commercial	2	1	50%	\$41,942	\$20,971	50%			
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	0	0%						
Government	1	0	0%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall									
Sewer Lift Station									
Williamson Community Center									

Loss Estimates

Countywide damage was established from the NCDC data base for some hazards up to 65 years. Loss factors were developed specific to the attributes of Grass or wild Land Fire throughout the region. These factors were able to provide an annual damage estimate by dividing the total loss by number of years of data. Per event damage calculated by dividing total loss by number of events. There are no NCDC events documented. Local information indicates that an estimated event at \$450 to activate a fire department. Expense beyond activation would be calculate by the duration of the fire.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
2	2	4	2	10

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	No event that has been reported has been historically significant wildfire; due to the nature of this hazard the SHMT determined that the probability in any given year is occasional (10-20%) due to the amount of fires reported and the low amount of historically significant wild land fires as determined by the National Interagency Fire Center (none are on record since the first recorded event in 1804). HMGP Committee members thought that estimate could be accurate for the state but that there but could be more accurately stated as simply “possible” in Lucas County. The consensus was that it could happen once in the next 100 years was accurate for this region.	2
<i>MAGNITUDE / SEVERITY</i>	<p>While wildfires have proven to be most destructive in the Western States, they have become an increasingly frequent and damaging phenomenon nationwide. People choosing to live in wild-land settings are more vulnerable to wildfires, and the value of exposed property is increasing at a faster rate than population. Iowa is less vulnerable to wild land fire because of the extremely large percentage of land that is developed. Grass fires are often more easily contained and extinguished before there is damage to people or developed property. Fires often burn large portions of field crops in the fall when the crops are dry and the harvesting equipment overheats or throws sparks. This can be quite costly to the farmer in terms of lost production.</p> <p>Grass and wild land fires pose a threat to individuals ranging from smoke inhalation to severe burns and death. Risk to response personnel includes heart attack and smoke inhalation.</p> <p>Operations could be impacted if facilities are damaged by a grass or wildfire or if electrical transmission lines are damaged. Damage to property, facilities, and infrastructure can range from minor smoke damage to incineration. Grass and wildfires pose a threat to crops and livestock as well as structures.</p> <p>Grass and wildfires may be of particular concern in Lucas County due to the presence of old coal mines. Not all of these mines were exhausted of coal, most abandoned as coal mining technology changed in the early part of the 20th Century. A fire spreading to coal mines could lead to mine collapse and the associated impacts.²</p> <p>Economic impacts would be most significant on the agricultural community unless such a fire were to spread into a settled community. Insurance policies may or may not cover grass or wildfire damage.</p> <p>Most grass fires are contained to highway right-of-way and rail right-of-way ditches and are less than a few acres in size. High winds can turn a small flame into a multi-acre grassfire within a matter of minutes. The extent is dependent upon conditions such as land use/land cover, moisture, and wind.</p>	2

<i>WARNING TIME</i>	As mentioned above, most grass fires occur without warning and travel at moderate rates. This situation depends upon conditions at the time such as moisture, wind and land cover. However, methods for forecasting the probability of occurrence of conditions most suitable for wild-fires to occur has increased with the use of the national wild land significant fire potential outlook issued by the National Interagency Fire Center and the NOAA Storm Prediction Center.	4
<i>DURATION</i>	The majority of Iowa wild land fires occur in short duration on areas of brush and forest lands with approximately half of the fires being prescribed fires and controlled burns supervised by trained experts.	2
	WEIGHTED SCORE	10

Mitigation

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson
Water Storage or Saving Plans	
Description	Develop plan for water storage for back-up and to supplement Rathbun Rural Water, develop policy or program for helping residents reduce water demand using measures such as low-flow toilets and showerheads and landscaping
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	ADLM, City Council
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 2.5, 3.1, 3.3, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson
Burning Restrictions	
Description	Develop, implement, and enforce burning restrictions for trash and yard waste within each city's boundaries
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Councils and Fire Departments,
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Smoke / Fire / Carbon Monoxide Detector and Sprinkler Systems	
Description	Encourage use and maintenance of smoke / fire / carbon monoxide detectors and fire suppression (aka sprinkler) systems in private buildings; use and maintain smoke / fire / carbon monoxide detectors in City-owned buildings and install sprinkler systems as funds are available and as needed
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City Maintenance Dept and Property Owners
Mitigation Category	Prevention, Property Protection
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Search and Rescue Training for First Responders	
Description	Training Firefighters and other local emergency responders best practices in search and rescue operations
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	Fire Department
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

14. Hazard Profile – Dam Failure

A dam failure is the uncontrolled release of impounded water resulting in downstream flooding, which can affect life and property. Flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, and poor construction, vandalism, or terrorism cause dam failures. Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation and recreation.

1. Description

Dams are classified into three (3) categories based on the potential risk to people and property should a failure occur. The classification may change over time because of development downstream from the dam since its construction. Older dams may not have been built to the standards of its new classification. Below are the hazard classifications defined by Iowa Department of Natural Resources (DNR):

- High Hazard – A structure shall be classified as high hazard if located in an area where failure may create a serious threat of loss of human life or result in serious damage to residential, industrial, or commercial areas, important public utilities, public buildings or major transportation facilities.
 - Local High Hazard dams – Appanoose 1, Lucas 1
 - Federal dams identified in State Major Dam Inventory – Lake Rathbun in Appanoose County.
- Moderate (Significant) Hazard – A structure shall be classified as moderate hazard if located in an area where failure may damage isolated home or cabins, industrial or commercial buildings, moderately traveled roads or railroads, interrupted major utility services, but without substantial risk of loss of human life. In addition, structures where the dam and its impoundment are of themselves of public importance, such as dams associated with public water supply systems, industrial water supply or public recreation, or which are an integral feature of a private development complex, shall be considered moderate hazard for design and regulatory purposes unless a higher hazard class is warranted by downstream conditions;
 - Local Significant Hazard dams – Appanoose 3, Lucas 3, Lucas 1

- Low Hazard – A structure shall be classified as a low hazard dam if located in an area where damages from a failure would be limited to loss of the dam, loss of livestock, damages to farm outbuildings, agricultural lands, and lesser used roads, and where loss of human life is considerably unlikely.

Dam hazard potential classifications have nothing to do with the material condition of the dam, only the potential for death and/or destruction due to the size of the dam, the size of the impoundment, and the characteristics of the area downstream from the dam. The Iowa Department of Natural Resources (DNR) tracks all dams in Iowa with a height of 25 feet or a total storage of at least 50 acre feet of water. The inventory excludes all dams less than six (6) feet high regardless of storage capacity and dams less than fifteen (15) feet of storage regardless of height.

2. Past Occurrences & Severity

There have been two historical occurrences in the State of Iowa; one event occurred in 1968 in Waterloo when the Virden Creek Dam failed. The incidence claimed one life, and the dam is no longer in existence. There was concern during the very wet period of 1993 that water would overtop Saylorville Reservoir. With the outfall flowing at full capacity and water flowing out of the spillway, the reservoir did not overtop the dam. The second occurrence happened when the Lake Delhi dam failed in July of 2010. The 92 year old dam was breached at nine mile long lake that was owned by a local homeowner’s recreation association. The breach occurred at a 300 foot section of the earthen portion of the dam near the concrete structure. The breach caused significant property loss, an evacuation of as many as 700 near the dam, as well as severe economic impacts to the tourism industry in the area.

3. Vulnerable Locations/Buildings

The following chart summarizes the maximum population and building exposure to Dam Failure. Dam Failure is the uncontrolled release of impounded water resulting in downstream flooding which can affect life and property. Flooding, Earthquakes, blockages, lack of maintenance, improper operation and poor construction, vandalism, or terrorism cause Dam Failures. Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation and recreation. No incorporated communities are located along the low-lying area containing the Chariton River where the greatest impact from a failure of Morris Dam and Ellis dam would be seen. Both of these are recognized by the Iowa State Plan as “Significant Hazard Dam”. This rating indicates that this dam is located in an area where it’s failure would cause damage to few homes (less than 6), industrial buildings, moderately traveled roads or rail lines, interrupt major utility services but without substantial risk to the loss of life. There could be extensive damage to highway 34, possibly highway 5 and countless gravel roads that lie to the south and east of the dam. The two lakes are the sole water source for the City of Chariton. Crystal Lake is located on the west edge of Chariton, just outside the city limits. This lake is also deemed a “Significant Hazard Dam” would release into a marsh land below and eventually enter the Chariton River West Court Street of Chariton, and possibly a City sewage lift station.

The Iowa State Mitigation plan has identified one “High Hazard Dam” in Lucas County as Red Haw Lake. The dam lies south of Highway 34 and in the event of failure would release into the rural regions of southeastern corner of the county. A majority of the water would enter Lake Ellis or continue to flow north and reach Lake Red Rock through many tributaries.

No incorporated communities are located along the low-lying area containing the Chariton River where the greatest impact from a failure of Morris Dam and Ellis dam would be seen. Both of these are recognized by the Iowa State Plan as “Significant Hazard Dam”. This rating indicates that this dam is located in an area where it’s failure would cause damage to few homes (less than 6), industrial buildings, moderately traveled roads or rail

lines, interrupt major utility services but without substantial risk to the loss of life. There could be extensive damage to highway 34, possibly highway 5 and countless gravel roads that lie to the south and east of the dam.

The 2013 Iowa State Mitigation plan has identified one “High Hazard Dam” in Lucas County as Red Haw Lake. The dam lies south of Highway 34 and in the event of failure would release into the rural regions of southeastern corner of the county. A majority of the water would enter Lake Ellis or continue to flow north and reach Lake Red Rock through many tributaries.

UNINCORPORATED COUNTY AREA – DAM FAILURE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	80	5%	\$127,778,883	\$6,388,944	5%	3540	177	5%
Commercial	57	1	1%	\$16,815,709	\$168,157	1%			
Industrial	2	0	0%	\$1,057,800	0	0%	-	-	-
Agricultural			15%				-	-	-
Religious / Non-profit									

Critical Facilities: Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Lake Red Haw					X		--	\$3,000,000	

CHARITON – DAM FAILURE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	16	1%	\$99,523,675	995,237	1%	4321	43	1%
Commercial	217	2	1%	\$28,798,725	287,987	1%			
Industrial	9	1	1%	\$1,475,384	14,754	1%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	0	0%						
Government	5	1	1%						
Education	9	1	1%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Critical Facilities

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Southern Iowa Oil, fuel, Propane	2130 Court	X			X				
Convenience Store & Restaurant	2130 Court			X					

Loss Estimate

There have been no dam failures in Lucas County to calculate an estimated loss. The loss would vary upon the extent of the dam failure and location. Damage would include crops, roads, bridges, and a great expense would occur for cleanup.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
1	3	4	2	10

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>With increased attention to sound design, quality construction and continued maintenance and inspection, dam failure probability can be reduced. It is important to consider that by 2020, 85% of the dams in the United States will be more than 50 years old (the design life of a dam). In Iowa, 41% of dams by 2020 will be more than 50 years old. This reflects the need to consider and encourage dam failure emergency action plans for high and significant hazard dams in the State.</p> <p>There are 3787 dams on the State of Iowa Dam Inventory. 270 are classified as “major dams” subject to periodic inspections. Major dams are all high hazard dams, plus significant hazard dams that have a permanent storage volume exceeding 100 acre-feet or a total water storage volume to the top of the dam exceeding 250 acre-feet, and low hazard dams with a product of storage (acre-feet) time’s height (feet) which exceeds 30,000 acre ft. The height and storage of volumes are measured at the emergency spillway crest unless there is not an emergency spillway then they are measured at the top of the dam. In addition, the DNR identified 17 federally owned dams as falling within the “major dam” classification. Federally owned dams are not subject to state inspection.</p> <p>The SHMT analysis evaluated the probability that a dam failure in Iowa has a low chance of occurrence in any given year. The HMP Committee agreed that the probability of dam failure would be very low in Lucas County. The failure of Red Haw Lake, Lake Ellis & Lake Morris dams would have primary impact on agriculture land and roadways. Should Crystal Lake near Chariton experience Dam Failure it would impact one business, several roads and the wetlands downstream.</p>	1
<i>MAGNITUDE / SEVERITY</i>	<p>The severity of damage could be similar to flash flooding impacts.</p> <p>Operations could be affected by communication loss, critical facility damage/destruction, etc. Depends upon the downstream property, facilities, and infrastructure. Worst case scenario could involve whole subdivisions being swept away by the fast flowing water.</p> <p>Property can be impacted either by being damaged by the force of flowing water, water damage inside buildings, and compromises to structural integrity due to erosion</p> <p>Dam failure would quickly inundate areas thought to be out of flood-prone areas. Loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop</p>	3

	<p>and livestock damage and loss and interruption of business are common impacts.</p> <p>Hazards of fire, health and transportation accidents, and contamination of water supplies are likely effects of flooding situations which could occur from dam failure. Materials swept away by flood waters can contaminate and leave a lasting impact on the environment.</p> <p>Most impacts are indirect due to disruption of business and damage to infrastructure on which industry and services rely upon.</p>	
<i>WARNING TIME</i>	A dam failure can be immediate and catastrophic leaving little or no time to warn those downstream of the imminent hazard. With maintenance and monitoring, weak areas and possible failure points can be identified allowing time for evacuation and securing the dam. Most dams are only inspected periodically thus allowing problems to go undetected until a failure occurs.	4
<i>DURATION</i>	Response to the effects of a dam failure are extensive and require wide-ranging recovery efforts for reconstruction of the original flood control structures.	2
	WEIGHTED SCORE	10

Mitigation

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	ity Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazard?	Yes
Jurisdictions	Chariton, Unincorp County,

Public Education and Outreach	
Description	Develop hazard education and outreach program to help Lucas County residents understand meaning of hazard warnings and self-protection measures
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	ADLM emergency management, fire departments/first responders
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Unincorp County,

Evaluate/maintain/repair area dams	
Description	Establish an inspection, maintenance & enforcement program to help continue structural integrity of Lucas County Dams and levees. Plan would also include emergency plans to develop access roads, pumping, etc.
Estimated Cost	Moderate to High
Timeline/Schedule	Medium Term
Responsible Entity	ADLM,
Mitigation Category	Prevention, Natural Resource Protection, Structural Project
Related Goals/Objectives	1.1, 1.3, 2.1, 2.4, 2.5, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Unincorp County

Evacuation Plans	
Description	Develop evacuation plans for school, community buildings, and for town
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	City Council and ADLM-Emergency Management
Mitigation Category	Prevention, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.2, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Unincorp County,

Search and Rescue Training for First Responders	
Description	Training Firefighters and other local emergency responders best practices in search and rescue operations
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	Fire Department
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Mass Casualty Preparation	
Description	Develop plan for how to handle mass casualties resulting from hazard events in and near each jurisdiction
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	First Responders, ADLM-Emergency Management
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.2, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Unincorp County,

15. Hazard Profile – Hailstorm

An outgrowth of a severe thunderstorm in which balls or irregularly shaped lumps of ice greater than 0.75 inches in diameter fall with rain.

Description

Hail is frozen water droplets formed inside a thunderstorm cloud. They are formed during the strong updrafts of warm air and downdrafts of cold air, when the water droplets are carried well above the freezing level to temperatures below 32 degrees Fahrenheit, and then the frozen droplet begins to fall, carried by cold downdrafts, and may begin to thaw as it moves into warmer air toward the bottom of the thunderstorm. This movement up and down inside the cloud, through cold then warmer temperatures, causes the droplet to add layers of ice and can become quite large, sometimes round or oval shaped and sometimes irregularly shaped, before it finally falls to the ground as hail.

Hail can be smaller than a pea or as large as a softball and can be very destructive to plants and crops. Pets and livestock are particularly vulnerable to hail. Hailstorms impact an area about 15 miles in diameter on average.

Past Occurrences & Severity

Hailstorms cause nearly \$1 billion dollars annually in property and crop damage in the United States. The peak hail activity coincides with the Midwest’s peak agricultural season. Financial impacts resulting from damage to property is in the millions of dollars every year, most of which is covered by crop and hazard insurance.

Exposure to hail larger than a nickel can be very dangerous and life threatening. Risk to response personnel is the same as the risk to others without shelter from the hail. Operations should not be affected to any significant degree. Damage to property, facilities, and infrastructure is usually limited to broken windows and damaged roofs.

Since 1961 there have been 53 recorded hail storms in Lucas County. The cumulative damage of these events on property amounted to \$346 thousand and \$353 thousand in crop losses.

The chart below provides a summary of NCDC recorded Hailstorms; property and crop damages are in thousands of dollars.

<u>Location</u>	<u>County/Zone</u>	<u>St.</u>	<u>Date</u>	<u>Type</u>	<u>Mag</u>	<u>Dth</u>	<u>Inj</u>	<u>PrD</u>	<u>CrD</u>
LUCAS	LUCAS CO.	IA	04/12/2014	Hail	0.88 in.	0	0	0.00K	0.00K
CHARITON	LUCAS CO.	IA	04/12/2014	Hail	1.00 in.	0	0	1.00K	0.00K
Totals:						0	0	1.00K	0.00K

Vulnerable Locations/Buildings

Hailstorms develop from severe thunderstorms and wide region can be vulnerable to such a storm. Although they occur in every state on the mainland, Hailstorms occur primarily in the Midwestern states. Since 1961 there have been 53 recorded hail storms in Lucas County. The largest noted Hailstorm occurred in Chariton, Derby and Russell during June 1994. The storm produced 1.75 inch hail stones that created \$50,000 damage in personal property damage, as well as \$55,000 in crop damage. The greatest risk in Lucas County is to crops and structures. Severe crop damage can occur as a result of storm with hail diameters of .8 inches. There is also a risk of injury to humans; however the risk of serious injury is slight. Damage to vehicles and structures is usually covered by private insurance.

UNINCORPORATED COUNTY AREA – HAILSTORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	1598	100%	\$127,778,883	\$127,778,883	100%	3540	3540	100%
Commercial	57	57	100%	\$16,815,709	\$16,815,709	100%			100%
Industrial	2	2	100%	\$1,057,800	\$1,057,800		-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Unincorporated County Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$16,000,000	
Landfill		X					40acres	\$ 600,000	
Lake Red Haw					X		--	\$ 3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	\$ 6,000,000	
Iowa DOT	Hwy 34						4800	\$ 480,000	

CHARITON – HAILSTORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	1597	100%	\$99,523,675	\$99,523,675	100%	4321	4321	100%
Commercial	217	217	100%	\$28,798,725	\$28,798,725	100%			100%
Industrial	9	9	100%	\$1,475,384	\$1,475,384	100%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	13	100%						
Government	5	5	100%						
Education	9	9	100%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000	
Auburn Manor, Inc	815 Auburn St		X				6875	\$ 800,000	
SENECA Area on Aging	117 S Grand St		X				6067	\$ 600,000	
Circle of Life Hospice	1010 N 7 th St		X				3044	\$ 600,000	
Kiddie Kampus	East Court St		X				5200	\$ 1,000,000	
Hammer Medical Supply	110 N Grand st			X			7647	\$ 1,300,000	
Chariton Fire Hall		X		X	X		9796	\$ 2,000,000	
Dept of Correctional Services	115 S Main St			X	X				
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000	
Hy-Vee Store	2001 Court Ave			X			22,600	\$ 4,000,000	
ShopKo	1900 Court Ave			X			22,500	\$ 1,400,000	
Dollar General	307 N Grand St			X			8405	\$ 1,000,000	
Lucas Co Sherriff's office		X			X		5016	\$ 1,200,000	
Farmer's Coop	2120 Osceola Ave			X			7200	\$ 5,000,000	
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000	
Kum & Go	335 Main St			X			2400	\$ 600,000	
Elliott Oil Comp	Hwy 34 & 1 st St			X			5350	\$ 600,000	
Casey's General Store	418 S 7 th Street			X			10,320	\$ 1,000,000	
Corydon Oil company	8 th & Court			X			3300	\$ 750,000	
Kum & Go	1155 N 7 th St			X			1736	\$ 450,000	
Sewer Lift Stations		X					120	\$ 100,000	
Historic Courthouse Square		X	X	X	X	X			
North Ridge Assisted Living	1110 N 6 th St		X						
Chariton Nursing & Rehab Center	1214 N 7 th St		X						
Private In-Home Daycare	511 Orchard Ave		X						
Private In-Home Daycare	26986 550 th St		X						
Private In-Home Daycare	1120 N Grand St		X						
Private In-Home Daycare	720 N 7 th St		X						

Private Daycare	In-Home	334 N 7 th St		X						
Private Daycare	In-Home	1721 Ilion Ave		X						
Private Daycare	In-Home	437 Court Ave		X						
Private Daycare	In-Home	806 S 7 th St		X						
Private Daycare	In-Home	1430 Franklin Ave		X						
Private Daycare	In-Home	311 S 12 th St		X						

School Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value
Chariton High School	501 N Grand St		X	X	X		70,000	\$27,000,000	
Chariton Middle School	1300 N 16 th St		X	X	X		50,000	\$20,000,000	
Van Allen Elementary	1129 Ashland St		X	X	X		31,000	\$15,000,000	
Columbus Elementary	1215 Linden Ave		X	X	X		15,500	\$11,000,000	
The Other Hand, Alternative Ed	1516 Court Ave		X	X	X		1400	\$ 250,000	
Bus Barn									

LUCAS COUNTY HEALTH CENTER FACILITIES

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office. Insured value is according to the hospital's insurance policy.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value	Occupancy or capacity
Lucas County Health Center	1200 N 7th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed

DERBY - HAILSTORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	52	100%	\$1,251,043	\$1,251,043	100%	115	115	100%
Commercial	7	7	100%	\$33,725	\$33,725	100%			100%
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-

Derby Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	
Private In-Home Daycare	554 Prairie Ave		X						

LUCAS – HAILSTORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	98	100%	\$2,885,880	\$2,885,880	100%	216	216	100%
Commercial	13	13	100%	\$231,717	\$231,717	100%			
Industrial	1	1	100%	\$183,000	\$183,000	-	-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit			100%						
Government			100%						
Education									
Utilities			-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
Fire Hall		X					6000	\$ 600,000	
Water plant		X							
Water tower		X						\$1,500,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
Lagoon		X					20acres	\$ 65,000	
Gas & Go				X					
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	
Southern Iowa Petroleum, LLC	Hwys 5& 34			X			2400	\$ 540,000	
In-Home Private Daycare	506 Vine St			X					

RUSSELL – HAILSTORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	214	100%	\$8,787,186	\$8,787,186	100%	554	554	100%
Commercial	19	19	100%	\$378,610	\$378,610	100%			100%
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	\$320,790	-	-	-	-
Religious / Non-profit	3	3	100%						
Government	2	2	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	\$ 60,000	
Fire Hall		X					1200	\$ 120,000	
Community Bldg					X		2800	\$ 280,000	
Water plant		X					--		
Water tower		X					--	\$ 1,000,000	
City Maintenance/ Storage					X		1860	\$ 100,000	
Lagoon		X					20acres	\$ 100,000	
Public Library/Russell Historical Society Museum	106 S Prairie St					X	2000	\$ 450,000	
D&D Market	114 S Prairie St			X			1859	\$ 260,000	

WILLAMSON – HAILSTORM

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	73	100%	\$1,231,664	\$1,231,664	100%	152	152	100%
Commercial	2	2	100%	\$41,942	\$41,942	100%			100%
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	2	100%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall									
Sewer Lift Station									
Williamson Community Center									

Loss Estimate

Countywide damage was established from the NCDC data base from the past 65 years. Loss factors were developed specific to the attributes of Hailstorms throughout the region. These factors were able to provide an annual damage estimate by dividing the total loss by number of years of data. Per event damage calculated by dividing total loss by number of events. During the past 42 years, 33 events have occurred with property damage being reported at \$448,000. This indicates a loss of approximately \$10,667 per year. The reported crop damage during the same timeframe was \$378,000 for an annual loss of \$9,000. The 2013 Iowa State Mitigation Plan estimates an annual average loss of \$30,000.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
3	3	4	1	11

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	Data on probability and frequency of occurrence of hailstorms is limited, but research indicates that any given point in Iowa can expect on average two to three hailstorms a year.	3
<i>MAGNITUDE / SEVERITY</i>	<p>Agricultural crops such as corn and beans are particularly vulnerable to hailstorms stripping the plant of its leaves. Hail can also do considerable damage to vehicles and buildings. Hail only rarely results in loss of life directly although injuries can occur.</p> <p>The land area affected by individual hail events is not much smaller than that of a parent thunderstorm, an average of 15 miles in diameter around the center of the storm. Damage to property, facilities, and infrastructure is usually limited to broken windows and damaged roofs.</p> <p>Hailstorms cause nearly \$1 billion dollars annually in property and crop damage in the US. The peak hail activity coincides with the Midwest's peak agricultural season. Financial impacts resulting from damage to property is in the millions of dollar every year, most of which is covered by crop and hazard insurance.</p>	3
<i>WARNING TIME</i>	Forecasting hailstorms as with their parent thunderstorm, and forecasting the conditions suitable for developing storms with the potential to create hail is becoming quite accurate due to the advancement in Doppler Radar and other technologies operated by the National Weather Service and many television weather departments.	4

<i>DURATION</i>	The occurrence of hailstorms is short term in nature and usually limited to less than 6 hours per event.	1
	WEIGHTED SCORE	11

Mitigation

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Storm Warning System	
Description	Acquisition and installation of community early warning system to compliment system at fire station
Estimated Cost	Moderate to high
Timeline/Schedule	Long Term
Responsible Entity	City Council
Mitigation Category	Structural Project
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 3.2 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Weather Radios	
Description	Encouragement of residents and businesses to obtain NOAA weather radios
Estimated Cost	Voluntary program; approximately \$30 per radio
Timeline/Schedule	Short Term
Responsible Entity	City Council and city residents
Mitigation Category	Prevention and Public Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.2, 3.3, 3.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Temporary Debris Disposal Plan	
Description	Develop policy for temporary debris disposal for city and private property owners for post-disaster clean-up
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Council
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

16. Hazard Profile – Sinkholes

The loss of surface elevation due to the removal of subsurface support defines a sinkhole. Sinkholes range from broad, regional lowering of the land surface to localized collapse. The primary causes of most subsidence are human activities: Underground mining of coal, groundwater or petroleum withdraw, and drainage of organic soils. In addition, this is due to the erosion of limestone of the subsurface.

Description

Land subsidence occurs slowly and continuously over time or on occasion abruptly, as in the sudden formation of sinkholes. Sinkholes can aggravate flooding potential, collapses such as the sudden for formation of sinkholes or the collapse of an abandon mine may destroy buildings, roads and utilities.

Past Occurrences & Severity

While there are no recorded sinkholes in or immediately surrounding the incorporated cities, there is a possibility of subsidence occurring. The prevalence of mines under a large proportion of the communities provides the potential of large areas within the county being damaged by mine cave-ins. The Iowa Department of Natural Resources monitors and maps sinkholes and mines in Iowa. Not all of the mines under Lucas County are fully mapped; the extents of some mines are estimated. Iowa DNR indicates mines north of the city but there are no known mines mapped under the community.

Vulnerable Locations/Buildings

The table below displays the maximum population and building exposure at risk with Sinkholes. Given the history of mining in Lucas County, mine subsidence may well be of concern for the county and its communities. However, due to poorly mapped conditions, we can only estimate the locations of the abandon mines. The participating jurisdictions know of estimated shafts but do not have precise, mapped locations.

Sinkholes, also known as subsidence, come in two primary forms in Iowa, Karst subsidence and Mine subsidence. Mines subsidence occurs when a mine or part of a mine collapses causing surface land to create a basin or hole. Karst subsidence occurs as water dissolves underlying rock creating a gap that ultimately collapses. Most of Iowa's sinkholes occur in rural areas where their main impact is rendering some land unsuitable for row-crop agriculture. Sinkholes have also resulted in the failure of farm and other types of ponds, roads, and one sewage-treatment lagoon. As sinkholes sometimes allow surface runoff to directly enter bedrock aquifers, their presence has a potential impact on groundwater quality.

The prevalence of mines under a large proportion of the communities provides the potential of large areas within the county being damaged by mine cave-ins. The Iowa Department of Natural Resources monitors and maps sinkholes and mines in Iowa. Not all of the mines under Lucas County are fully mapped; the extents of some mines are estimated. Based on these mapping limitations, the condition of at least some of the mines is presumably not fully known.

UNINCORPORATED COUNTY AREA – SINKHOLES

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	799	10%	\$127,778,883	\$63,889,441	50%	3540	1770	50%
Commercial	57	29	10%	\$16,815,709	\$8,407,854	50%			
Industrial	2	1	10%	\$1,057,800	\$528,900	50%	-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$16,000,000	
Landfill		X					40acres	\$ 600,000	
Lake Red Haw					X		--	\$ 3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	\$ 6,000,000	
Iowa DOT	Hwy 34						4800	\$ 480,000	

CHARITON - SINKHOLES

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	799	5%	\$99,523,675	\$ 49,761,838	50%	4321	2161	50%
Commercial	217	109	5%	\$28,798,725	\$ 14,399,363	50%			
Industrial	9	4	5%	\$1,475,384	\$ 737,692	50%	-	-	-
Agricultural	-						-	-	-
Religious / Non-profit	13	6	5%						
Government	5	2	5%						
Education	9	4	5%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Critical Facilities

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000		
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000		
Auburn Manor, Inc	815 Auburn St		X				6875	\$ 800,000		
SENECA Area on Aging	117 S Grand St		X				6067	\$ 600,000		
Circle of Life Hospice	1010 N 7 th St		X				3044	\$ 600,000		
Kiddie Kampus	East Court St		X				5200	\$ 1,000,000		
Hammer Medical Supply	110 N Grand st			X			7647	\$ 1,300,000		
Lucas County Health Center	1200 N 7 th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed
Chariton Fire Hall		X		X	X		9796	\$ 2,000,000		
Dept of Correctional Services	115 S Main St			X	X					
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000		
Hy-Vee Store	2001 Court Ave			X			22,600	\$ 4,000,000		
ShopKo	1900 Court Ave			X			22,500	\$ 1,400,000		
Dollar General	307 N Grand St			X			8405	\$ 1,000,000		
Lucas Co Sherriff's office		X			X		5016	\$ 1,200,000		
Farmer's Coop	2120 Osceola Ave			X			7200	\$ 5,000,000		
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000		
Kum & Go	335 Main St			X			2400	\$ 600,000		
Elliott Oil Comp	Hwy 34 & 1 st St			X			5350	\$ 600,000		
Casey's General Store	418 S 7 th Street			X			10,320	\$ 1,000,000		
Corydon Oil company	8 th & Court			X			3300	\$ 750,000		
Kum & Go	1155 N 7 th St			X			1736	\$ 450,000		
Sewer Lift Stations		X					120	\$ 100,000		
Historic Courthouse Square		X	X	X	X	X				

DERBY - SINKHOLES

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	52	1%	\$1,251,043	\$1,251,043	100%	115	115	100%
Commercial	7	7	1%	\$33,725	\$33,725	100%			100%
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	-	-							
Government	-	-							
Education	-	-	-	-	-	-	-	-	-
Utilities	-	-	-	-	-	-	-	-	-

Derby Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	
Private In-Home Daycare	554 Prairie Ave		X						

LUCAS – Sinkholes

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	98	25%	\$2,885,880	\$2,885,880	100%	216	216	100%
Commercial	13	13	25%	\$231,717	\$231,717	100%			
Industrial	1	1	25%	\$183,000	\$183,000	-	-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit			25%						
Government			25%						
Education									
Utilities			-	-	-	-	-	-	-

Lucas Structural Inventory

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
Fire Hall		X					6000	\$ 600,000	
Water plant		X							
Water tower		X						\$ 1,500,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
Lagoon		X					20acres	\$ 65,000	
Gas & Go				X					
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	
Southern Iowa Petroleum, LLC	Hwys 5& 34			X			2400	\$ 540,000	
In-Home Private Daycare	506 Vine St			X					

RUSSELL – SINKHOLES

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	21	10%	\$8,787,186	\$878,718	10%	554	55	10%
Commercial	19	2	10%	\$378,610	\$37,861	10%			
Industrial	-								
Agricultural	-			-			-	-	-
Religious / Non-profit	3	1	30%						
Government	2	1	50%						
Education									
Utilities	-			-	-	-	-	-	-

Russell Structural Inventory

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	\$ 60,000	
Fire Hall		X					1200	\$ 120,000	
Community Bldg					X		2800	\$ 280,000	
Water plant		X					--		
Water tower		X					--	\$ 1,000,000	
City Maintenance/ Storage					X		1860	\$ 100,000	
Lagoon		X					20acres	\$ 100,000	
Public Library/Russell Historical Society Museum	106 S Prairie St					X	2000	\$ 450,000	
D&D Market	114 S Prairie St			X			1859	\$ 260,000	

WILLAMSON – SINKHOLES

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	4	5%	\$1,231,664	\$61,583	5%	152	8	5%
Commercial	2	1	50%	\$41,942	\$20,971	50%			
Industrial	-			-			-	-	-
Agricultural	-			-		-	-	-	-
Religious / Non-profit	2	1	50%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall								\$ 546,698	\$ 162,365
Sewer Lift Station									
Williamson Community Center								\$ 546,698	\$ 162,365

Loss Estimate

The estimated loss estimate is around \$ 150,000,000.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
1	2	4	3	10

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>Historic inventories estimate 2,596 sinkholes in the Upper Iowa River Watershed. However, there is no central collection point for this information. Land subsidence occurs slowly and continuously over time or on occasion abruptly, as in the sudden formation of sinkholes.</p> <p>Land subsidence occurs slowly and continuously over time or on occasion abruptly, as in the sudden formation of sinkholes.</p> <p>The major risk associated with sinkholes in Iowa is threatened infrastructure such as roads, bridges, and public buildings. Given the history of mining in Lucas County, mine subsidence may well be of concern for the county and its communities. The Iowa Department of Natural Resources monitors and maps sinkholes and mines in Iowa. Not all of the mines under Lucas County are fully mapped; the extents of some mines are estimated. Iowa DNR indicates mines north of the city but there are no known mines mapped under the community.</p>	1
<i>MAGNITUDE / SEVERITY</i>	<p>Sinkholes, also known as subsidence, come in two primary forms in Iowa, Karst subsidence and Mine subsidence. Mines subsidence occurs when a mine or part of a mine collapses causing surface land to create a basin or hole. Karst subsidence occurs as water dissolves underlying rock creating a gap that ultimately collapses.</p> <p>Most of Iowa's sinkholes occur in rural areas where their main impact is rendering some land unsuitable for row-crop agriculture. Sinkholes have also resulted in the failure of farm and other types of ponds, roads, and one sewage-treatment lagoon. As sinkholes sometimes allow surface runoff to directly enter bedrock aquifers, their presence has a potential impact on groundwater quality. Not all of the mines in Lucas County are fully mapped; the extents of some mines are estimated. Based on these mapping limitations, the condition of at least some of the mines is presumably not fully known.</p> <p>Damage consists primarily of direct structural damage and property loss and depreciation of land values, but also includes business and personal losses that accrue during periods of repair.</p> <p>Generally, land subsidence possess a greater risk to property than to life. Damage to property, facilities and infrastructure would only occur if the event undermined foundations.</p>	2
<i>WARNING TIME</i>	<p>Regional lowering occurs gradually over time, while the collapse of abandoned mines can occur suddenly. Collapse is one that can be properly mitigated provided that measures are taken structurally below the ground to compensate for the presents of mine caverns.</p>	4

<i>DURATION</i>	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.	3
	WEIGHTED SCORE	10

Mitigation

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazard?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Temporary Debris Disposal Plan	
Description	Develop policy for temporary debris disposal for city and private property owners for post-disaster clean-up
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Council
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, ,Lucas, Russell, Unincorp County, Williamson

Expanded Hazard Area Mapping and Mine Evaluation	
Description	Record areas where hazards occur to aid in hazard mapping, encourage detailed evaluation of the structural integrity of mines under each community, encourage detailed floodplain mapping, seek funds to develop more detailed multi-hazard area maps
Estimated Cost	Minimal to moderate
Timeline/Schedule	Short Term (hazard recording) to Long Term (mine evaluation)
Responsible Entity	ADLM
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.1, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Search and Rescue Training for First Responders	
Description	Training Firefighters and other local emergency responders best practices in search and rescue operations
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	Fire Department
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Collection & Protection of Vital Records	
Description	Encourage property owners to inventory and protect critical information for improved disaster recovery and minimize disruptions to lives following disaster events; critical information includes titles to property, bank information, insurance documents, wills, copies of prescription medications, family contact information, social security cards, passports, marriage licenses, birth certificates, and other forms of information that may be difficult to replace or needed to document eligibility for disaster aid
Estimated Cost	Voluntary
Timeline/Schedule	Short Term
Responsible Entity	ADLM, first responders, fire departments
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 3.1, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

17. Hazard Profile – Human Disease

This hazard encompasses the following consolidated hazards from the 2007 mitigation plan: human disease incident, and pandemic human disease. This includes a medical, health, or sanitation threat to the general public (such as contamination, epidemics, plagues, insect infestations, and pandemics).

Description

An incident related to human disease is defined as a medical, health, or sanitation threat to the general public (such as contamination, epidemics, plagues, and insect infestation). Public health action to control infectious disease in the 21st century is based on the 19th century discovery of microorganisms as the cause of many serious diseases (i.e. cholera & TB). Disease control resulted from improvements in sanitation and hygiene, the discovery of antibiotics, and the implementation of universal childhood vaccination programs. Scientific and technological advances played a major role in each of these areas and are the foundation for today's disease

surveillance and control systems. Scientific findings have contributed to a new understanding of the evolving relationship between humans and microbes. As of January 1, 2010, sixty (60) infectious disease were designated as notifiable at the national level. A notifiable disease is one for which regular, frequent, and timely information regarding individual cases is considered necessary for the prevention and control of the disease.

Human disease is defined as a disease that has spread around the world to many people. The word, “pandemic”, means that disease has caused illness in a person on nearly every continent. Many diseases throughout history of the world have been pandemic. Examples are HIV/AIDS/Influenza. A pandemic will have wide spread economic and societal implications for our state. Response and recovery to a pandemic will likely be lengthy.

Past Occurrences & Severity

From 1990-2000, there were three (3) influenza pandemics, all about 30 years apart. This seems to follow the same trend with the next occurrences to affect Iowa beginning in 2009 with the H1N1 influenza virus causing 659 hospitalizations with lab confirmed H1N1 since 9/1/2009 and resulting in 41 fatalities. Typically people who become ill are the elderly, the very young people with chronic medical conditions and high risk behaviors. Approximately 22% of Iowa’s population is considered high risk.

The jurisdictions within Lucas County have experienced bouts with influenza, particularly at Chariton Community Schools. Populations are challenged with influenza annually and the severity varies. Iowa Department of Public Health indicates that the estimates are 1-3 people living with HIV/AIDS in Lucas County.

The **Ebola virus disease (EVD)**, **Ebola hemorrhagic fever (EHF)**, or simply **Ebola** is a disease caused by an ebolavirus. Symptoms start a few days, or weeks, after contracting the virus, with a sore throat, fever, headaches, and muscle pain. Typically, diarrhea, vomiting, and a rash follow, along with decreased function of the kidneys and liver. Around this time, people who are affected may begin to bleed both within the body and externally.

The virus may be acquired upon contact with bodily fluids or blood of an infected animal or other human. It has not been known to spread through the air. It is thought that fruit bats are a carrier, and may spread the virus without being affected. After human infection occurs, the disease could spread between people, as well. Male survivors may be able to transmit the disease through semen for close to two months after being treated. In order to make a proper diagnosis, typically other diseases with similar symptoms such as cholera, malaria, and other viral hemorrhagic fevers are initially excluded. To confirm a diagnosis, samples of blood are tested for viral RNA, viral antibodies, or the virus itself.

Other disease that are passed to humans from insects include Lyme disease, West Nile, and Rocky Mountain spotted fever. Lyme disease and Rocky Mountain spotted fever are transmitted by a tick bite. There were 193 cases of Lyme disease in Iowa during 2014 (none in Lucas County). This is a 10% increase from the average of the three prior. There were 10 cases of Rocky Mountain spotted fever in Iowa (none in Lucas County) but six of the ten cases were identified in southern Iowa.

West Nile cases have decreased dramatically in the past year. In 2014, the state saw a 66% decrease in the number of cases to IDPH. There were no documented cases in Lucas County.

In 1976 the disease was first identified in Sudan and parts of Zaire. Outbreaks typically occur in tropical regions of sub-Saharan Africa. From 1976, the World Health Organization (WHO) has reported over 1,716 new cases. The largest outbreak to date is the ongoing 2014 West African Ebola Outbreak, which is affecting Sierra Leone, Guinea, Nigeria, and Liberia.

Vulnerable Locations/Buildings

An incident related to human disease is defined as a medical, health, or sanitation threat to the general public (such as contamination, epidemics, plagues, and insect infestation). Public health action to control infectious diseases in the 21st century is based on the 19th century discovery of microorganisms as the cause of many serious diseases (e.g., cholera and TB). Disease control resulted from improvements in sanitation and hygiene, the discovery of antibiotics, and the implementation of universal childhood vaccination programs. A pandemic human disease is defined as a disease that has spread around the world to many people. The word, “pandemic”, means that a disease has caused illness in a person on nearly every continent. Many diseases throughout the history of the world have been pandemic. Examples are HIV/AIDS/Influenza. A pandemic will have wide spread economic and societal implications for our state. Response and recovery to a pandemic will likely be lengthy. Considering that the manner that the diseases can spread so quickly, all residents can be considered at risk, however, the most vulnerable population considered are the elderly, youth and disabled residents.

The individuals that travel internationally and have high exposure to potential vectors of disease are the most susceptible. Greater than 20% of Iowa’s population is considered high risk.

Particular locations that are susceptible to such diseases would include assisted care facilities and school districts. There are 2 retirement homes or assisted care facilities in Lucas County, however, none of them are located in the unincorporated regions of Lucas County. The children attending Chariton Community Schools are located throughout the region and approximately 785 of them reside in the unincorporated region of this county.

<i>Lucas County Maximum Population & Building Exposure Human Disease 2010 US Census</i>				
Location	# of residents with Disabilities	# of residents over 65 yrs	# of residents 19yrs and under	Total # of Vulnerable People
Unincorp	637	268	910	1815
Chariton	948	1166	488	298
Derby	18	29	14	9
Lucas	43	49	15	35
Russell	98	177	51	32
Williamson	26	41	23	11

Loss Estimate

According to Iowa Department of Public Health, a clinic visit to the doctor costs an estimated \$84-\$200 and a visit to the emergency room will be approximately \$50-\$1600. A disease or epidemic event may put a higher than normal strain on public health services. It would also likely have an economic impact as well.

Hazard Scoring & Rankings

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
1	3	1	4	9

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>Public health agencies work to protect Iowans from infectious disease and preserve the health and safety of Iowans through disease surveillance, investigation of suspect outbreaks, education and consultation to county, local and public/private health agencies. Historically pandemics occur every 30 years.</p> <p>The SHMT analysis evaluated the probability of a human disease incident less than 10% in any given year.</p>	1
<i>MAGNITUDE / SEVERITY</i>	<p>Public health agencies work to protect Iowa from infectious disease and preserve the health and safety of Iowans through disease surveillance, investigation, of suspect outbreaks, education, and consultation to the county, local and health agencies. Public health agencies also work to reduce the impact of communicable diseases in Iowa and to eliminate the morbidity associated with these diseases. Programs guide community-based prevention planning, monitor current infectious disease trends, prevent transmission of infectious diseases, provide early detection and treatment for infected persons, and ensure access to health care for refugees in Iowa. While vaccines are available for many diseases, Iowans remain vulnerable to other diseases known and unknown.</p> <p>Because of our highly mobile society, these diseases can move rapidly across the state and across the nation within days, weeks, or months. Many of the diseases on the national notification list result in serious illness if not death. Some are treatable, others only the symptoms are treatable.</p> <p>Influenza (flu) happens every year in nearly every country of the world. It spreads through a population for a few months and then will disappear or will move onto another country. Influenza usually occurs in the fall and winter months. Typically people who usually become ill are the elderly, the very young and/or the people with chronic medical conditions and high risk behaviors. The individuals that travel internationally and have high exposure to potential vectors of the disease are the most susceptible. Greater than 20% of Iowa's population is considered high risk.</p>	3
<i>WARNING TIME</i>	<p>The private practitioner is the first line of defense and will undoubtedly be the first to witness the symptoms of human disease incidents. The Iowa Department of Public Health and the U.S. Centers for Disease Control monitor reports submitted by doctors, hospitals, and labs to identify patterns. The Department of CDC are proactive in providing information to the health care community on medical concerns. Conditions related to scope and magnitude can escalate quickly and area resources can be drained of personnel, medications, and vaccinations rather quickly.</p>	1
<i>DURATION</i>	<p>Response to highly infectious diseases occurs continuously, although the direct effects of a pandemic influenza can occur for months at a time as evident with the N1H1 influenza in August of 2009.</p>	4
	WEIGHTED SCORE	9

Mitigation

Building Code Enforcement	
Description	Encourage all local governments to adopt and enforce updated building codes to reduce the risk of collapse, failure or injury in the event of a disaster.
Estimated Cost	Moderate
Timeline/Schedule	ongoing
Responsible Entity	City Council, First Responders, ADLM, County Public Health Department
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.4, 2.5, 3.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Derby, Lucas, Russell, Williamson

Collection & Protection of Vital Records	
Description	Encourage property owners to inventory and protect critical information for improved disaster recovery and minimize disruptions to lives following disaster events; critical information includes titles to property, bank information, insurance documents, wills, copies of prescription medications, family contact information, social security cards, passports, marriage licenses, birth certificates, and other forms of information that may be difficult to replace or needed to document eligibility for disaster aid
Estimated Cost	Voluntary
Timeline/Schedule	Short Term
Responsible Entity	ADLM, first responders, fire departments
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 3.1, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Radon/Lead Mitigation	
Description	Encourage property owner Radon/Lead testing and mitigation, explore feasibility of Cities leveraging funds to help property owners test and / or mitigation unsafe Radon/Lead levels
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	Property Owners, City, ADLM-Environmental Management
Mitigation Category	Public Education and Awareness, Prevention
Related Goals/Objectives	1.1, 1.3, 2.5, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	No
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Pest Management	
Description	Review policies for effectiveness governing mowing and maintaining properties to discourage infestations by pests within Lucas County , consider or update as needed other polices to control pests
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City Council
Mitigation Category	Prevention, Natural Resource Protection
Related Goals/Objectives	1.1, 1.3, 2.1, 2.4, 3.1, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	No
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Waste Disposal Enforcement	
Description	Develop or update waste disposal policies and enforce, review for effectiveness
Estimated Cost	Minimal
Timeline/Schedule	Short to Medium Term
Responsible Entity	City Council
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	No
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Immunizations	
Description	Encourage periodic immunizations, especially for children and elderly residents, review mass immunization plan with school for emergency immunizations
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City, school district, and County Public Health Department
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 2.2, 2.3, 2.5, 3.1, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	No
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Mass Casualty Preparation	
Description	Develop plan for how to handle mass casualties resulting from hazard events in and near each jurisdiction
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	First Responders, ADLM-Emergency Management
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.2, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Local Hazardous Materials Capabilities	
Description	Encourage establishment of local hazardous materials team and / or support training for local first responders
Estimated Cost	Moderate to high
Timeline/Schedule	Medium to Long Term
Responsible Entity	City Council and fire department (in partnership with ADLM and / or County)
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 3.1, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Demolish & Remove Dilapidated Buildings	
Description	Leverage funds for property owners or cities that are unable to afford to remove/repair/demolish dilapidated structures.
Estimated Cost	Moderate-high
Timeline/Schedule	Ongoing
Responsible Entity	City Council, Property Owners, ADLM
Mitigation Category	Property Protection, Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.4, 2.5, (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

18. Hazard Profile – Earthquake

EARTHQUAKE: A sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of earth’s tectonic plates (FEMA).

MERCALLI INTENSITY SCALE: The Mercalli Scale is based on observable damage which while is more subjective, is easier to comprehend for the general populace (USGS FAQ – Measuring Earthquakes). See *Appendix 12: Modified Mercalli Scale for Earthquake Intensity*.

RICHTER SCALE: The Richter Scale is a measure of size and power of earthquakes; “as an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value” (USGS Visual Glossary – Richter Scale).

Description

An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the Earth's surface. This shaking can cause buildings and bridges to collapse; disrupt gas, electric, and phone service; and sometimes trigger landslides, flash floods, and fires. The three general classes of earthquakes now recognized are: tectonic, volcanic, and artificially produced.

While Iowa is not thought of as a state that can experience an earthquake, the New Madrid fault line is located where Missouri, Arkansas, Kentucky, and Tennessee meet. Additionally the Wabash Valley seismic zone is located along the south eastern boarder of Illinois and Indiana.

Past Occurrences & Severity

Iowa as a whole has experienced the effects of only a few earthquakes in the past 175 years. The epicenters of thirteen (13) earthquakes have been located in the state with the majority along the Mississippi River. The first know occurrence was in 1867 near Sidney in southwest Iowa. The most recent occurrence was in 2004 near Shenandoah in southwest Iowa. The largest Iowa earth quake (Mercalli magnitude VI) occurred near Davenport in southeast Iowa in 1934. Only the most recent of these events was instrumentally recorded. Outside Iowa the most recent quakes were in the 1960’s occurring in Illinois and Missouri. While more than twenty (20) earthquakes have occurred in or around Iowa, over the past 175 years they have not seriously impacted the state.

The strongest earthquake in Iowa occurred in Davenport in 1934 and resulted in only slight damage. Estimated effects of a Richter scale 6.5 magnitude earthquake along the New Madrid Fault Zone Suggest that Iowans in four southeast counties could experience trembling buildings, some broken dishes and cracked windows. About 29 other counties, from Page (southwest) to Polk (central) to Muscatine (southeast), could experience vibrations similar to the passing of a heavy truck; rattling of dishes, creaking of walls, and swinging of suspended objects. Specific parts of central Iowa could sustain different

levels of damage due to the soundness of the structures. A published FEMA report using the HAZUS-MH software determined the loss associated with such an event would result in approximately \$1,068,000 in damages to the State of Iowa. These losses are mainly attributed to the extreme southeastern portion of the state.

In the spring of 2008, slight tremors could be felt in parts of Iowa resulting from an Earthquake originating in south eastern Illinois.

Vulnerable Locations/Buildings

UNINCORPORATED COUNTY AREA – EARTHQUAKE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	1598	100%	\$127,778,883	\$127,778,883	100%	3540	3540	100%
Commercial	57	57	100%	\$16,815,709	\$16,815,709	100%			100%
Industrial	2	2	100%	\$1,057,800	\$1,057,800		-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Unincorporated County Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$ 16,000,000	
Landfill		X					40acres	\$ 600,000	
Lake Red Haw					X		--	\$ 3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	\$ 6,000,000	
Iowa DOT	Hwy 34						4800	\$ 480,000	

CHARITON – EARTHQUAKE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	1597	100%	\$99,523,675	\$99,523,675	100%	4321	4321	100%
Commercial	217	217	100%	\$28,798,725	\$28,798,725	100%			
Industrial	9	9	100%	\$1,475,384	\$1,475,384	100%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit	13	13	100%						
Government	5	5	100%						
Education	9	9	100%						
Utilities	-	-	-	-	-	-	-	-	-

Chariton Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000	
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000	
Auburn Manor, Inc	815 Auburn St		X				6875	\$ 800,000	
SENECA Area on Aging	117 S Grand St		X				6067	\$ 600,000	
Circle of Life Hospice	1010 N 7 th St		X				3044	\$ 600,000	
Kiddie Kampus	East Court St		X				5200	\$ 1,000,000	
Hammer Medical Supply	110 N Grand st			X			7647	\$ 1,300,000	
Chariton Fire Hall		X		X	X		9796	\$ 2,000,000	
Dept of Correctional Services	115 S Main St			X	X				
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000	
Hy-Vee Store	2001 Court Ave			X			22,600	\$ 4,000,000	
ShopKo	1900 Court Ave			X			22,500	\$ 1,400,000	
Dollar General	307 N Grand St			X			8405	\$ 1,000,000	
Lucas Co Sherriff's office		X			X		5016	\$ 1,200,000	
Farmer's Coop	2120 Osceola Ave			X			7200	\$ 5,000,000	
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000	
Kum & Go	335 Main St			X			2400	\$ 600,000	
Elliott Oil Comp	Hwy 34 & 1 st St			X			5350	\$ 600,000	
Casey's General Store	418 S 7 th Street			X			10,320	\$ 1,000,000	
Corydon Oil company	8 th & Court			X			3300	\$ 750,000	
Kum & Go	1155 N 7 th St			X			1736	\$ 450,000	
Sewer Lift Stations		X					120	\$ 100,000	
Historic Courthouse Square		X	X	X	X	X			
North Ridge Assisted Living	1110 N 6 th St		X						
Chariton Nursing & Rehab Center	1214 N 7 th St		X						
Private In-Home Daycare	511 Orchard Ave		X						
Private In-Home Daycare	26986 550 th St		X						
Private In-Home Daycare	1120 N Grand St		X						
Private In-Home	720 N 7 th		X						

Daycare	St								
Private In-Home Daycare	334 N 7 th St		X						
Private In-Home Daycare	1721 Ilion Ave		X						
Private In-Home Daycare	437 Court Ave		X						
Private In-Home Daycare	806 S 7 th St		X						
Private In-Home Daycare	1430 Franklin Ave		X						
Private In-Home Daycare	311 S 12 th St		X						

School Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value
Chariton High School	501 N Grand St		X	X	X		70,000	\$27,000,000	
Chariton Middle School	1300 N 16 th St		X	X	X		50,000	\$20,000,000	
Van Allen Elementary	1129 Ashland St		X	X	X		31,000	\$15,000,000	
Columbus Elementary	1215 Linden Ave		X	X	X		15,500	\$11,000,000	
The Other Hand, Alternative Ed	1516 Court Ave		X	X	X		1400	\$ 250,0000	
Bus Barn									

LUCAS COUNTY HEALTH CENTER FACILITIES

****Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office. Insured value is according to the hospital's insurance policy.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Size of Bldg	Replacement Value	Insured value	Occupancy or capacity
Lucas County Health Center	1200 N 7th St	X	X	X	X	84,000 sq ft	\$26,356,000		25 bed

DERBY - EARTHQUAKE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	52	100%	\$1,251,043	\$1,251,043	100%	115	115	100%
Commercial	7	7	100%	\$33,725	\$33,725	100%			100%
Industrial	-	-	-			-	-	-	-
Agricultural	-	-	-			-	-	-	-
Religious / Non-profit	-	-							
Government	-	-							
Education	-	-	-	-	-	-	-	-	-
Utilities	-	-	-	-	-	-	-	-	-

Derby Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	
Private In-Home Daycare	554 Prairie Ave		X						

LUCAS – EARTHQUAKE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	98	100%	\$2,885,880	\$2,885,880	100%	216	216	100%
Commercial	13	13	100%	\$231,717	\$231,717	100%			
Industrial	1	1	100%	\$183,000	\$183,000	-	-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit			100%						
Government			100%						
Education									
Utilities			-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
Fire Hall		X					6000	\$ 600,000	
Water plant		X							
Water tower		X						\$ 1,500,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
Lagoon		X					20acres	\$ 65,000	
Gas & Go				X					
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	
Southern Iowa Petroleum, LLC	Hwys 5 & 34			X			2400	\$ 540,000	
In-Home Private Daycare	506 Vine St			X					

RUSSELL – EARTHQUAKE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	214	100%	\$8,787,186	\$8,787,186	100%	554	554	100%
Commercial	19	19	100%	\$378,610	\$378,610	100%			100%
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	\$320,790	-	-	-	-
Religious / Non-profit	3	3	100%						
Government	2	2	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	\$ 60,000	
Fire Hall		X					1200	\$ 120,000	
Community Bldg					X		2800	\$ 280,000	
Water plant		X					--		
Water tower		X					--	\$ 1,000,000	
City Maintenance/ Storage					X		1860	\$ 100,000	
Lagoon		X					20acres	\$ 100,000	
Public Library/Russell Historical Society Museum	106 S Prairie St					X	2000	\$ 450,000	
D&D Market	114 S Prairie St			X			1859	\$ 260,000	

WILLAMSON – Earthquake

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	73	100%	\$1,231,664	\$1,231,664	100%	152	152	100%
Commercial	2	2	100%	\$41,942	\$41,942	100%			100%
Industrial	-	-	-	-	-	-	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	2	2	100%						
Government	1	1	100%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall								\$ 546,698	\$ 162,365
Sewer Lift Station									
Williamson Community Center								\$ 546,698	\$ 162,365

Loss Estimate

According to simulations run using FEMA HAZUS software, a seismic event at the New Madrid fault would cause minimal damage to Lucas County.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
1	4	4	1	10

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>Seismologists attempt to forecast earth quake size and frequency based on data from previous events in the New Madrid Fault Zone, is difficult because there are few historic moderate to large earthquakes, and the active faults are too deeply buried to effectively monitor. Based on the recurrence intervals for small earthquakes, scientist estimate a 90% chance of a Richter scale 6.0 magnitude earthquake in the New Madrid Fault Zone by the year 2040. A magnitude 6.5 in New Madrid would create a magnitude four (4) effect in Iowa; resulting in little or no damage and/or fear. The SHMT analysis evaluated the probability of future earthquakes in Iowa as less than 10% in any given year.</p> <p>Lucas County is in an area where the probability of exceeding horizontal peak gravity acceleration by 1-2% is 10% over a period of 50 years. In other words, there is a 90% chance that any earthquake in the next 50 years affecting Lucas County will not exceed an acceleration of 1-2% of the force of gravity.</p> <p>An intensity of 6-7 on the Mercalli Scale is approximately equal to 10% gravity acceleration, meaning the speed at which the ground shakes. This magnitude is roughly equivalent to a strong earthquake that would be very noticeable with some structural damage, especially to older or poorly built structures and movement of heavy furniture. Ground acceleration of 1-2%, the intensity applicable to the Lucas county area, would be minor or negligible.</p>	1
<i>MAGNITUDE / SEVERITY</i>	<p>Vulnerability to earthquakes in Iowa is largely related to buildings and infrastructure. As Iowa is not known as an area at risk of earthquakes, buildings often do not incorporate the earthquake resistant features that those in California and other earthquake-prone regions do. Unreinforced structures face the risk of collapse or similar significant damage which poses a risk to the inhabitants and those that may be outside but near. Likewise, damage to infrastructure ranging from roadways, to buried pipelines, to structures could cripple a municipality's capacity to maintain services or recover following a significant earthquake.</p> <p>Few if any injuries would likely be seen in Iowa from an earthquake. However, the elderly and individuals with mobility or balance challenges may face some injuries from falls.</p> <p>Property losses would likely be minimal generally confined to minor cracks in walls to potentially knocking pictures or other objects hung on walls down. Dams may be most at risk, though given the distance from the nearest known fault lines, the risk would likely be limited.</p> <p>Earthquakes are naturally occurring events though threats to the environment may occur through chemical spills or hazardous substances disturbed by an earthquake.</p> <p>Damage to infrastructure and buildings, while minor, could result in costs to repair damaged brick or utilities.</p>	4

	<p>Earthquake coverage in Iowa insurance policies is not common, however the monetary impacts of an earthquake are likely minor given the distance to the nearest known fault lines.</p> <p>Since Iowa is not known for earthquakes, the reputation of local jurisdictions would likely not face much risk unless there is a significant event and lack of local response.</p>	
<i>WARNING TIME</i>	Earthquake prediction is an inexact science. Even in areas that are well monitored with instruments, such as California’s San Andreas Fault Zone, scientists only very rarely predict earthquakes.	4
<i>DURATION</i>	Due to the limited effects to Iowa, response to the occurrence of an earthquake would likely be in support of nearby states utilizing mutual aid agreements, in-state response would be likely be very limited.	1
	WEIGHTED SCORE	10

Mitigation

New Storm Shelter/ Cooling or Heating Shelter	
Program/Project Description	Construction of comprehensive storm shelter to Tornado Safe Room standards to serve as a temporary shelter for multiple hazards as often a Church, Community Center, Legion Hall, City Hall, and School are currently utilized as needed
Anticipated Cost	Moderate to high – grant dependent
Timeline/Schedule	Long term
Responsible Agency	City Council
Mitigation Category	Structural project
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.3 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Continuity of Operations Planning	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Lucas County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Public Education and Outreach	
Description	Develop hazard education and outreach program to help Lucas County residents understand meaning of hazard warnings and self-protection measures
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	ADLM emergency management, fire departments/first responders
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Demolish & Remove Dilapidated Buildings	
Description	Leverage funds for property owners or cities that are unable to afford to remove/repair/demolish dilapidated structures.
Estimated Cost	Moderate-high
Timeline/Schedule	Ongoing
Responsible Entity	City Council, Property Owners, ADLM
Mitigation Category	Property Protection, Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.4, 2.5, (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Temporary Debris Disposal Plan	
Description	Develop policy for temporary debris disposal for city and private property owners for post-disaster clean-up
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Councils
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Evacuation Plans	
Description	Develop evacuation plans for school, community buildings, and for town
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	City Council and ADLM-Emergency Management
Mitigation Category	Prevention, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.2, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Hazardous Material Disposal	
Description	Develop hazardous materials disposal program incorporating public education, community clean-up days, and household hazardous waste exchange
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	City or Fire Department and Volunteers, ADLM
Mitigation Category	Prevention, Natural Resource Protection, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4 2.5, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Search and Rescue Training for First Responders	
Description	Training Firefighters and other local emergency responders best practices in search and rescue operations
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	Fire Department
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Williamson

Mass Casualty Preparation	
Description	Develop plan for how to handle mass casualties resulting from hazard events in and near each jurisdiction
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	First Responders, ADLM-Emergency Management
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.2, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Collection & Protection of Vital Records	
Description	Encourage property owners to inventory and protect critical information for improved disaster recovery and minimize disruptions to lives following disaster events; critical information includes titles to property, bank information, insurance documents, wills, copies of prescription medications, family contact information, social security cards, passports, marriage licenses, birth certificates, and other forms of information that may be difficult to replace or needed to document eligibility for disaster aid
Estimated Cost	Voluntary
Timeline/Schedule	Short Term
Responsible Entity	ADLM, first responders, fire departments
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 3.1, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Building Code Enforcement

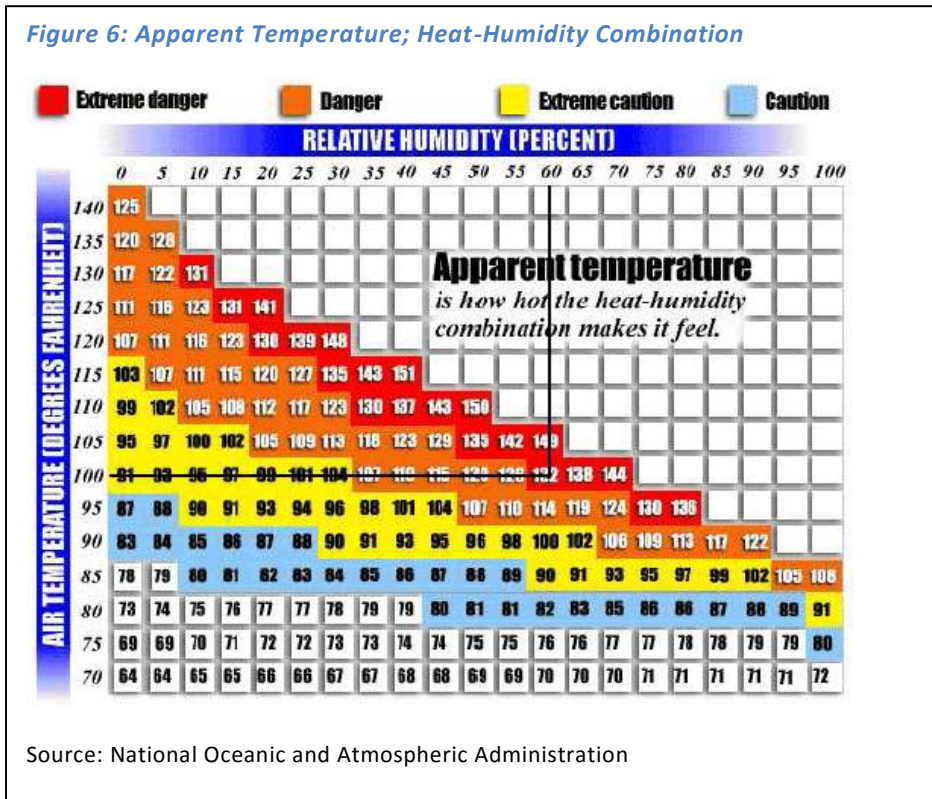
Description	Encourage all local governments to adopt and enforce updated building codes to reduce the risk of collapse, failure or injury in the event of a disaster.
Estimated Cost	Moderate
Timeline/Schedule	ongoing
Responsible Entity	City Council, First Responders, ADLM, County Public Health Department
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.4, 2.5, 3.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Derby, Lucas, Russell, Williamson

19. Hazard Profile – Extreme Heat

Temperatures (including heat index) in excess of 100 degrees Fahrenheit or 3 successive days of 90+ degrees Fahrenheit. A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees.

Description

Conditions for extreme heat are defined by summertime weather that is substantially hotter and/or more humid than average for a location at that time of year. This includes temperatures (including heat index) in excess of 100 degrees Fahrenheit or at least three (3) successive days of 90+ degrees Fahrenheit. A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees. The heat index is a number in degrees Fahrenheit that tells how hot it really feels when relative humidity is added to the actual air temperature. Exposure to sunshine can increase the heat index by at least 15 degrees. Extreme heat can impose stress on humans and animals. Heatstroke, sunstroke, cramps, exhaustion, and fatigue are possible with prolonged exposure or physical activity due to the body’s inability to dissipate the heat. Urban areas are particularly at risk because of air stagnation and large quantities of heat absorbing materials such as streets and buildings. Extreme heat can also result in distortion and failure of structures and surfaces such as roadways and railroad tracks.



Past Occurrences & Severity

During the period between 1995 and 2014 experienced 20 extreme heat events. The heat wave that occurred in July of 1995 had a major impact across the entire state, temperatures ranged from 98 degrees to 108 degrees with heat indices reaching a high of 131 degrees. This event lasted two (2) days causing 3.8 million dollars of property damage and resulted in three (3) fatalities. The figure relating to property damage with this event was based on a combination of livestock losses and transportation infrastructure damages. The following map depicts the number of extreme heat occurrences from 1994-2009.

During the summers of 1997 and 1998, there were combined total of 31 days when the high temperature was 90 degrees Fahrenheit or higher. There were three (3) periods when temperatures were 90 degrees or above for at least three (3) consecutive days during the summers of 2005-2006. Based on historical information, Iowa will likely experience around 26 days a year with temperatures above 90 degrees. There is a very good chance that there will also be period of at least three (3) consecutive days or more with temperatures in the 90s. It is also common for the temperature to hit 100 degrees or more once every three (3) years during the summer months.

Nationally, over the last 30 years, excessive heat accounts for more reported deaths annually than hurricanes, floods, tornadoes, and lightning combined. Response personnel could suffer heat stroke and dehydration working in extreme heat conditions. Transportation impacts include the loss of lift for aircrafts, softening of asphalt roads, buckling of highways and railways, and stress on automobiles and trucks (increase in mechanical failures).

Electric transmission systems are impacted when power lines sag in high temperatures. High demand for electricity also outstrips supply, causing electric companies to have rolling black outs. The demand for water also increases sharply during periods of extreme heat. This can contribute to fire suppression problems for both urban and rural fire departments.

Livestock and other animals are adversely impacted by extreme heat. High temperatures at the wrong time inhibit crop yields as well. Economic costs in transportation, agriculture, production, energy, and infrastructure. These direct costs could impact many other economic sectors indirectly.

Two periods of extreme heat between 1994 and 2001 resulted in 4 deaths and \$3.8 million in property damage for the region including Lucas County. In the past five years, only one heat event has been documented by NOAA in Lucas County:

<u>Location</u>	<u>County/Zone</u>	<u>St.</u>	<u>Date</u>	<u>Type</u>	<u>Dth</u>	<u>Inj</u>	<u>PrD</u>	<u>CrD</u>
LUCAS (ZONE)	LUCAS (ZONE)	IA	07/15/2011	Excessive Heat	0	0	135.00K	0.00K
Totals:					0	0	135.00K	0.00K

Vulnerable Locations/Buildings

The table below summarizes the maximum population and building exposure to Extreme Heat. The health of the public and the economic impact on the agricultural community are the primary concerns with extreme heat. The segments of the public most at risk from extreme heat are the elderly, the very young, and individuals living below the poverty line. The estimated number of affected people in the table below is derived from the 2010 US Census. Those included in this calculation are residents over 65 years, children under 5 years, individuals living below the poverty line and people living with a diagnosed disability. Economic impact on the agricultural sector could result from the damage to animals and crops. Livestock is particularly vulnerable to the effects of the extreme heat and there are approximately 36,500 cattle and 14,318 hogs. Roads, bridges, and railroad tracks are also susceptible to damage from extreme heat. The HMGP committee believes that the major effect of an extreme heat will be on livestock and crops. Livestock is particularly vulnerable. The 2012 Agricultural Census reports that the estimated market value of all livestock, poultry, and products in Lucas County is \$26.7 million. Transportation facilities are also vulnerable to extreme heat. Most common type of damage is road buckles; however Lucas County has not tracked the damage expenses directly related to this hazard.

<i>Lucas County Maximum Population & Building Exposure Extreme Heat 2010 U.S. Census</i>				
Jurisdiction	Population 65yrs & older	Population 5 years & younger	Population living below poverty guidelines	Residents living with a diagnosed disability
Unincorporated	268	910	602	637
Chariton	948	1166	488	298
Derby	18	29	14	9
Lucas	43	49	15	35
Russell	98	177	51	32
Williamson	26	41	23	11

Loss Estimate

Countywide damage was established from the NCDC data base for some hazards up to 65 years. Loss factors were developed specific to the attributes of Extreme Heat throughout the region. These factors were able to provide an annual damage estimate by dividing the total loss by number of years of data. Per event damage calculated by dividing total loss by number of events. The only event of Extreme Heat in Lucas County in the past 50 years occurred in 2011 with \$135,000 property damage reported, no crop loss and no deaths. This indicates an annual estimated loss of \$2,077. The 2013 Iowa State Mitigation Plan estimates an annual average loss of \$34,000.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
3	2	4	4	13

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>Based on historical information, Iowa will likely experience about 26 days a year with temperatures above 90 degrees. There is a very good chance that there will also be a period of 3 consecutive days or more with temperatures in the 90s. It is also common for the temperatures to hit 100 degrees or more once every three years during the summer months.</p> <p>Based on the evaluation of this hazard, the SHMT determined that Iowa has between 10%-20% chance of experiencing extreme heat events lasting at least three days or more in succession.</p>	3
<i>MAGNITUDE / SEVERITY</i>	<p>The very young and the elderly are particularly vulnerable to extreme heat as are low income populations. Likewise, those on certain medications or drugs (especially tranquilizers and anticholinergics), and persons with weight and alcohol problems are particularly susceptible to heat reactions. Children are less likely to recognize the risk and therefore less likely to take precautionary measures. Likewise, the elderly may have more difficulty in sensing the extremities and may become over-exposed to the dangers.</p> <p>Most of the state would likely be impacted by extreme heat, but urban areas pose special risks. The stagnant atmospheric conditions of the heat wave trap pollutants in urban areas and add to the stresses of hot weather.</p>	2

	<p>Livestock and other animals are adversely impacted by extreme heat. High temperatures at the wrong time inhibit crop yields as well.</p> <p>Economic costs in transportation, agriculture, production, energy and infrastructure. These direct costs could impact many other economic sectors indirectly.</p> <p>During past occurrences of this hazard coupled with advanced notice from weather reports has illustrated the importance of utilizing existing shelter systems set up around the state to protect vulnerable populations.</p>	
<i>WARNING TIME</i>	As with other weather phenomena, periods of extreme heat are predictable within a few degrees within 3 days or so. Variations in local conditions can affect the actual temperature within a matter of hours or even minutes. The National Weather Service will initiate alert procedures when the heat index is expected to exceed 105 degrees Fahrenheit for at least two consecutive days.	4
<i>DURATION</i>	The definition of an extreme heat event is an occurrence of 90+ degree weather for a minimum of 3 days. The SHMT evaluated this hazard as likely to exceed one week in duration based on a review of past extreme heat events in the state.	4
	WEIGHTED SCORE	13

Mitigation

Collection & Protection of Vital Records	
Description	Encourage property owners to inventory and protect critical information for improved disaster recovery and minimize disruptions to lives following disaster events; critical information includes titles to property, bank information, insurance documents, wills, copies of prescription medications, family contact information, social security cards, passports, marriage licenses, birth certificates, and other forms of information that may be difficult to replace or needed to document eligibility for disaster aid
Estimated Cost	Voluntary
Timeline/Schedule	Short Term
Responsible Entity	ADLM, first responders, fire departments
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 3.1, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson
New Storm Shelter/ Cooling or Heating Shelter	
Program/Project Description	Construction of comprehensive storm shelter to Tornado Safe Room standards to serve as a temporary shelter for multiple hazards as often a Church, Community Center, Legion Hall, City Hall, and School are currently utilized as needed
Anticipated Cost	Moderate to high – grant dependent
Timeline/Schedule	Long term
Responsible Agency	City Council
Mitigation Category	Structural project
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.3 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Public Education and Outreach

Description	Develop hazard education and outreach program to help Lucas County residents understand meaning of hazard warnings and self-protection measures
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	ADLM emergency management, fire departments/first responders
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City Council, Fire Department, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Weather Radios	
Description	Encouragement of residents and businesses to obtain NOAA weather radios
Estimated Cost	Voluntary program; approximately \$30 per radio
Timeline/Schedule	Short Term
Responsible Entity	City Council, and city residents
Mitigation Category	Prevention and Public Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.2, 3.3, 3.4 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Maintenance of Heating / Cooling Systems	
Description	Encourage property owner maintenance of heating and cooling systems and maintenance of heating and cooling systems in community buildings
Estimated Cost	Minimal to moderate
Timeline/Schedule	Short Term
Responsible Entity	City Maintenance and Property Owners
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.3, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

20. Hazard Profile – Expansive Soils

Soils and soft rock that tend to swell or shrink excessively due to changes in moisture content.

Description

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

Past Occurrences & Severity

The availability of data on expansive soils varies greatly. In or near metropolitan areas and at dam sites, abundant information on the amount of clay generally is available. However, for large areas of the U.S., little information is reported other than field observations of the physical characteristics of the clay.

Vulnerable Locations/Buildings

UNINCORPORATED COUNTY AREA – EXPANSIVE SOILS

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	1598	5%	\$127,778,883	\$127,778,883	100%	3540	3540	100%
Commercial	57	57	5%	\$16,815,709	\$16,815,709	100%			100%
Industrial	2	2	5%	\$1,057,800	\$1,057,800		-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Unincorporated County Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$16,000,000	
Landfill		X					40acres	\$ 600,000	
Lake Red Haw					X		--	\$ 3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	\$6,000,000	
Iowa DOT	Hwy 34						4800	\$ 480,000	

CHARITON – EXPANSIVE SOILS

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1597	16	1%	\$99,523,675	\$ 995,237	1%	4321	43	1%
Commercial	217	2	1%	\$28,798,725	\$ 287,987	1%			
Industrial	9	1	1%	\$1,475,384	\$ 14,754	1%	-	-	-
Agricultural	-		-				-	-	-
Religious / Non-profit	13	0	0%						
Government	5	1	1%						
Education	9	1	1%						
Utilities	-		-	-	-	-	-	-	-

Chariton Critical Facilities

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Lucas County Historical Museum	217 N 17 th St					X	2268	\$ 500,000		
Chariton Public Library	803 Braden Ave			X	X		5160	\$ 1,500,000		
Lucas County Public Health	117 S Grand St									
SENECA Area on Aging	117 S Grand St		X				6067	\$ 600,000		
Circle of Friends Home Care	1010 N 7 th St		X				3044	\$ 600,000		
Circle of Life Hospice House	220 Northwestern									
Hammer Medical Supply	110 N Grand st			X			7647	\$ 1,300,000		
Lucas County Health Center	1200 N 7th St	X	X	X	X		84,000 sq ft	\$26,356,000		25 bed
Chariton Fire Hall & City Hall	115 S Main St	X		X	X		9796	\$ 2,000,000		
Lucas County Courthouse		X			X	X	11868	\$ 6,000,000		
Hy-Vee Store	2001 Court Ave			X			22,600	\$ 4,000,000		
ShopKo	1900 Court Ave			X			22,500	\$ 1,400,000		
Dollar General	1635 N Grand St			X			8405	\$ 1,000,000		
Family Dollar	307 N Grand St									
Lucas Co	22 nd St	X			X		5016	\$ 1,200,000		

Sherriff's office										
Farmer's Coop	2120 Osceola Ave			X			7200	\$ 5,000,000		
Casey's General Store	1421 Court Ave			X			2376	\$ 560,000		
Casey's	335 Main St			X			2400	\$ 600,000		
Elliott Oil Comp	Hwy 34& 1 st St			X			5350	\$ 600,000		
Casey's General Store	418 S 7 th Street			X			10,320	\$1,000,000		
South Central Coop	2120 Osceola St			X						
BP	107 Grace St			X						
Southern Iowa Oil, fuel, Propane	2130 Court			X						
Sewer Lift Stations		X					120	\$ 100,000		
Historic Courthouse Square		X	X	X	X	X				
Southgate Apartments	429 S Main St		X							
Autumn Park	330 N Main St		X							
Chariton Airport										
Landfill	220 th Ave									
Chariton Head Start	418 N Main St		X							
Discovery Preschool Center	1711 Osceola St		X							
Hyvee Fuel Station	Osceola St			X						
Community Bldg	Main St				X					

DERBY - EXPANSIVE SOILS

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	3	5%	\$1,251,043	\$62,552	5%	115	6	5%
Commercial	7	1	5%	\$33,725	\$1,686	5%			
Industrial	-						-	-	-
Agricultural	-						-	-	-

Derby Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall					X		1800	\$ 180,000	
Sewer Lift Station		X					60	\$ 150,000	
Elevator/COOP				X					
Derby Community Center					X		1800	\$ 180,000	
Private In-Home Daycare	554 Prairie Ave		X						

LUCAS – EXPANSIVE SOILS

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	25	5%	\$2,885,880	\$721,470	25%	216	54	25%
Commercial	13	3	5%	\$231,717	\$57,939	25%			
Industrial	1	1	5%	\$183,000	\$183,000	100%	-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit			5%						
Government			5%						
Education									
Utilities			-	-	-	-	-	-	-

Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
Fire Hall		X					6000	\$ 600,000	
Water plant		X							
Water tower		X						\$ 1,500,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
Lagoon		X					20acres	\$ 65,000	
Gas & Go				X					
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	
Southern Iowa Petroleum, LLC	Hwys 5 & 34			X			2400	\$ 540,000	

RUSSELL – EXPANSIVE SOILS

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	214	107	5%	\$8,787,186	\$4,393,593	50%	554		50%
Commercial	19	10	5%	\$378,610	\$189,305	50%			
Industrial	-		-	-		-	-		-
Agricultural	-		-	-		-	-		-
Religious / Non-profit	3	1	5%						
Government	2	1	5%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Russell Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		600	\$ 60,000	
Fire Hall		X					1200	\$ 120,000	
Community Bldg					X		2800	\$ 280,000	
Water plant		X					--		
Water tower		X					--	\$1,000,000	
City Maintenance/ Storage					X		1860	\$ 100,000	
Lagoon		X					20acres	\$ 100,000	
Public Library/Russell Historical Society Museum	106 S Prairie St					X	2000	\$ 450,000	

WILLAMSON – EXPANSIVE SOILS

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	73	4	5%	\$1,231,664	\$61,583	5%	152	8	5%
Commercial	2	1	5%	\$41,942	\$20,971	50%			
Industrial	-		-	-		-	-		-
Agricultural	-		-	-		-	-		-
Religious / Non-profit	2	1	5%						
Government	1	1	5%						
Education									
Utilities	-	-	-	-	-	-	-	-	-

Critical Facilities: *Estimates of Square footage and Replacement Value provided by Lucas County Assessor's office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall/Fire Hall								\$ 546,698	\$ 162,365
Sewer Lift Station									
Williamson Community Center								\$ 546,698	\$ 162,365

Loss Estimate.

No previous documentation. Estimated loss is around \$ 152,642,000.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
1	2	4	1	8

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	Probability and frequency analyses have not been prepared because of the nature of occurrence of this hazard. This is consistent with other geologic hazards that occur slowly over time. It is difficult to predict probability without adequate data to support it. The SHMT evaluated the probability of future expansive soils events in Iowa at between 10%-25% chance in the next year. The following map depicts the potential swelling clay deposits in Iowa.	1
<i>MAGNITUDE / SEVERITY</i>	<p>Little if any direct human impacts. Impacts commonly involve swelling clays beneath areas covered by buildings and slabs of concrete and asphalt, such as those used in construction of highways, walkways, and airport runways.</p> <p>The availability of data on expansive soils varies greatly. In or near metropolitan areas and at dam sites, abundant information on the amount of clay generally is available. However, for large areas of the US, little information is reported other than field observations of the physical characteristics of clay.</p> <p>The most extensive damage occurs to highways and streets. Houses and one-story commercial buildings are more apt to be damaged by the expansion of swelling than are multi-story buildings, which usually are heavy enough to counter swelling pressures.</p>	2
<i>WARNING TIME</i>	The warning time for expansive soils is consistent with other geological hazards that occur slowly over time.	4
<i>DURATION</i>	The response to this hazard is limited in Iowa with most severe cases being washed out roads and access routes to rural towns. Although prolonged periods of drought are a primary indicator of risk followed by forecasted periods of precipitation, the response to expansive soils in Iowa is limited and is in large part, coupled with response to flash flooding or river flooding.	1
	WEIGHTED SCORE	8

Mitigation

Public Education and Outreach	
Description	Develop hazard education and outreach program to help Lucas County residents understand meaning of hazard warnings and self-protection measures
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	ADLM emergency management, fire departments/first responders
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Hazard Occurrence Data Collection	
Description	Record occurrences of hazards, loss estimates, populations impacted, amount of area impacted, and other relevant information for updates to this plan and for improved emergency response information
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City Council, First Responders, ADLM, County Public Health Department
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4, 2.5, 3.1, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

21. Hazard Profile – Animal/Crop/Plant Disease

An outbreak of disease that can be transmitted from animal to animal. The disease outbreak will likely have a significant economic implications or public health impact. The crop/plant pest infestation will likely have severe economic implications, cause significant crop production losses, or significant environmental damage. The crop/plant pests may also have implications for public health.

Description

An outbreak of disease that can be transmitted from animal to animal or plant to plant represents an animal/crop/plant disease. The crop/plant pest infestation will likely have severe economic implications, cause significant crop production losses, or significant environmental damage. The crop/plant pests may also have implications for public health. The introduction of some high consequence diseases may severely limit or eliminate our ability to move, slaughter, and export animals and animal products. Response and recovery to infectious animal disease outbreaks will be lengthy, and many producers may never be able to return to business. There will be many indirect effects on our economy. Rumors of an infectious animal disease outbreak could cause significant damage to the markets; as was evidenced in an incident in Kansas in 2003 where the mere rumor of a Foot and Mouth Disease outbreak caused the market to plummet.

Crop/plant pest infestations can cause widespread crop/plant loss and severe economic hardship on farmers and landowners and related businesses. Once infestation occurs, the pest may become endemic, causing repeated losses in subsequent growing years. Loss of production will affect all related industries, such as fuel, food, synthetics, processors, etc.

Past Occurrences & Severity

Every year the Iowa Department of Agriculture and Land Stewardship (IDALS) conduct numerous animal disease investigations. In 2005, IDALS and USDA conducted 19 highly infectious disease investigations. Fortunately the investigation results are negative. IDALS, under the direction of the state plant regulatory official works with Iowa’s universities and industries to conduct regular crop / plant pest surveillance. Committee members indicate that there have been small amounts of Foot and Mouth Disease and random other disease the livestock can contract over the years. The incidents are small in numbers and where of no major concerns that have ever developed from them.

Members discussed small bouts of Foot and Mouth Disease among livestock owners, but acknowledge that it is not that uncommon and is not a widespread problem.

In 2014 the Avian Influenza A (H5N1), commonly referred to as the “Bird Flu” greatly affected the bird population in Iowa. By May of 2015 more than 9.5 million of cases have been reported throughout the state of Iowa. This includes 21 sites and spans across ten counties. Although it does not include Lucas County as this point, it is a very real possibility that the county will be affected. The governor recently declared a state of disaster to offer additional resources to handle this agricultural disaster.

The emerald ash borer (EAB), *Agrilus planipennis*, is an exotic insect pest from Asia. The flattened, creamy white larval stage feeds below the bark and cuts off the living, water and nutrient conducting vessels causing tree death. Adults are small elongated oval beetles that are metallic green in color. This insect colonizes the top of ash trees (*Fraxinus* species) first, then moves down the tree. EAB has been found in several Iowa counties. As of February 2014, all 99 counties in Iowa have been quarantined by the Iowa Department of Agriculture and Land Stewardship to slow the movement of this destructive pest to non-quarantined areas/states. A cooperative state and federal effort has developed the “Iowa Emerald Ash Borer Readiness Plan.” EAB has also been found in 24 other states, including Illinois, Minnesota, Missouri, and Wisconsin, on Iowa’s borders.” (Iowa State University Extension & Outreach – Pesticide Safety Education Program)

Vulnerable Locations/Buildings

An outbreak of disease that can be transmitted from animal to animal. The disease outbreak will likely have a significant economic implications or public health impact. The crop/plant pest infestation will likely have severe economic implications, cause significant crop production losses, or significant environmental damage. The crop/plant pests may also have implications for public health.

The movement of people, animals, animal products, wildlife, plants, crops and potential disease/pest vectors could all cause the introduction of diseases/pests. Diseases/pests could also be introduced naturally, for example by hurricanes or jet streams. Emerging disease is also a threat such as West Nile Virus, new more virulent influenza strains, etc. Because many diseases/pests are not present in Iowa, our populations of animals, crops, and plants have no immunity and are highly susceptible.

<p style="text-align: center;"><i>Lucas County</i> <i>Maximum Population & Building Exposure</i> <i>Animal/Plant/Crop Disease</i> 2012 U.S. Agricultural Census</p>				
648 Farms in Lucas County	Estimated Market Values per farm		Type of Livestock	Estimated number in Lucas County
Land & buildings	\$786,496		Cattle & calves	31,188
Machinery & Equipment	\$99,623,000		Hogs & pigs	38,037
Ag product Sold	\$78,872,000			

Loss Estimate.

See chart above.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
2	3	3	4	12

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>Disease/pests are present in many other areas of the country/world. Many disease/pests are easily transmitted therefore the probability of introduction is high. Iowa leads the nation in production of pork, soybeans, eggs, and corn and is among the leading beef production states. Human disease outbreaks can have an economic impact on agricultural products as well as recently seen with the H1N1 scare and the resulting aversion to pork products or even eradication of pigs in areas around the world. With the millions of animals and animal products that move across our state yearly, probability is high.</p> <p>Every year the Iowa Department of Agriculture and Land Stewardship (IDALS) conduct numerous animal disease investigations. IDALS, under the directions of the state plant regulatory official works with Iowa's universities and industries to conduct regular crop/plant pest surveillance. In the evaluation of the probability of a serious animal/plant/crop disease incident was that an event has a low probability of occurrence in any given year.</p> <p>The SHMT analysis evaluated the probability that an animal/crop/plant disease infestation is highly likely to occur in Iowa next year, however, the Lucas County committee believes that there is a possibility of the event but that a 2%-10% chance of occurring in the next year is accurate for the area. Iowa is a productive agricultural state producing both crop and livestock. Due to the severity of potential agricultural losses this hazard ranked high.</p>	2
<i>MAGNITUDE / SEVERITY</i>	<p>The movement of people, animals, animal products, wildlife, plants, crops and potential disease/pest vectors could all cause the introduction of diseases/pests. Diseases/pests could also be introduced naturally, for example by hurricanes or jet streams. Emerging disease is also a threat such as West Nile Virus, new more virulent influenza strains, etc. Because many diseases/pests are not present in Iowa, our populations of animals, crops, and plants have no immunity and are highly susceptible.</p> <p>The impact will vary by disease/pest and the type of animal/ crop/plant infected. Should the disease/pest have public health implications, the economic impact would be even greater.</p> <p>The severity will vary by the disease/pest. The types of animals, crops, or plants affected will also significantly influence the severity.</p>	3
<i>WARNING TIME</i>	<p>If the disease/pests are highly infectious (many animals that are infected with the disease can be transmitting disease before they show clinical signs), by the time the time they are discovered, they will likely have spread across the state</p>	3

	or nation. This will put us at a very severe disadvantage during the response and recovery.	
<i>DURATION</i>	Response and recovery from serious infectious or disease are lengthy, with many producers likely to never be able to return to business, in addition, crop infestation/animal disease can reoccur, causing repeated losses in subsequent years.	4
	WEIGHTED SCORE	12

Mitigation

Pest Management	
Description	Review policies for effectiveness governing mowing and maintaining properties to discourage infestations by pests within Lucas County , consider or update as needed other polices to control pests
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City Council
Mitigation Category	Prevention, Natural Resource Protection
Related Goals/Objectives	1.1, 1.3, 2.1, 2.4, 3.1, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	No
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Hazard Occurrence Data Collection	
Description	Record occurrences of hazards, loss estimates, populations impacted, amount of area impacted, and other relevant information for updates to this plan and for improved emergency response information
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City Council, First Responders, ADLM, County Public Health Department
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4, 2.5, 3.1, 3.5, 3.6 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

22. Hazard Profile – Landslide

Landslides occur when susceptible rock, earth, or debris moves down a slope under the force of gravity and water.

Description

Landslides can be very small or very large can move at slow to very high speeds. A natural phenomenon, small scale landslides have been occurring in slide-prone areas of Iowa long before human occupation. New landslides can occur because of rainstorms, fires, earthquakes, and various activities that modify slope and drainage.

Past Occurrences & Severity

There have been numerous small-scale landslide events in Iowa, none resulting in injury or death. The geographic extent of the historic events has been limited to less than a city block in size and has “run out” over the stretch of less than 100 yards.

Vulnerable Locations/Buildings

The Cities of Chariton, Derby, Russell, and Williamson lie on flat ground and are not at risk of a landslide.

UNINCORPORATED COUNTY AREA – LANDSLIDE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1598	80	5%	\$127,778,883	\$6,388,944	5%	3540	177	5%
Commercial	57	3	5%	\$16,815,709	\$840,785	5%			5%
Industrial	2	0	0%	\$1,057,800			-	-	-
Agricultural							-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Unincorporated County Structural Inventory

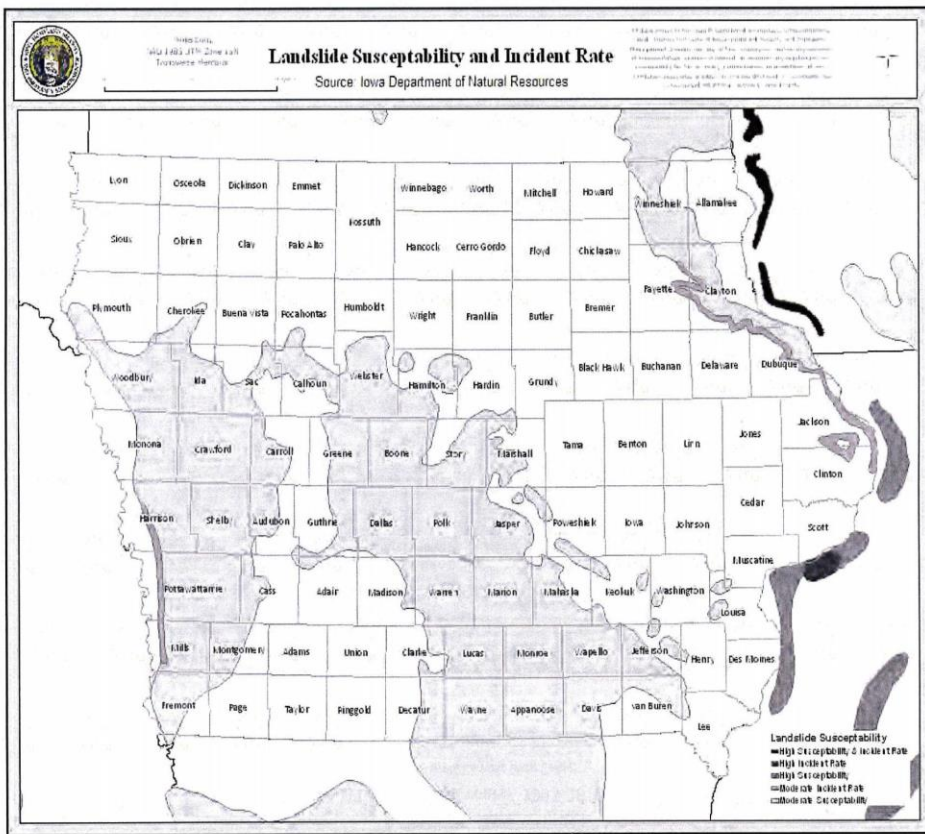
***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office.*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)		X					--	\$16,000,000	
Landfill		X					40acres	\$ 600,000	
Lake Red Haw					X		--	\$ 3,000,000	
Rural Water towers		X					--	--	
IDOT roads maintenance shop					X		6000	\$ 6,000,000	
Iowa DOT	Hwy 34						4800	\$ 480,000	

The south edge of Lucas is situated on a steep hill. The railroad, Lucas Bottoms and highway 34 could potentially be affected in a small scale landslide.

LUCAS – LANDSLIDE

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	98	25	25%	\$2,885,880	\$721,470	25%	216	54	25%
Commercial	13	3	25%	\$231,717	\$57,939	25%			
Industrial	1	1	100%	\$183,000	\$183,000	100%	-	-	-
Agricultural			-			-	-	-	-
Religious / Non-profit			100%						
Government			100%						
Education									
Utilities			-	-	-	-	-	-	-



Lucas Structural Inventory

***Estimates of Square footage and Replacement Value provided by Lucas County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value
City Hall					X		1800	\$ 180,000	
Fire Hall		X					6000	\$ 600,000	
Water plant		X							
Water tower		X						\$1,500,000	
City Maintenance/ Storage					X		1860	\$ 200,000	
Lagoon		X					20acres	\$ 65,000	
Gas & Go				X					
John L Lewis Mining & Labor Museum	102 Division St					X	3200	\$ 650,000	
Lucas Community Center					X		1800	\$ 180,000	
Southern Iowa Petroleum, LLC	Hwys 5 & 34			X			2400	\$ 540,000	

Loss Estimate.

There have been no events reported in Lucas County to compare to. Estimates for the Unincorporated & Lucas could impact more than \$7M in structures.

Hazard Scoring & Ranking

<i>Hazard Score Calculation</i>				
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
1	2	4	1	8

EVALUATION CRITERIA	DESCRIPTION	SCORE
<i>PROBABILITY</i>	<p>A portion of the state is moderately susceptible to landslides: in northeastern Iowa, along the Silurian Escarpment you can find blocks of dolomite slumped onto the underlying Maquoketa Shale and, in the hilly terrain of central Iowa; areas of Pennsylvanian Shale are susceptible to slides where it is overlain by loess or till. Lastly, susceptible area are found along the adjacent steep terrain associated with the major river valleys of Mississippi, Missouri, Des Moines, and Iowa River valleys and in the Loess Hills area of western Iowa.</p> <p>The SHMT evaluated the probability of a significant landslide event in Iowa and decided between 10% and 25% probability in any given year. The best available data was personal knowledge of the SHMT. The group discussed known occurrences around the state but no known agency documents historical data landslides. The attached map depicts landslide susceptibility and incident rates in Iowa.</p>	1
<i>MAGNITUDE / SEVERITY</i>	<p>Those occupying structures that overlook river valleys and steep ravines are most vulnerable. These constitute a very small number of homes and commercially occupied structures in the state.</p> <p>The geographic extent of the historic events has been limited to less than a city block in size and has “run out” over the stretch of less than 100 yards. The maximum extent is very limited because of Iowa’s gently rolling hills as opposed to steeper slopes.</p> <p>Very limited. Injuries and deaths are very unlikely except in the case of undetected slope failure warning signs in structures overlooking steep slopes.</p>	2
<i>WARNING TIME</i>	<p>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, landslide can be detected if high potential landslide areas are monitored.</p>	4
<i>DURATION</i>	<p>The response to the effects of landslides are limited and mainly associated with restoration of public infrastructure routes (roads, bridges, etc.)</p>	1
	WEIGHTED SCORE	8

Mitigation

Community Emergency Response Team	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	City councils, Fire Department, Emergency Management, and Residents
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.3, 2.1, 2.2, 2.3, 3.3, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Continuity of Operations Planning	
Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct residents to minimize injuries, as well as (off-site) backups of important City documents and files
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	Emergency Management, Red Cross, City Councils, County Board of Supervisors.
Mitigation Category	Property Protection
Related Goals/Objectives	2.1, 2.2, 2.3, 3.3, 3.4, 3.5 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Sensitive Areas Ordinance	
Description	Develop city ordinance restricting construction or type of construction in hazard / sensitive areas such as steep slopes, over mines, wetlands, near floodplains, etc.
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Councils
Mitigation Category	Prevention, Natural Resource Protection
Related Goals/Objectives	1.1, 1.2, 2.3 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

Public Education and Outreach	
Description	Develop hazard education and outreach program to help Lucas County residents understand meaning of hazard warnings and self-protection measures
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City Councils, Schools, Emergency Management, County Board of Supervisors
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 3.3 (See page 42 or Appendix)
Addresses High Risk Hazards?	Yes
Jurisdictions	Chariton, Derby, Lucas, Russell, Unincorp County, Williamson

C. Mitigation Strategies and Implementation

During the meeting, previous mitigation actions were being evaluated and jurisdictions updated local accomplishments and challenges. A full chart of strategies and progress is provided in Appendix 26. Some of the main accomplishments include: Chariton installed two additional early storm warning systems; active shooter trainings have occurred at schools and businesses in the county; Chariton and Russell Fire Departments have FREE smoke alarms available to residents and FREE Radon Testing Kits are now available at the local Environmental Health office.

The existing mitigation strategies were reviewed and the committee felt were still pertinent for the hazards identified. The mitigation actions considered by the committee were included in this plan and were then prioritized based on several criteria, whether or not they address a high risk hazard, how many hazards they address, what kind of priority each strategy is, the estimated timeline, and the estimated cost. The logic of this was much like ranking the hazards, the actions with the broadest positive impact would be naturally raised to the top of the list while those that would be costly or be limited in impact would naturally fall to the bottom.

This would mean that the actions toward the top of the list should be where the County's mitigation efforts should be directed, however where opportunities to pursue lower ranked actions arise, they should be taken so long as they do not preclude taking an action with a more broad positive impact is possible. For example, if grant funds for a project are available that would address an action ranked near the middle of the spectrum then the County or any jurisdiction should pursue the grant opportunity. If such a grant opportunity is presented and it could be used for two or more identified actions, then it should be directed toward the highest ranked of the potential projects where practicable.

Each action is profiled along similar lines as the hazards. Each action profile contains a description of the action, estimated cost with either an approximate dollar amount or listed as voluntary, minimal, moderate, or high. These categories are loosely defined as follows;

- Voluntary – reliant on donated time or resources
- Minimal – little or no cost, may be a nominal increase in day-to-day activities
- Moderate – would likely require outside funds potentially from multiple sources or potential tax / fee increases
- High – would require outside funds such as in the form of grant programs through State or Federal agencies

Prevention: Government administrative or regulatory measures or processes that influence the way land and buildings are developed and built. These measures also include public actions to reduce hazard losses to property and human health impacts. Examples include:

- Hazard mapping
- Studies/data collection and analysis to support prevention measures
- Floodplain regulations
- Multi-jurisdictional agreements that reduce hazard risks
- Other regulatory measures or processes that reduce hazard risks.

Property Protection: Measures that involve modifying existing buildings or structures to protect them from a hazard, or removing buildings or structures from the hazard area, or providing insurance to cover potential losses. Examples include:

- Acquisition, elevation, or relocation of hazard-prone property
- Safe room/storm shelter retrofits
- Critical facility protection
- Risk reduction retrofits (modifications) to hazard prone properties
- Studies/data collection and analysis to develop property protection measures
- Continued National Flood Insurance Program (NFIP) participation

Public Education and Awareness: Measures to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Examples include:

- Programs to improve awareness of hazard risk
- Programs to improve awareness of hazard risk prevention and reduction
- Education programs directed toward specialized audience, i.e. buildings, developers, and hazard prone neighborhoods

Natural Resource Protection: Measures that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. Examples include:

- Sensitive areas ordinance (development restrictions)
- Stream corridor restoration, watershed management
- Forest and vegetation management
- Wetland restoration and preservation

Emergency Services: Measures taken before, during and after a hazard event to protect people, and property; although these measures are not typically considered “mitigation, they significantly minimize the events impact and preserve the community’s health and safety. Examples include:

- Emergency response facilities and personnel
- Hazard warning systems and equipment
- Health, safety, environmental risk prevention or reduction
- Emergency response infrastructure, equipment, planning, or training
- Emergency response services studies and data collection
- Emergency response communication systems

Structural Projects: These are measures that involve the construction and maintenance of structures and infrastructure that will reduce the impact of a hazard or redirect the impact away from people and property. Examples include:

- Channel modification/maintenance
- Dam and reservoir construction/maintenance
- Levee and floodwall construction and maintenance
- Safe room or storm shelter construction
- Infrastructure construction and maintenance
- Studies and data collection to develop structural projects

Prioritized Mitigation Activities

Mitigation actions were evaluated by various factors as previously mentioned; each of the factors was assigned a numerical value to aid in ranking the actions according to their anticipated positive impacts and drawbacks. The numerical values that were substituted in for estimated cost and timelines are as follows;

Number of Hazard:

- Number of hazards that the mitigation strategy applies to and each it is worth one point toward that strategy.

Cost:

- Voluntary (+1) – reliant on donated time or resources
- Minimal (0)– little or no cost, may be a nominal increase in day-to-day activities
- Moderate (-1) – would likely require outside funds potentially from multiple sources or potential tax / fee increases
- High (-2)– would require outside funds such as in the form of grant programs through State or Federal agencies

Priority:

- High priority +2pt
- Medium priority +1pt
- Low priority 0

Timeline:

- Ongoing (+1) – activities that are currently in practice or are suspected to have been implemented previously
- Short Term (0) – relatively low cost, low complexity activities that may be implemented in the next year
- Medium Term (-1)– low to modest cost activities that may require more effort and / or time to properly implement such as review of regulatory measures for effectiveness or development of new regulations or programs, implementable within a period of 5 years and likely within 2-3 years
- Long Term (-2)– high cost and time-intensive activities that require outside funds, significant administrative investment (temporary or permanent), and generally involve construction, anticipated to take 5 years or more from time of initial planning to securing funding to completion of activity

Require Political Support?:

- Yes 0pts
- No +1pt

Protect Life and/or Prevent Injuries?:

- Yes +1pt
- No 0pt

Will it reduce or eliminate damage to structures or infrastructure?:

- Yes +1pt
- No 0pts

This ranking system is crude, but it helps to organize the actions in a way that begins to show a prioritization of what can provide the biggest positive impact for the effort required to implement them. A more sophisticated ranking system may include weighting for various factors depending on community priorities and concerns.

The composite ranking of mitigation actions is as follows;

Lucas County Mitigation Action Ranking

Public Education & Outreach of Warnings and Self Protection	17
Develop Emergency Response Team Post-Disaster	14
Continuity of Operations Plan for Post-Disaster	13
Search & Rescue Training and Equipment for First Responders	10
Weather Radios for Citizens	9
Maintain Current Evacuation Plans for Public buildings, schools & Hospitals	9
Flood proofing by Homeowners	7
Encourage Smoke/Fire/Carbon Monoxide Detectors & Sprinkler Systems	7
Maintain a current Plan for Mass Casualty Preparation & Up-to-date Training	7
Participation in Community Rating Systems for Flooding	6
New Storm Shelter Heating/Cooling Shelter	6
Maintenance of Heating/Cooling Systems	6
Flood Insurance by Property Owners	5
Temporary Debris Disposal Plan	5
Fireplace Maintenance	5
Collection & Protection of Vital Records by Private Residents	5
Digging Hotline/ Pipeline/ Safety Regulations and education	5
Tree Management/ Trimming by Homeowners, Utilities, & County	5
Manufactured Home Tie-downs regulations/ordinance	5
NFIP Participation	5
Critical Infrastructure Protection from Terrorism	4
Hazard Occurrence Data Collection & reporting	4
Waste Disposal Enforcement	4
Immunizations Plans – scheduled & emergency situations	4
Review Floodplain Management & Enforcement for Effectiveness	4
Surge Protection/ Lightning Protection	4
Acquisition & Installation of Storm Warning System	4
Generators for Shelter/ Public Facilities	4
Hazardous Materials Protection for Storm Shelters	3
Storm water Management Ordinance	3
Water Storage Savings Plan	3
Burning Restrictions	3
Building Code Enforcement	3
Radon/Lead Mitigation	2
Pest Management by cities through Regulations of Property Maintenance	2
Snow Fences / Barriers	2
Safe Rooms in Schools, Mobile Home Parks, Campgrounds, Hospital, Fairgrounds	2
Evaluate /Maintain / Repair area Dams	2

Assessment Risk for Terrorism	1
Rehabilitate Older Buildings	1
Hazardous Materials Disposal Program	1
Establish Local Hazardous Materials Capabilities	1
Secure Funding for Vacant/Collapsed Buildings to Remove or Repair	0
Bury Powerlines	0
Acquisition or Relocation of Buildings in Floodplains	0
Expand Hazard Area for Mapping & Mine Evaluation	-1

Mitigation Alternatives

Below is a listing of the mitigation alternatives considered and where applicable, which jurisdictions they would be for.

i. Constraints

In the planning committee’s discussion of mitigation alternatives, certain constraints exist to the implementation of the various alternative strategies. One of the major constraints is availability of funding as the communities of Lucas County are small and lack the resources available in other areas of Iowa.

The criteria for a positive impact includes greater overall benefits than the costs of the alternative, local capabilities to fund, administer, or obtain funds for the alternative, and public acceptance of the alternative.

G. Appendix 1: Resolutions Adopting Lucas County Multi-Jurisdictional Hazard Mitigation Plan

DRAFT RESOLUTION # _____

Purpose: A Resolution to approve and adopt the _____ County Multi-Jurisdictional Hazard Mitigation Plan.

WHEREAS, _____ County Multi-Jurisdictional Hazard Mitigation Plan was presented to the _____ City Council on _____, 2016; and

WHEREAS, _____ County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division; and

WHEREAS, _____ County Multi-Jurisdictional Hazard Mitigation Plan identifies the county and all jurisdiction’s potential hazards; and

WHEREAS, _____ County Multi-Jurisdictional Hazard Mitigation Plan includes a profile of hazard events, vulnerability assessment, evaluation of mitigation goals and a plan maintenance process.

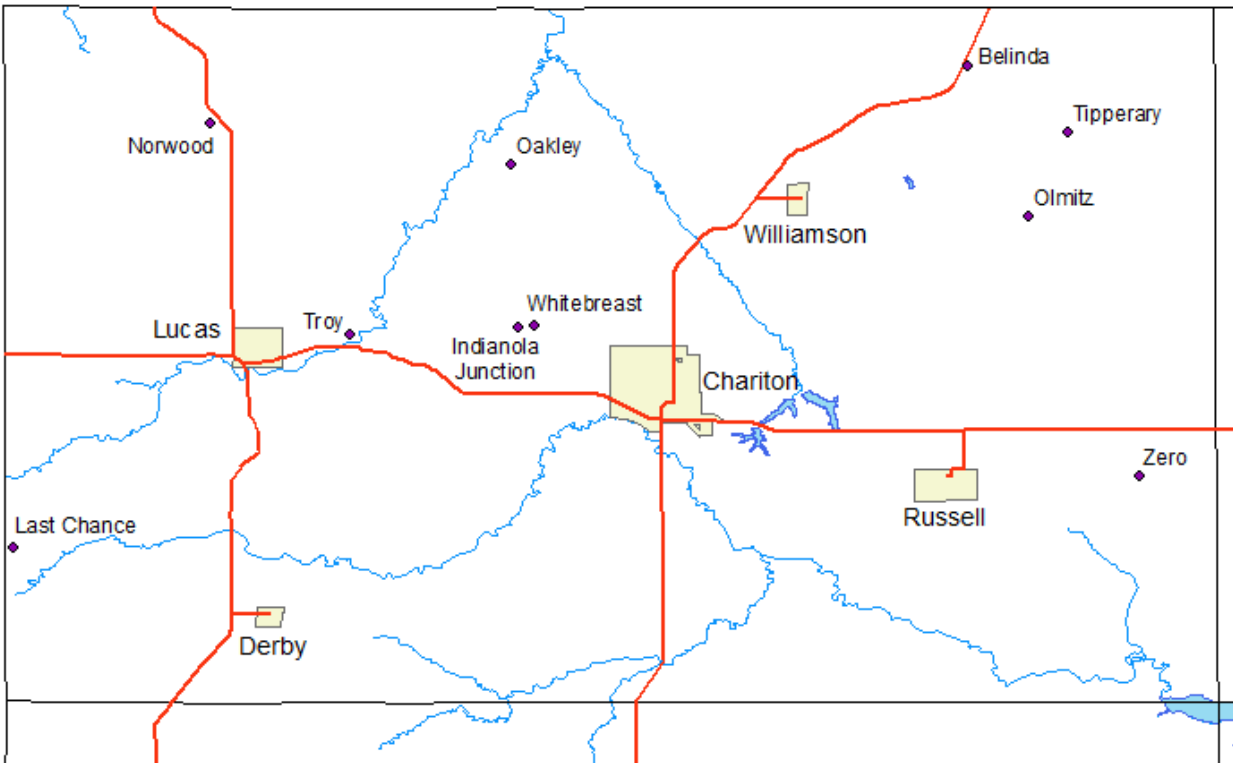
NOW THEREFORE BE IT RESOLVED that the City/County of _____ does hereby approve and adopt the _____ County Multi-Jurisdictional Hazard Mitigation Plan this _____ day of _____, 2016.

City/County Representative name & title

Date of Signature

Attest:

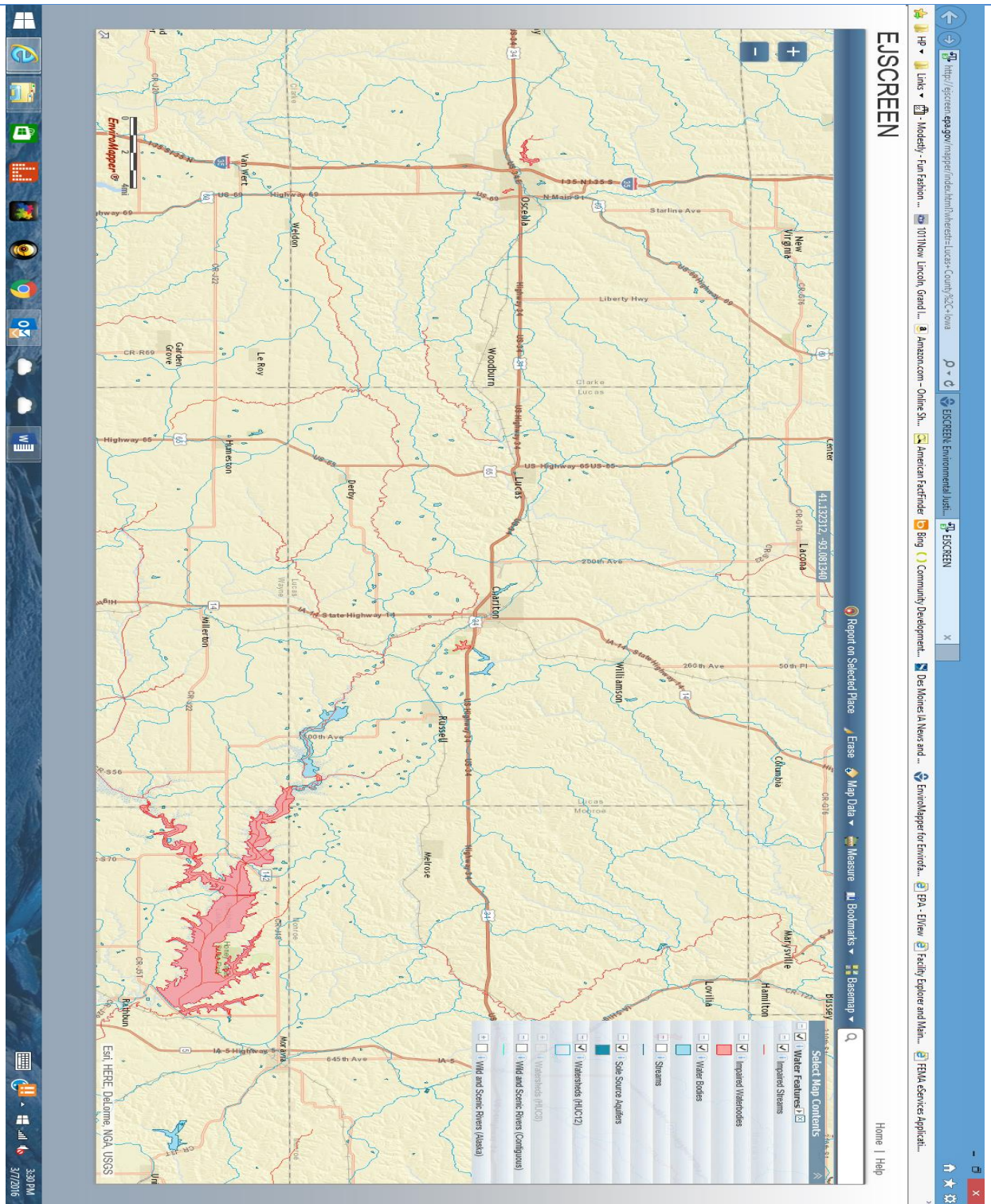
Appendix 2: Communities of Lucas County



There are twenty-four unincorporated communities and fifteen incorporated cities in Lucas County. These communities reflect the entire body of Census-recognized named places in the county, though there may be others that are locally recognized such as named subdivisions in the unincorporated county.

Source: IA DNR GIS data compiled by Chariton Valley Planning and Development

Appendix 3: Water bodies in Lucas County



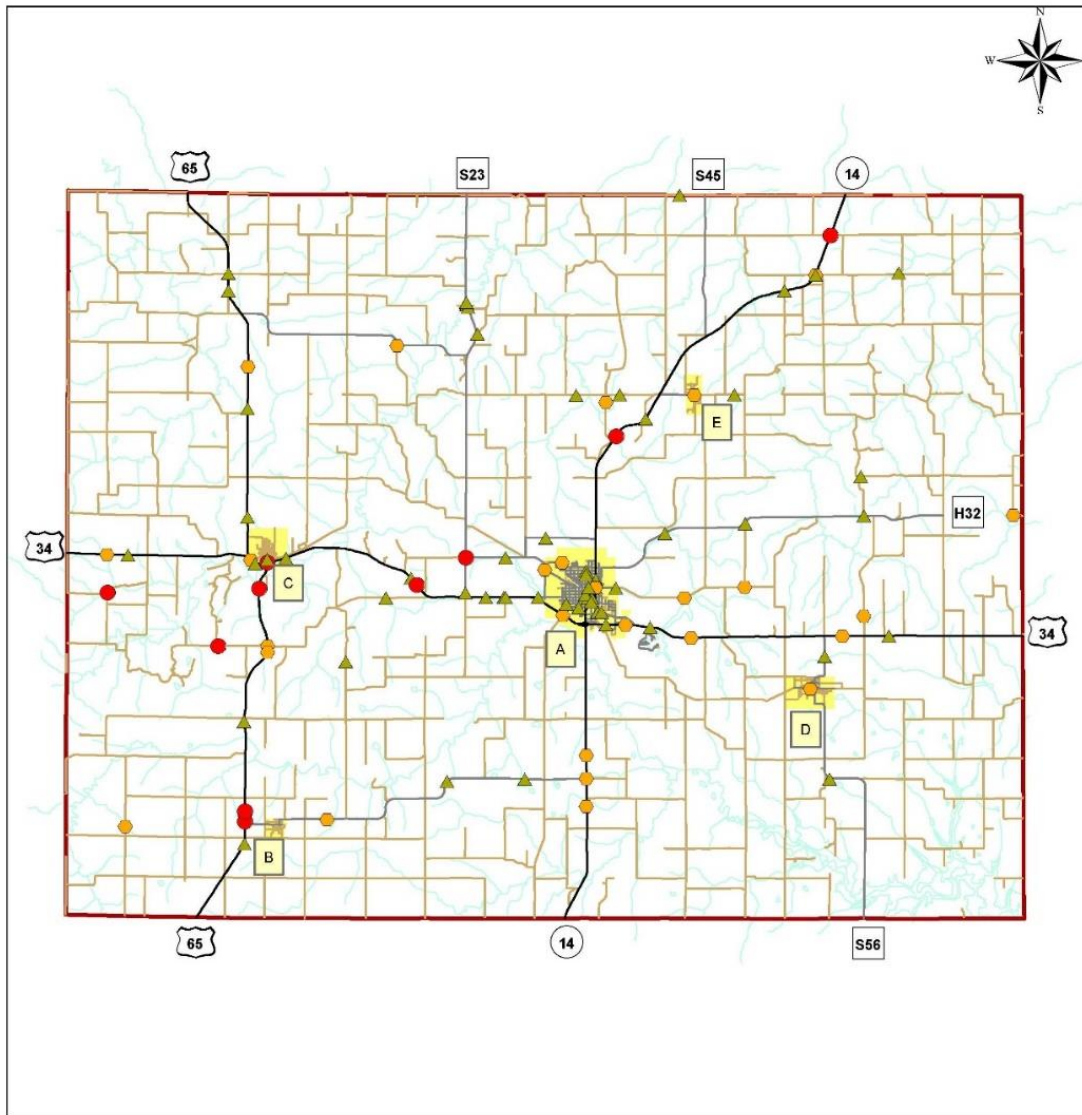
Appendix 4: Hill shade Image of Lucas County



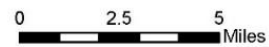
This image shows a representation of the topography in Lucas County. The Chariton River is clearly defined by the topography reaching from the west to south-east of the county in the southern half of the image. Derby, Chariton, Williamson, and Russell are all located on relatively flat terrain while Lucas is characterized by more steep topography and a lower-lying stream path that White Breast Creek follows.

The interactive mapping site where this image can be generated and manipulated can be found on the ISU GIS Facility Iowa Geographic Map Server website; <http://ortho.gis.iastate.edu/map.html> (30-meter DEM).

Appendix 5: Lucas County Crash History



**Lucas County
2007 - 2011 Reportable Crash History
All Rural Crashes
By Crash Severity**



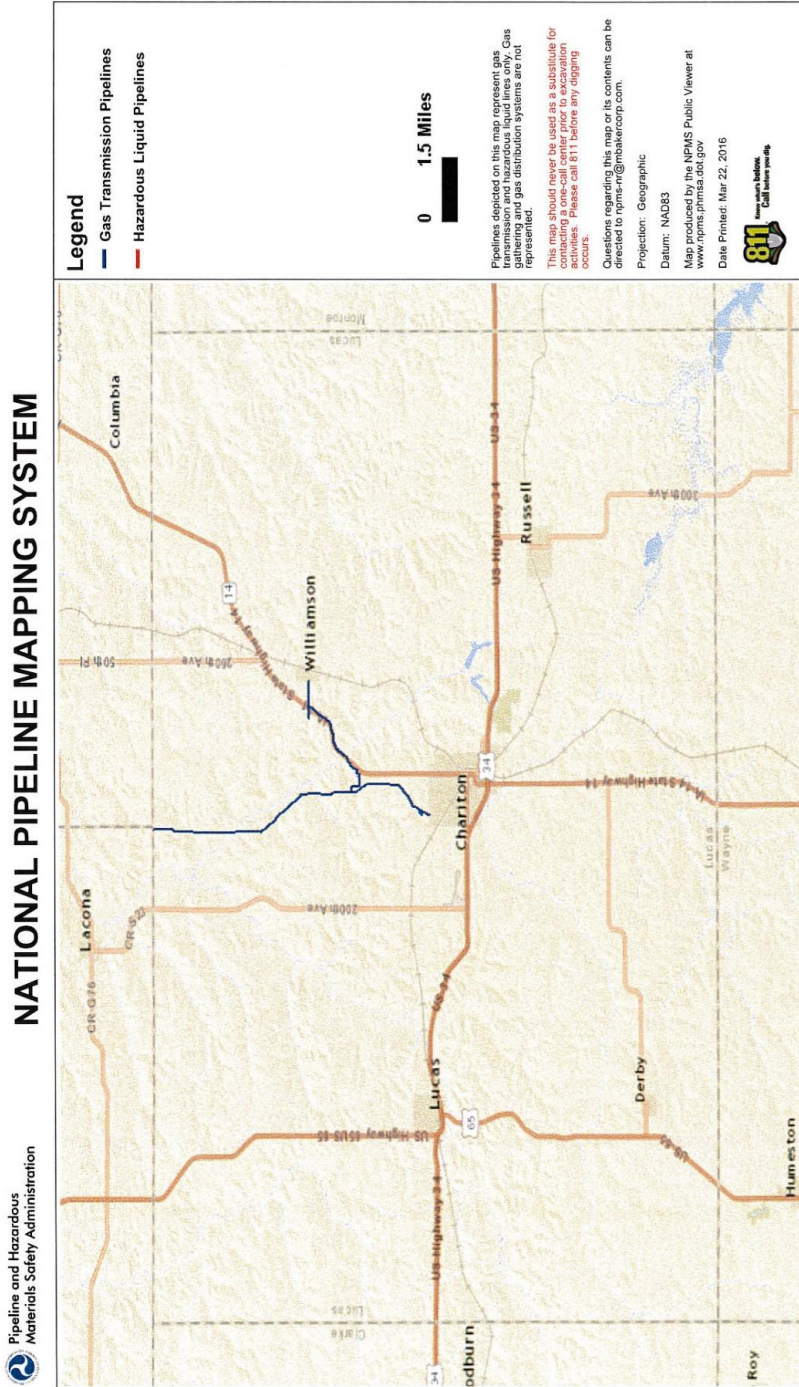
- A CHARITON
- B DERBY
- C LUCAS
- D RUSSELL
- E WILLIAMSON

- Interstate
- US
- Iowa
- County

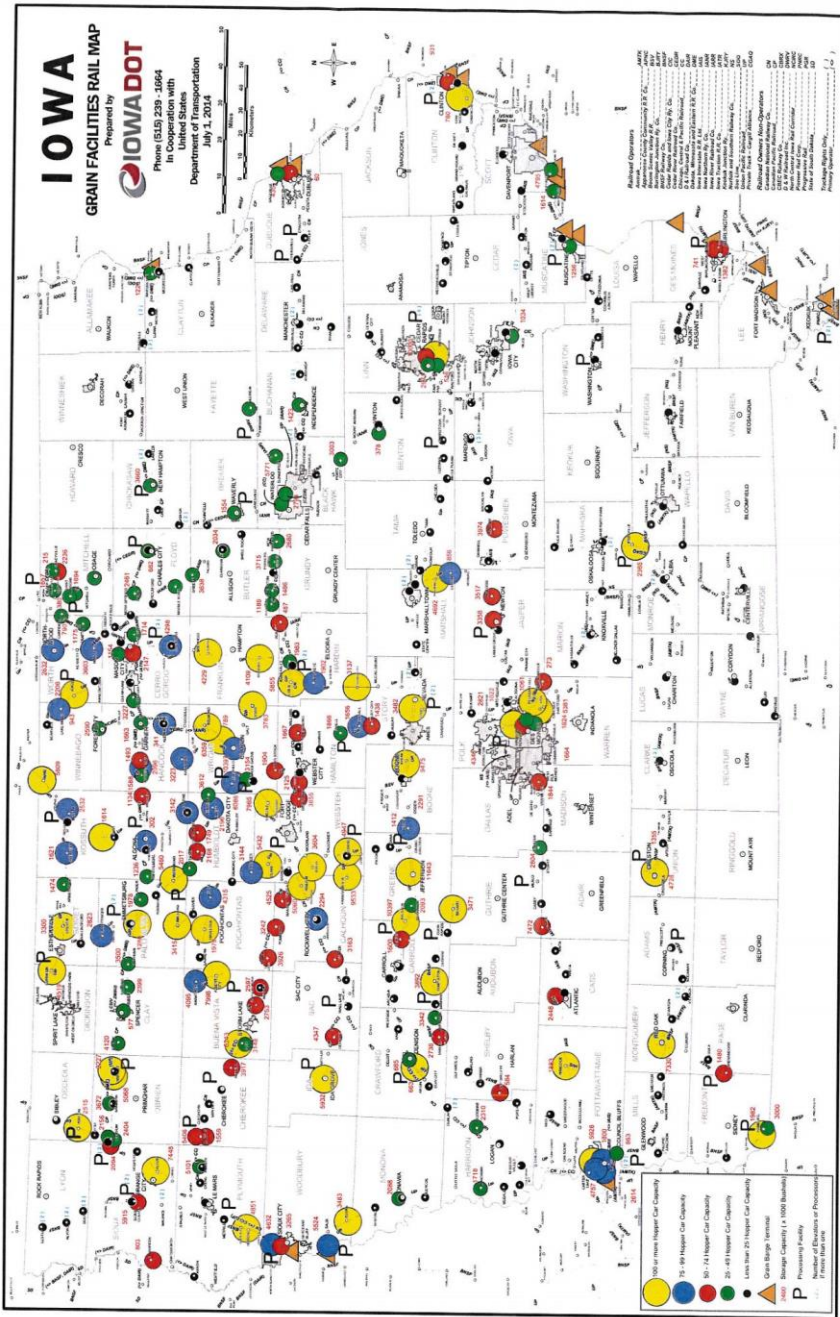
Legend

- Crash Severity**
- Fatal
 - Major Injury
 - Minor Injury

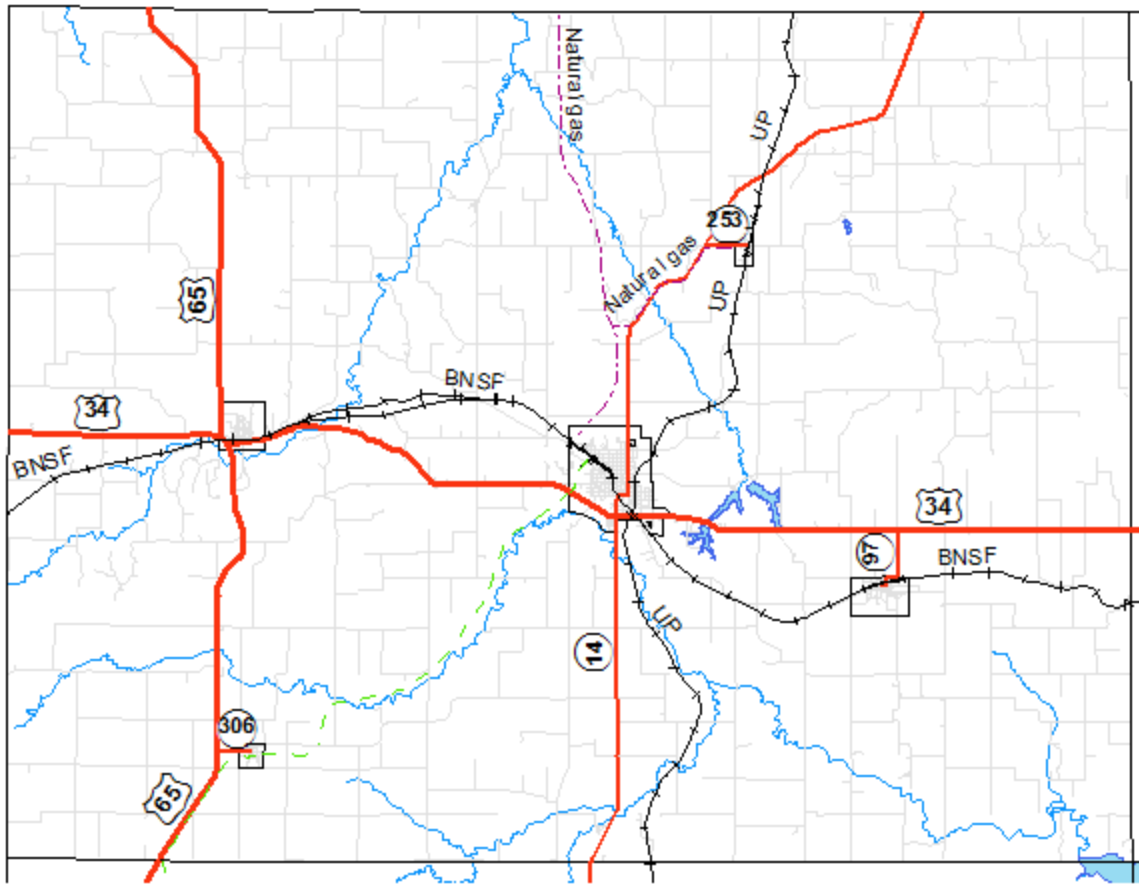
Appendix 6: National Pipeline Mapping












Appendix 7: Grain Facility Locations & Rail Shipping



Appendix 8: Transportation Routes in Lucas County



Legend

-  Trails
-  Railroad
-  Pipeline
-  US Hwy
-  State Hwy
-  Inc. Community
-  Roads
-  Water Body
-  River / Creek

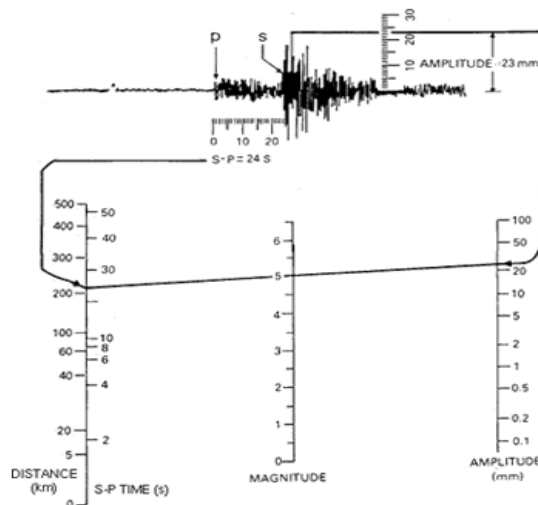
Source: IA DNR GIS data compiled by Chariton Valley Planning and Development

Appendix 9: Richter Scale

The Richter Scale is a mathematical model for evaluating Earthquake magnitudes on a logarithmic scale. This means that for each one point step upward, the magnitude is ten times stronger.

Richter Magnitude	Description	Earthquake Effects	Frequency (global average)
Less than 2.0	Micro	MicroEarthquakes, not felt	About 8,000 per day
2.0 – 2.9	Minor	Generally not felt, but recorded	About 1,000 per day
3.0 – 3.9		Often felt, but rarely causes damage	About 49,000 per yr.
4.0 – 4.9	Light	Noticeable shaking of indoor items, rattling noises. Significant damage unlikely	About 6,200 per yr.
5.0 – 5.9	Moderate	Can cause major damage to poorly constructed buildings over small regions. At most, slight damage to well-designed buildings	800 per year
6.0 – 6.9	Strong	Can be destructive in areas up to about 100 miles across in populated areas	120 per year
7.0 – 7.9	Major	Can cause serious damage over large areas	18 per year
8.0 – 8.9	Great	Can cause serious damage in areas several hundred miles across	1 per year
9.0 – 9.9		Devastating in areas several thousand miles across	1 per 20 years
10.0 +	Epic	Never recorded	unknown

Source: Wikipedia http://en.wikipedia.org/wiki/Richter_magnitude_scale



USGS <http://Earthquake.usgs.gov/learning/glossary.php?termID=149>

Appendix 10: Community Assets & Critical Facilities

MUSEUMS

LUCAS COUNTY HISTORICAL MUSEUM

217 NORTH 17TH STREET, CHARITON, IA

JOHN L. LEWIS MINING & LABOR MUSEUM

102 DIVISION STREET, LUCAS, IA

RUSSELL HISTORICAL SOCIETY MUSEUM

106 SOUTH PRAIRIE ST, RUSSELL, IA

WILLIAMSON SCHOOL MUSEUM

WILLIAMSON, IA

SCHOOLS

CHARITON COMMUNITY SCHOOL DISTRICT (5 LOCATIONS)

LINDEN AVE & 12TH STREET, CHARITON, IA

LIBRARIES

CHARITON FEE PUBLIC LIBRARY

803 BRADEN AV, CHARITON, IA

RUSSELL PUBLIC LIBRARY

RUSSELL, IA

COMMUNITY CENTERS

DERBY COMMUNITY CENTER, DERBY, IA

RUSSELL COMMUNITY CENTER, RUSSELL, IA

LUCAS COMMUNITY HALL, LUCAS, IA

WILLIAMSON COMMUNITY HALL, WILLIAMSON, IA

PLACES OF WORSHIP	#'s
CHARITON	13
RUSSELL	3
WILLIAMSON	0
LUCAS	1
DERBY	1

NURSING/RETIREMENT HOMES – VULNERABLE POPULATIONS
AUBURN MANOR, INC

815 AUBURN AVE, CHARITON, IA 50049

SENECA AREA AGENCY ON AGING

117 SOUTH GRAND ST, CHARITON, IA 50049

CIRCLE OF LIFE HOSPICE

 1010 NORTH 7TH STREET, CHARITON, IA 50049

KIDDIE KAMPAS PRE-SCHOOL/NURSERY

EAST COURT ST, CHARITON, IA 50049

HOSPITALS & MEDICAL CENTERS
HAMMER MEDICAL SUPPLY

110 N GRAND ST, CHARITON, IA 50049

LUCAS COUNTY HEALTH CENTER

 1200 NORTH 7TH ST, CHARITON, IA 50049

CHARITON FAMILY MEDICAL CENTER

 1200 NORTH 7TH ST, STE 100, CHARITON, IA 50049

AMBULANCE SERVICES
RUSSELL FIRE & RESCUE, RUSSELL, IA

CHARITON FIRE & RESCUE, CHARITON, IA

LUCAS VOLUNTEER FIRE & RESCUE, LUCAS, IA

POLICE/LAW ENFORCEMENT CENTERS**DEPT OF CORRECTIONAL SERVICES**

115 SOUTH MAIN STREET, CHARITON, IA 50049

DEPARTMENT OF DEFENSE

1415 LUCAS AVE, CHARITON, IA 50049

COURTHOUSE

LUCAS COUNTY COURTHOUSE CHARITON, IA

GROCERY STORES**HY-VEE STORES**

2001 COURT AVE, CHARITON, IA 50049

SHOPKO INC

1900 COURT AVENUE, CHARITON, IA 50049

DOLLAR GENERAL

307 N GRAND ST, CHARITON, IA 50049

D&D MARKET

114 SOUTH PRAIRIE ST, RUSSELL, IA 50238

COMMUNICATIONS**LUCAS COUNTY SHERIFF'S OFFICE**

CHARITON, IA

GAS STATIONS & OTHER SITES WITH POSSIBLE HAZARDOUS MATERIALS

SOUTHERN IOWA PETROLEUM LLC

HWYS 5 & 34, LUCAS, IA 50151

DERBY ELEVATOR CORP

115 EAST FRONT STREET, DERBY, IA 50068

FARMERS COOP ASSN

2120 OSCEOLA AVE, CHARITON, IA 50049

IOWA DEPT OF TRANSPORTATION

45842 STATE HWY 14, CHARITON, IA 50049

CASEY'S GENERAL STORE

1421 COURT AVE, CHARITON, IA 50049

KUM & GO

335 MAIN ST, CHARITON, IA 50049

ELLIOTT OIL COMPANY

HWY 34 & 1ST STREET, CHARITON, IA 50049

CASEY'S GENERAL STORE

418 SOUTH 7TH STREET, CHARITON, IA 50049

CORYDON OIL COMPANY

8TH & COURT, CHARITON, IA 50049

KUM & GO

1155 NORTH 7TH STREET, CHARITON, IA 50049

IOWA DEPT OF TRANSPORTATION

HWY 34, CHARITON, IA 50049

CRITICAL BRIDGES & OVERPASSES

BRIDGE ON US 34 OVER SMALL NATURAL STREAM

OVERPASS OF US 34 & 65 OVER BNSF RR

BRIDGE OVER WHITE BREAST CREEK ON US 34

BRIDGE OVER SMALL NATURAL STREAM ON US 34

OVER PASS ON US 34 OVER BIKE PATH

BRIDGE ON US 34 OVER SMALL NATURAL STREAM

OVERPASS ON US 34 OVER BNSF & UP RR LINES

BRIDGE ON US 34 OVER THE CITY RESERVOIR INLET

BRIDGE OVER LITTLE WHITE BREAST CREEK ON SR 265 TRL

BRIDGE ON US 34 OVER LITTLE WHITE BREAST CREEK

BRIDGE OVER HAMILTON CREEK ON US 65

BRIDGE OVER CHARITON RIVER ON US 65

BRIDGE ON US 65 OVER WHITE BREAST CREEK

BRIDGE ON US 65 OVER WHITE BREAST CREEK

BRIDGE OVER WOLF CREEK ON IA 14

BRIDGE ON IA 14 OVER CHARITON RIVER

OVERPASS OVER US 34 ON IA 14

BRIDGE ON IA 14 OVER WHITE BREAST CREEK

OVERPASS ON IA 14 OVER UP RAIL LINE

BRIDGE OVER ENGLISH CREEK ON IA 14

BRIDGE ON US 65 OVER WHITE BREAST CREEK

SHELTERS/FOOD PANTRIES/OTHER

CHARITON HOUSING BOARD

429 SOUTH MAIN ST, CHARITON, IA 50049

JOHANSEN PLUMBING & HEATING

115 N MAIN ST, CHARITON, IA 50049

RUSSELL PLUMBING HEATING & AIR INC

201 GROZIER ST, RUSSELL, IA 50238

Appendix 11: National Climatic Data Center Storm Results

Storm Events Database - Search Results | National Centers for Environmental Information Page 1 of 2

National Centers for Environmental Information

Storm Events Database

Search Results for Lucas County, Iowa

Event Types: Thunderstorm Wind

66 events were reported between 01/01/1950 and 12/31/2015 (24106 days)

Summary Info:

Number of County/Zone areas affected:	1
Number of Days with Event:	46
Number of Days with Event and Death:	0
Number of Days with Event and Injury:	0
Number of Days with Event and Property Damage:	36
Number of Days with Event and Crop Damage:	12
Number of Event Types reported:	1

Column Definitions:

'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Wind Magnitude Definitions:

Measured Gust:'MG', Estimated Gust:'EG', Measured Sustained:'MS', Estimated Sustained:'ES'

Click on **Location** below to display details.

Available Event Types have changed over time. Please refer to the [Database Details](#) for more information.

Select:

Sort By:

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	734.00K	597.00K
LUCAS CO.	LUCAS CO.	IA	06/18/1973	07:45	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	06/18/1975	07:15	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	12/14/1975	01:40	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	06/07/1981	18:50	CST	Thunderstorm Wind	58 kts.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	06/23/1985	17:55	CST	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	05/08/1986	15:01	CST	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	09/22/1986	15:55	CST	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	05/31/1987	17:30	CST	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	07/15/1992	20:11	PST	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
Williamson	LUCAS CO.	IA	07/04/1995	17:05	CST	Thunderstorm Wind	50 kts.	0	0	5.00K	0.00K
CHARITON	LUCAS CO.	IA	06/05/1997	16:45	CST	Thunderstorm Wind	50 kts.	0	0	5.00K	0.00K
LUCAS	LUCAS CO.	IA	05/21/1998	22:40	CST	Thunderstorm Wind	50 kts.	0	0	2.00K	0.00K
CHARITON	LUCAS CO.	IA	06/18/1998	07:00	CST	Thunderstorm Wind	56 kts.	0	0	50.00K	5.00K
RUSSELL	LUCAS CO.	IA	06/18/1998	07:10	CST	Thunderstorm Wind	56 kts.	0	0	20.00K	2.00K
CHARITON	LUCAS CO.	IA	06/18/1998	08:30	CST	Thunderstorm Wind	54 kts.	0	0	15.00K	2.00K
LUCAS	LUCAS CO.	IA	06/18/1998	10:23	CST	Thunderstorm Wind	52 kts.	0	0	2.00K	0.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	06/18/1998	13:45	CST	Thunderstorm Wind	53 kts.	0	0	2.00K	0.00K
CHARITON	LUCAS CO.	IA	06/04/1999	12:05	CST	Thunderstorm Wind	52 kts.	0	0	1.00K	0.00K
WILLIAMSON	LUCAS CO.	IA	07/23/1999	14:30	CST	Thunderstorm Wind	52 kts.	0	0	5.00K	0.00K
LUCAS	LUCAS CO.	IA	07/23/1999	15:25	CST	Thunderstorm Wind	70 kts.	0	0	15.00K	2.00K
CHARITON	LUCAS CO.	IA	06/04/2000	05:05	CST	Thunderstorm Wind	61 kts. E	0	0	5.00K	0.00K
WILLIAMSON	LUCAS CO.	IA	06/04/2000	05:15	CST	Thunderstorm Wind	65 kts. E	0	0	100.00K	2.00K
CHARITON	LUCAS CO.	IA	06/23/2000	13:00	CST	Thunderstorm Wind	61 kts. E	0	0	50.00K	5.00K
CHARITON	LUCAS CO.	IA	08/06/2000	13:45	CST	Thunderstorm Wind	52 kts. E	0	0	3.00K	1.00K
CHARITON	LUCAS CO.	IA	04/11/2001	14:00	CST	Thunderstorm Wind	61 kts. E	0	0	7.00K	0.00K
CHARITON	LUCAS CO.	IA	05/10/2001	19:30	CST	Thunderstorm Wind	50 kts. E	0	0	2.00K	0.00K
CHARITON	LUCAS CO.	IA	06/14/2001	14:51	CST	Thunderstorm Wind	52 kts. E	0	0	3.00K	0.00K
LUCAS	LUCAS CO.	IA	09/20/2001	16:32	CST	Thunderstorm Wind	65 kts. E	0	0	30.00K	10.00K

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CHARITON	LUCAS CO.	IA	10/22/2001	15:01	CST	Thunderstorm Wind	52 kts. E	0	0	5.00K	0.00K
RUSSELL	LUCAS CO.	IA	10/22/2001	15:06	CST	Thunderstorm Wind	52 kts. E	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	03/08/2002	23:30	CST	Thunderstorm Wind	61 kts. E	0	0	25.00K	0.00K
OAKLEY	LUCAS CO.	IA	09/18/2002	20:05	CST	Thunderstorm Wind	52 kts. E	0	0	5.00K	2.00K
CHARITON	LUCAS CO.	IA	08/20/2003	14:10	CST	Thunderstorm Wind	57 kts. EG	0	0	5.00K	5.00K
WILLIAMSON	LUCAS CO.	IA	08/03/2004	20:40	CST	Thunderstorm Wind	57 kts. EG	0	0	5.00K	1.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	06/04/2005	19:57	CST	Thunderstorm Wind	52 kts. MG	0	0	2.00K	0.00K
CHARITON	LUCAS CO.	IA	06/29/2005	22:55	CST	Thunderstorm Wind	61 kts. EG	0	0	5.00K	0.00K
DERBY	LUCAS CO.	IA	07/13/2006	18:05	CST	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
DERBY	LUCAS CO.	IA	08/23/2007	17:15	CST-6	Thunderstorm Wind	52 kts. EG	0	0	4.00K	0.00K
LUCAS	LUCAS CO.	IA	05/30/2008	03:45	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
OAKLEY	LUCAS CO.	IA	05/30/2008	03:51	CST-6	Thunderstorm Wind	61 kts. EG	0	0	15.00K	0.00K
NEWBERN	LUCAS CO.	IA	05/30/2008	04:00	CST-6	Thunderstorm Wind	61 kts. EG	0	0	5.00K	0.00K
NEWBERN	LUCAS CO.	IA	05/30/2008	04:00	CST-6	Thunderstorm Wind	65 kts. EG	0	0	25.00K	0.00K
CHARITON	LUCAS CO.	IA	06/19/2008	11:58	CST-6	Thunderstorm Wind	52 kts. EG	0	0	5.00K	0.00K
DERBY	LUCAS CO.	IA	07/27/2008	16:50	CST-6	Thunderstorm Wind	61 kts. EG	0	0	20.00K	0.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	04/26/2009	17:52	CST-6	Thunderstorm Wind	54 kts. MG	0	0	0.00K	0.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	04/26/2009	17:56	CST-6	Thunderstorm Wind	54 kts. MG	0	0	0.00K	0.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	04/26/2009	17:56	CST-6	Thunderstorm Wind	56 kts. EG	0	0	10.00K	0.00K
RUSSELL	LUCAS CO.	IA	06/01/2010	20:30	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	07/18/2010	03:07	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	06/19/2011	23:45	CST-6	Thunderstorm Wind	54 kts. MG	0	0	5.00K	0.00K
RUSSELL	LUCAS CO.	IA	06/19/2011	23:53	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	06/26/2011	17:04	CST-6	Thunderstorm Wind	57 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	07/23/2011	17:15	CST-6	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
RUSSELL	LUCAS CO.	IA	07/23/2011	17:25	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	50.00K
CHARITON	LUCAS CO.	IA	08/06/2011	22:30	CST-6	Thunderstorm Wind	61 kts. EG	0	0	25.00K	10.00K
WILLIAMSON	LUCAS CO.	IA	08/06/2011	22:50	CST-6	Thunderstorm Wind	52 kts. EG	0	0	2.00K	0.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	04/12/2014	22:00	CST-6	Thunderstorm Wind	52 kts. MG	0	0	0.00K	0.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	06/17/2014	01:15	CST-6	Thunderstorm Wind	57 kts. MG	0	0	25.00K	0.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	06/24/2015	20:30	CST-6	Thunderstorm Wind	53 kts. MG	0	0	0.00K	0.00K
CHARITON	LUCAS CO.	IA	06/24/2015	20:33	CST-6	Thunderstorm Wind	61 kts. EG	0	0	50.00K	0.00K
CHARITON	LUCAS CO.	IA	06/24/2015	20:35	CST-6	Thunderstorm Wind	60 kts. EG	0	0	20.00K	0.00K
WILLIAMSON	LUCAS CO.	IA	07/28/2015	20:07	CST-6	Thunderstorm Wind	52 kts. EG	0	0	50.00K	500.00K
RUSSELL	LUCAS CO.	IA	07/28/2015	20:17	CST-6	Thunderstorm Wind	52 kts. EG	0	0	5.00K	0.00K
CHARITON	LUCAS CO.	IA	08/02/2015	17:55	CST-6	Thunderstorm Wind	52 kts. EG	0	0	10.00K	0.00K
CHARITON	LUCAS CO.	IA	08/02/2015	17:55	CST-6	Thunderstorm Wind	50 kts. MG	0	0	0.00K	0.00K
LUCAS	LUCAS CO.	IA	08/02/2015	18:00	CST-6	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
Totals:								0	0	734.00K	597.00K

National Centers for Environmental Information

Storm Events Database

Search Results for Lucas County, Iowa

Event Types: High Wind

Lucas county contains the following zones:

'Lucas'

20 events were reported between 01/01/1950 and 12/31/2015 (24106 days)

Summary Info:

Number of County/Zone areas affected:	1
Number of Days with Event:	20
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	13
Number of Days with Event and Crop Damage:	2
Number of Event Types reported:	1

Column Definitions:

'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Wind Magnitude Definitions:

Measured Gust:'MG', Estimated Gust:'EG', Measured Sustained:'MS', Estimated Sustained:'ES'

Click on **Location** below to display details.

Available Event Types have changed over time. Please refer to the [Database Details](#) for more information.

Select:

Sort By:

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	785.11K	30.10K
LUCAS (ZONE)	LUCAS (ZONE)	IA	01/17/1996	21:00	CST	High Wind	55 kts.	0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	02/10/1996	12:00	CST	High Wind	56 kts.	0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	03/24/1996	17:00	CST	High Wind	54 kts.	0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	04/25/1996	09:30	CST	High Wind	52 kts.	0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	10/29/1996	11:00	CST	High Wind	57 kts.	0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	04/06/1997	09:00	CST	High Wind	55 kts.	0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	04/30/1997	12:00	CST	High Wind	52 kts.	0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	04/12/1998	08:00	CST	High Wind		0	0	50.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	11/10/1998	02:00	CST	High Wind	61 kts.	0	0	300.00K	5.10K
LUCAS (ZONE)	LUCAS (ZONE)	IA	03/08/2000	11:00	CST	High Wind	50 kts. E	0	0	10.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	04/07/2001	04:00	CST	High Wind	50 kts. M	0	0	50.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	03/09/2002	06:00	CST	High Wind	M	0	0	50.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	11/12/2003	09:00	CST	High Wind	50 kts. EG	0	0	50.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	04/18/2004	15:10	CST	High Wind	35 kts. MS	0	0	80.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	04/27/2004	12:30	CST	High Wind	35 kts. MS	0	0	75.11K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	01/22/2005	00:15	CST	High Wind	35 kts. MS	0	0	10.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	11/12/2005	18:00	CST	High Wind	35 kts. MS	0	0	50.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	01/24/2006	09:30	CST	High Wind	50 kts. MG	0	0	10.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	10/26/2008	11:00	CST-6	High Wind	35 kts. ES	0	0	25.00K	25.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	01/26/2014	15:00	CST-6	High Wind	50 kts. EG	0	0	25.00K	0.00K
Totals:								0	0	785.11K	30.10K

National Centers for Environmental Information

Storm Events Database

Search Results for Lucas County, Iowa

Event Types: Tornado

9 events were reported between 01/01/1950 and 12/31/2015 (24106 days)

Summary Info:

Number of County/Zone areas affected:	1
Number of Days with Event:	8
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	1
Number of Days with Event and Property Damage:	7
Number of Days with Event and Crop Damage:	3
Number of Event Types reported:	1

Column Definitions:

'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Click on **Location** below to display details.

Available Event Types have changed over time. Please refer to the [Database Details](#) for more information.

Select:

Sort By:

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	4	25.425M	12.00K
LUCAS CO.	LUCAS CO.	IA	06/09/1967	23:30	CST	Tornado	F2	0	0	25.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	06/08/1982	20:15	CST	Tornado	F0	0	0	0.03K	0.00K
LUCAS CO.	LUCAS CO.	IA	06/07/1984	18:30	CST	Tornado	F4	0	0	25.000M	0.00K
LUCAS CO.	LUCAS CO.	IA	06/07/1984	18:54	CST	Tornado	F1	0	0	25.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	06/10/1986	20:05	CST	Tornado	F0	0	0	0.25K	0.00K
LUCAS	LUCAS CO.	IA	04/08/1999	16:18	CST	Tornado	F3	0	4	250.00K	0.00K
LUCAS	LUCAS CO.	IA	09/20/2001	16:30	CST	Tornado	F0	0	0	50.00K	5.00K
LUCAS	LUCAS CO.	IA	09/05/2004	19:48	CST	Tornado	F0	0	0	75.00K	5.00K
WILLIAMSON	LUCAS CO.	IA	06/22/2015	16:06	CST-6	Tornado	EF1	0	0	0.00K	2.00K
Totals:								0	4	25.425M	12.00K

<http://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Tornado&be...> 2/17/2016

National Centers for Environmental Information

Storm Events Database

Search Results for Lucas County, Iowa

Event Types: Flood

Lucas county contains the following zones:
'Lucas'

87 events were reported between 01/01/1950 and 12/31/2015 (24106 days)

Summary Info:

Number of County/Zone areas affected:	2
Number of Days with Event:	81
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	64
Number of Days with Event and Crop Damage:	31
Number of Event Types reported:	1

Column Definitions:

'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Click on **Location** below to display details.

Available Event Types have changed over time. Please refer to the [Database Details](#) for more information.

Sort By: ▾

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	2.990M	21.513M
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/09/1996	06:00	CST	Flood		0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/10/1996	04:00	CST	Flood		0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/23/1996	15:00	CST	Flood		0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/26/1996	12:00	CST	Flood		0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	02/18/1997	18:00	CST	Flood		0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	04/14/1997	00:00	CST	Flood		0	0	10.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/07/1997	18:00	CST	Flood		0	0	0.00K	0.00K
CHARITON	LUCAS CO.	IA	07/24/1997	02:00	CST	Flood		0	0	25.00K	15.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	03/30/1998	18:00	CST	Flood		0	0	10.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	04/07/1998	12:00	CST	Flood		0	0	15.00K	0.00K
CHARITON	LUCAS CO.	IA	05/06/1998	22:00	CST	Flood		0	0	75.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/07/1998	01:00	CST	Flood		0	0	25.00K	10.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/24/1998	06:00	CST	Flood		0	0	25.00K	10.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	06/14/1998	09:00	CST	Flood		0	0	100.00K	20.00K
CHARITON	LUCAS CO.	IA	06/14/1998	16:00	CST	Flood		0	0	50.00K	30.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	07/06/1998	03:00	CST	Flood		0	0	50.00K	100.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	10/17/1998	06:00	CST	Flood		0	0	70.00K	10.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	03/16/1999	06:00	CST	Flood		0	0	1.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	04/06/1999	18:00	CST	Flood		0	0	7.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	04/22/1999	06:00	CST	Flood		0	0	10.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/16/1999	21:00	CST	Flood		0	0	200.00K	25.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	06/09/1999	06:00	CST	Flood		0	0	50.00K	75.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	07/31/1999	06:00	CST	Flood		0	0	25.00K	10.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	06/24/2000	03:00	CST	Flood		0	0	50.00K	75.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	02/24/2001	12:00	CST	Flood		0	0	7.50K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	03/15/2001	15:00	CST	Flood		0	0	5.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	03/23/2001	18:00	CST	Flood		0	0	7.50K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	04/07/2001	21:00	CST	Flood		0	0	150.00K	0.00K

LUCAS (ZONE)	LUCAS (ZONE)	IA	05/11/2001	06:00	CST	Flood	0	0	25.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/31/2001	15:00	CST	Flood	0	0	2.50K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	06/05/2001	03:00	CST	Flood	0	0	5.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	06/12/2001	15:00	CST	Flood	0	0	25.00K	50.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	10/23/2001	03:00	CST	Flood	0	0	5.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/11/2002	06:00	CST	Flood	0	0	10.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/04/2003	12:00	CST	Flood	0	0	5.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/09/2003	06:00	CST	Flood	0	0	5.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/22/2004	18:00	CST	Flood	0	0	100.00K	298.04K
LUCAS (ZONE)	LUCAS (ZONE)	IA	05/13/2005	02:00	CST	Flood	0	0	30.00K	0.00K
CHARITON	LUCAS CO.	IA	02/24/2007	23:00	CST-6	Flood	0	0	5.00K	0.00K
CHARITON	LUCAS CO.	IA	04/25/2007	07:45	CST-6	Flood	0	0	25.00K	0.00K
LUCAS	LUCAS CO.	IA	04/26/2007	06:00	CST-6	Flood	0	0	250.00K	0.00K
CHARITON	LUCAS CO.	IA	05/06/2007	14:15	CST-6	Flood	0	0	25.00K	0.00K
WILLIAMSON	LUCAS CO.	IA	05/07/2007	04:59	CST-6	Flood	0	0	300.00K	0.00K
RUSSELL	LUCAS CO.	IA	08/24/2007	03:30	CST-6	Flood	0	0	25.00K	50.00K
RUSSELL	LUCAS CO.	IA	03/02/2008	13:15	CST-6	Flood	0	0	50.00K	0.00K
RUSSELL	LUCAS CO.	IA	03/03/2008	06:00	CST-6	Flood	0	0	50.00K	0.00K
RUSSELL	LUCAS CO.	IA	04/08/2008	19:00	CST-6	Flood	0	0	25.00K	0.00K
RUSSELL	LUCAS CO.	IA	04/18/2008	02:00	CST-6	Flood	0	0	25.00K	0.00K
RUSSELL	LUCAS CO.	IA	05/11/2008	09:45	CST-6	Flood	0	0	0.00K	0.00K
RUSSELL	LUCAS CO.	IA	05/24/2008	15:22	CST-6	Flood	0	0	0.00K	20.00K
RUSSELL	LUCAS CO.	IA	05/30/2008	20:00	CST-6	Flood	0	0	0.00K	10.00K
RUSSELL	LUCAS CO.	IA	06/05/2008	23:59	CST-6	Flood	0	0	10.00K	50.00K
RUSSELL	LUCAS CO.	IA	06/26/2008	10:53	CST-6	Flood	0	0	10.00K	50.00K
RUSSELL	LUCAS CO.	IA	07/18/2008	10:02	CST-6	Flood	0	0	10.00K	5.00K
RUSSELL	LUCAS CO.	IA	07/25/2008	05:33	CST-6	Flood	0	0	10.00K	100.00K
LUCAS	LUCAS CO.	IA	07/25/2008	07:35	CST-6	Flood	0	0	25.00K	25.00K
LUCAS	LUCAS CO.	IA	07/25/2008	13:13	CST-6	Flood	0	0	25.00K	50.00K
RUSSELL	LUCAS CO.	IA	08/01/2008	00:00	CST-6	Flood	0	0	0.00K	25.00K
RUSSELL	LUCAS CO.	IA	09/12/2008	22:27	CST-6	Flood	0	0	5.00K	25.00K
CHARITON	LUCAS CO.	IA	09/13/2008	07:00	CST-6	Flood	0	0	50.00K	0.00K
RUSSELL	LUCAS CO.	IA	11/07/2008	10:58	CST-6	Flood	0	0	0.00K	5.00K
RUSSELL	LUCAS CO.	IA	12/26/2008	21:13	CST-6	Flood	0	0	5.00K	0.00K
RUSSELL	LUCAS CO.	IA	03/08/2009	08:52	CST-6	Flood	0	0	25.00K	0.00K
RUSSELL	LUCAS CO.	IA	03/24/2009	07:03	CST-6	Flood	0	0	25.00K	0.00K
RUSSELL	LUCAS CO.	IA	04/27/2009	00:55	CST-6	Flood	0	0	10.00K	0.00K
LUCAS	LUCAS CO.	IA	04/27/2009	02:00	CST-6	Flood	0	0	20.00K	0.00K
RUSSELL	LUCAS CO.	IA	05/15/2009	12:32	CST-6	Flood	0	0	10.00K	0.00K
RUSSELL	LUCAS CO.	IA	06/08/2009	09:12	CST-6	Flood	0	0	5.00K	10.00K
RUSSELL	LUCAS CO.	IA	07/04/2009	23:42	CST-6	Flood	0	0	10.00K	10.00K
RUSSELL	LUCAS CO.	IA	08/17/2009	14:28	CST-6	Flood	0	0	0.00K	0.00K
RUSSELL	LUCAS CO.	IA	08/27/2009	01:58	CST-6	Flood	0	0	50.00K	10.00K
RUSSELL	LUCAS CO.	IA	10/22/2009	18:05	CST-6	Flood	0	0	0.00K	25.00K
RUSSELL	LUCAS CO.	IA	10/29/2009	20:29	CST-6	Flood	0	0	0.00K	25.00K
RUSSELL	LUCAS CO.	IA	12/25/2009	02:25	CST-6	Flood	0	0	0.00K	0.00K
RUSSELL	LUCAS CO.	IA	03/11/2010	02:06	CST-6	Flood	0	0	10.00K	0.00K
RUSSELL	LUCAS CO.	IA	04/25/2010	02:38	CST-6	Flood	0	0	25.00K	0.00K
NORWOOD	LUCAS CO.	IA	04/25/2010	07:00	CST-6	Flood	0	0	50.00K	0.00K
RUSSELL	LUCAS CO.	IA	05/13/2010	10:47	CST-6	Flood	0	0	5.00K	0.00K
NORWOOD	LUCAS CO.	IA	06/12/2010	12:00	CST-6	Flood	0	0	0.00K	20.000M
CHARITON	LUCAS CO.	IA	06/15/2010	10:00	CST-6	Flood	0	0	150.00K	0.00K
RUSSELL	LUCAS CO.	IA	07/20/2010	07:03	CST-6	Flood	0	0	10.00K	25.00K
RUSSELL	LUCAS CO.	IA	06/27/2011	17:27	CST-6	Flood	0	0	0.00K	0.00K
CHARITON	LUCAS CO.	IA	05/28/2013	21:00	CST-6	Flood	0	0	200.00K	0.00K
RUSSELL	LUCAS CO.	IA	05/29/2013	06:30	CST-6	Flood	0	0	50.00K	0.00K
LUCAS	LUCAS CO.	IA	09/10/2014	05:21	CST-6	Flood	0	0	50.00K	15.00K
NORWOOD	LUCAS CO.	IA	06/25/2015	05:57	CST-6	Flood	0	0	75.00K	0.00K

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CHARITON	LUCAS CO.	IA	06/25/2015	06:15	CST-6	Flood		0	0	100.00K	250.00K
Totals:								0	0	2.990M	21.513M

<http://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Flood&begin...> 2/17/2016

National Centers for Environmental Information

Storm Events Database

Search Results for Lucas County, Iowa

Event Types: Flash Flood

15 events were reported between 01/01/1950 and 12/31/2015 (24106 days)

Summary Info:

Number of County/Zone areas affected:	1
Number of Days with Event:	10
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	10
Number of Days with Event and Crop Damage:	3
Number of Event Types reported:	1

Column Definitions:

'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Click on **Location** below to display details.

Available Event Types have changed over time. Please refer to the [Database Details](#) for more information.

Sort By: ▼

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	2.525M	175.00K
COUNTYWIDE	LUCAS CO.	IA	06/25/2000	19:00	CST	Flash Flood		0	0	200.00K	50.00K
LUCAS	LUCAS CO.	IA	05/07/2007	01:45	CST-6	Flash Flood		0	0	75.00K	0.00K
CHARITON	LUCAS CO.	IA	07/28/2008	00:15	CST-6	Flash Flood		0	0	25.00K	0.00K
DERBY	LUCAS CO.	IA	09/12/2008	21:03	CST-6	Flash Flood		0	0	100.00K	0.00K
CHARITON	LUCAS CO.	IA	07/07/2010	17:20	CST-6	Flash Flood		0	0	50.00K	0.00K
CHARITON	LUCAS CO.	IA	07/07/2010	18:09	CST-6	Flash Flood		0	0	100.00K	0.00K
CHARITON	LUCAS CO.	IA	07/07/2010	18:33	CST-6	Flash Flood		0	0	250.00K	0.00K
CHARITON	LUCAS CO.	IA	07/07/2010	19:10	CST-6	Flash Flood		0	0	250.00K	0.00K
CHARITON	LUCAS CO.	IA	07/20/2010	02:34	CST-6	Flash Flood		0	0	1.000M	100.00K
RUSSELL	LUCAS CO.	IA	05/28/2013	18:11	CST-6	Flash Flood		0	0	50.00K	0.00K
RUSSELL	LUCAS CO.	IA	05/28/2013	21:00	CST-6	Flash Flood		0	0	50.00K	0.00K
WILLIAMSON	LUCAS CO.	IA	05/28/2013	21:25	CST-6	Flash Flood		0	0	50.00K	0.00K
CHARITON	LUCAS CO.	IA	07/21/2013	12:40	CST-6	Flash Flood		0	0	250.00K	0.00K
WILLIAMSON	LUCAS CO.	IA	08/23/2014	06:00	CST-6	Flash Flood		0	0	25.00K	0.00K
LUCAS	LUCAS CO.	IA	09/10/2014	04:00	CST-6	Flash Flood		0	0	50.00K	25.00K
Totals:								0	0	2.525M	175.00K

<http://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Flash+Flood...> 2/17/2016

National Centers for Environmental Information

Storm Events Database

Search Results for Lucas County, Iowa

Event Types: Drought

Lucas county contains the following zones:

'Lucas'

10 events were reported between 01/01/1950 and 12/31/2015 (24106 days)

Summary Info:

Number of County/Zone areas affected:	1
Number of Days with Event:	10
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	1
Number of Days with Event and Crop Damage:	7
Number of Event Types reported:	1

Column Definitions:

'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Click on **Location** below to display details.

Available Event Types have changed over time. Please refer to the [Database Details](#) for more information.

Sort By: ▼

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	12.650M	97.650M
LUCAS (ZONE)	LUCAS (ZONE)	IA	07/20/1999	12:00	CST	Drought		0	0	0.00K	4.580M
LUCAS (ZONE)	LUCAS (ZONE)	IA	08/14/2000	00:00	CST	Drought		0	0	0.00K	4.690M
LUCAS (ZONE)	LUCAS (ZONE)	IA	09/01/2000	00:00	CST	Drought		0	0	0.00K	5.030M
LUCAS (ZONE)	LUCAS (ZONE)	IA	08/01/2001	00:00	CST	Drought		0	0	0.00K	11.350M
LUCAS (ZONE)	LUCAS (ZONE)	IA	08/01/2003	00:00	CST	Drought		0	0	12.650M	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	07/01/2012	00:00	CST-6	Drought		0	0	0.00K	45.000M
LUCAS (ZONE)	LUCAS (ZONE)	IA	08/01/2012	00:00	CST-6	Drought		0	0	0.00K	6.000M
LUCAS (ZONE)	LUCAS (ZONE)	IA	09/01/2012	00:00	CST-6	Drought		0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	10/01/2012	00:00	CST-6	Drought		0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	08/01/2013	00:00	CST-6	Drought		0	0	0.00K	21.000M
Totals:								0	0	12.650M	97.650M

National Centers for Environmental Information

Storm Events Database

Search Results for Lucas County, Iowa

Event Types: Winter Storm

Lucas county contains the following zones:

'Lucas'

12 events were reported between 01/01/1950 and 12/31/2015 (24106 days)

Summary Info:

Number of County/Zone areas affected:	1
Number of Days with Event:	12
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	9
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	1

Column Definitions:

'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Click on **Location** below to display details.

Available Event Types have changed over time. Please refer to the [Database Details](#) for more information.

Sort By: ▼

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	209.90K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	01/01/1999	15:00	CST	Winter Storm		0	0	10.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	03/08/1999	00:00	CST	Winter Storm		0	0	10.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	12/10/2000	21:00	CST	Winter Storm		0	0	24.90K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	02/08/2001	23:00	CST	Winter Storm		0	0	50.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	02/14/2003	11:00	CST	Winter Storm		0	0	5.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	02/12/2007	22:30	CST-6	Winter Storm		0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	12/22/2007	12:00	CST-6	Winter Storm		0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	02/05/2008	11:00	CST-6	Winter Storm		0	0	10.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	01/06/2010	13:00	CST-6	Winter Storm		0	0	25.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	01/29/2013	22:00	CST-6	Winter Storm		0	0	25.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	02/04/2014	12:00	CST-6	Winter Storm		0	0	0.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	02/01/2015	00:00	CST-6	Winter Storm		0	0	50.00K	0.00K
Totals:								0	0	209.90K	0.00K

National Centers for Environmental Information

Storm Events Database

Search Results for Lucas County, Iowa

Event Types: Lightning

2 events were reported between 01/01/1950 and 12/31/2015 (24106 days)

Summary Info:

Number of County/Zone areas affected:	1
Number of Days with Event:	2
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	2
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	1

Column Definitions:

'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Click on **Location** below to display details.

Available Event Types have changed over time. Please refer to the [Database Details](#) for more information.

Sort By: ▼

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	18.00K	0.00K
CHARITON	LUCAS CO.	IA	09/02/1996	08:30	CST	Lightning		0	0	3.00K	0.00K
CHARITON	LUCAS CO.	IA	05/24/2011	14:10	CST-6	Lightning		0	0	15.00K	0.00K
Totals:								0	0	18.00K	0.00K

National Centers for Environmental Information

Storm Events Database

Search Results for Lucas County, Iowa

Event Types: Wildfire

Lucas county contains the following zones:

'Lucas'

0 events were reported between 01/01/1950 and 12/31/2015 (24106 days)

Summary Info:

Number of County/Zone areas affected:	0
Number of Days with Event:	0
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	0
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	0

Column Definitions:

'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Click on **Location** below to display details.

Available Event Types have changed over time. Please refer to the [Database Details](#) for more information.

Sort By: ▾

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	0.00K	0.00K

National Centers for Environmental Information

Storm Events Database

Search Results for Lucas County, Iowa

Event Types: Hail

62 events were reported between 01/01/1950 and 12/31/2015 (24106 days)

Summary Info:

Number of County/Zone areas affected:	1
Number of Days with Event:	33
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	1
Number of Days with Event and Property Damage:	17
Number of Days with Event and Crop Damage:	17
Number of Event Types reported:	1

Column Definitions:

'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Click on **Location** below to display details.

Available Event Types have changed over time. Please refer to the [Database Details](#) for more information.

Select:

Sort By:

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	2	448.00K	378.00K
LUCAS CO.	LUCAS CO.	IA	06/23/1973	22:30	CST	Hail	1.75 in.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	04/13/1981	17:45	CST	Hail	1.75 in.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	04/28/1981	07:15	CST	Hail	1.75 in.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	09/13/1982	15:05	CST	Hail	1.00 in.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	09/13/1982	15:30	CST	Hail	1.00 in.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	05/31/1987	17:10	CST	Hail	0.75 in.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	05/08/1988	12:10	CST	Hail	1.75 in.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	05/14/1991	07:25	CST	Hail	1.75 in.	0	0	0.00K	0.00K
LUCAS CO.	LUCAS CO.	IA	04/10/1992	18:23	CST	Hail	1.75 in.	0	0	0.00K	0.00K
Chariton	LUCAS CO.	IA	06/11/1994	18:00	CST	Hail	1.75 in.	0	2	50.00K	50.00K
Derby	LUCAS CO.	IA	06/11/1994	18:20	CST	Hail	1.50 in.	0	0	50.00K	50.00K
Russell	LUCAS CO.	IA	06/11/1994	18:30	CST	Hail	1.75 in.	0	0	50.00K	50.00K
CHARITON	LUCAS CO.	IA	06/05/1997	16:45	CST	Hail	1.00 in.	0	0	1.00K	10.00K
CHARITON	LUCAS CO.	IA	03/30/1998	16:18	CST	Hail	0.75 in.	0	0	0.00K	0.00K
CHARITON	LUCAS CO.	IA	06/04/1999	12:05	CST	Hail	0.88 in.	0	0	1.00K	5.00K
CHARITON	LUCAS CO.	IA	06/04/1999	12:20	CST	Hail	2.00 in.	0	0	25.00K	5.00K
CHARITON	LUCAS CO.	IA	06/04/1999	12:20	CST	Hail	0.75 in.	0	0	0.00K	5.00K
CHARITON	LUCAS CO.	IA	06/04/1999	12:24	CST	Hail	1.50 in.	0	0	5.00K	5.00K
CHARITON	LUCAS CO.	IA	06/04/1999	12:25	CST	Hail	0.75 in.	0	0	0.00K	2.00K
CHARITON	LUCAS CO.	IA	06/04/1999	12:40	CST	Hail	0.75 in.	0	0	0.00K	5.00K
LUCAS	LUCAS CO.	IA	06/13/2000	11:30	CST	Hail	0.88 in.	0	0	1.00K	5.00K
CHARITON	LUCAS CO.	IA	08/06/2000	14:00	CST	Hail	1.00 in.	0	0	5.00K	5.00K
LUCAS	LUCAS CO.	IA	10/22/2001	14:50	CST	Hail	1.00 in.	0	0	5.00K	5.00K
CHARITON	LUCAS CO.	IA	10/22/2001	15:00	CST	Hail	1.75 in.	0	0	25.00K	5.00K
CHARITON	LUCAS CO.	IA	10/22/2001	15:00	CST	Hail	0.88 in.	0	0	5.00K	5.00K
CHARITON	LUCAS CO.	IA	10/22/2001	15:01	CST	Hail	1.75 in.	0	0	25.00K	5.00K
RUSSELL	LUCAS CO.	IA	10/22/2001	15:01	CST	Hail	2.50 in.	0	0	40.00K	15.00K
RUSSELL	LUCAS CO.	IA	10/22/2001	15:01	CST	Hail	0.75 in.	0	0	0.00K	5.00K
RUSSELL	LUCAS CO.	IA	10/22/2001	15:01	CST	Hail	0.88 in.	0	0	3.00K	5.00K
CHARITON	LUCAS CO.	IA	10/22/2001	15:02	CST	Hail	0.75 in.	0	0	0.00K	5.00K

RUSSELL	LUCAS CO.	IA	10/22/2001	15:02	CST	Hail	0.75 in.	0	0	0.00K	5.00K
CHARITON	LUCAS CO.	IA	10/22/2001	15:04	CST	Hail	0.75 in.	0	0	0.00K	5.00K
RUSSELL	LUCAS CO.	IA	10/22/2001	15:06	CST	Hail	1.75 in.	0	0	10.00K	5.00K
RUSSELL	LUCAS CO.	IA	10/22/2001	15:07	CST	Hail	1.75 in.	0	0	10.00K	5.00K
RUSSELL	LUCAS CO.	IA	05/08/2002	19:18	CST	Hail	0.88 in.	0	0	2.00K	1.00K
DERBY	LUCAS CO.	IA	06/01/2002	21:42	CST	Hail	1.00 in.	0	0	5.00K	5.00K
DERBY	LUCAS CO.	IA	06/01/2002	21:55	CST	Hail	1.00 in.	0	0	5.00K	5.00K
CHARITON	LUCAS CO.	IA	05/20/2004	17:38	CST	Hail	0.75 in.	0	0	0.00K	5.00K
WILLIAMSON	LUCAS CO.	IA	08/27/2004	18:30	CST	Hail	0.75 in.	0	0	0.00K	5.00K
LUCAS	LUCAS CO.	IA	03/30/2006	21:18	CST	Hail	1.50 in.	0	0	5.00K	0.00K
LUCAS	LUCAS CO.	IA	07/02/2006	19:10	CST	Hail	1.00 in.	0	0	2.00K	5.00K
CHARITON	LUCAS CO.	IA	06/19/2008	11:56	CST-6	Hail	1.00 in.	0	0	3.00K	10.00K
CHARITON	LUCAS CO.	IA	06/19/2008	11:57	CST-6	Hail	0.88 in.	0	0	1.00K	5.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	06/19/2008	11:58	CST-6	Hail	0.88 in.	0	0	1.00K	5.00K
CHARITON	LUCAS CO.	IA	06/19/2008	11:58	CST-6	Hail	1.00 in.	0	0	3.00K	5.00K
CHARITON	LUCAS CO.	IA	06/19/2008	11:59	CST-6	Hail	1.00 in.	0	0	3.00K	5.00K
LUCAS	LUCAS CO.	IA	07/27/2008	16:44	CST-6	Hail	0.88 in.	0	0	0.00K	10.00K
RUSSELL	LUCAS CO.	IA	07/27/2008	19:53	CST-6	Hail	1.00 in.	0	0	3.00K	10.00K
CHARITON	LUCAS CO.	IA	12/27/2008	03:03	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
CHARITON	LUCAS CO.	IA	06/18/2009	00:01	CST-6	Hail	1.00 in.	0	0	2.00K	5.00K
CHARITON	LUCAS CO.	IA	07/23/2009	04:22	CST-6	Hail	0.75 in.	0	0	0.00K	5.00K
LUCAS	LUCAS CO.	IA	04/03/2011	22:22	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
CHARITON	LUCAS CO.	IA	06/26/2011	16:25	CST-6	Hail	1.00 in.	0	0	1.00K	10.00K
DERBY	LUCAS CO.	IA	06/26/2011	17:04	CST-6	Hail	0.88 in.	0	0	0.00K	5.00K
LUCAS	LUCAS CO.	IA	04/14/2012	19:21	CST-6	Hail	1.75 in.	0	0	25.00K	0.00K
CHARITON	LUCAS CO.	IA	04/14/2012	19:29	CST-6	Hail	1.00 in.	0	0	50.00K	0.00K
CHARITON MUNI ARPT	LUCAS CO.	IA	05/28/2013	15:00	CST-6	Hail	0.75 in.	0	0	0.00K	5.00K
LUCAS	LUCAS CO.	IA	05/28/2013	15:00	CST-6	Hail	0.88 in.	0	0	0.00K	5.00K
LUCAS	LUCAS CO.	IA	04/12/2014	22:11	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
CHARITON	LUCAS CO.	IA	04/12/2014	22:13	CST-6	Hail	1.00 in.	0	0	1.00K	0.00K
RUSSELL	LUCAS CO.	IA	04/09/2015	13:10	CST-6	Hail	1.25 in.	0	0	25.00K	0.00K
LUCAS	LUCAS CO.	IA	08/02/2015	18:00	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
Totals:								0	2	448.00K	378.00K

National Centers for Environmental Information

Storm Events Database

Search Results for Lucas County, Iowa

Event Types: **Excessive Heat**

Lucas county contains the following zones:
'Lucas'

1 events were reported between 01/01/1950 and 12/31/2015 (24106 days)

Summary Info:

Number of County/Zone areas affected:	1
Number of Days with Event:	1
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	1
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	1

Column Definitions:

'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Click on **Location** below to display details.

Available Event Types have changed over time. Please refer to the [Database Details](#) for more information.

Sort By: ▾

<u>Location</u>	<u>County/Zone</u>	<u>St.</u>	<u>Date</u>	<u>Time</u>	<u>T.Z.</u>	<u>Type</u>	<u>Mag</u>	<u>Dth</u>	<u>Inj</u>	<u>PrD</u>	<u>CrD</u>
Totals:								0	0	135.00K	0.00K
LUCAS (ZONE)	LUCAS (ZONE)	IA	07/15/2011	18:00	CST-6	Excessive Heat		0	0	135.00K	0.00K
Totals:								0	0	135.00K	0.00K

Appendix 12: Modified Mercalli Scale for Earthquake Intensity

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

Source: Iowa Department of Natural Resources, Geological Survey. Modified Mercalli Intensity Scale from National Earthquake Information Center. <<http://www.igsb.uiowa.edu/Browse/earthqua/MERCALLI.HTM>>.

Appendix 13: Alternate Facilities Valuation Estimate Tools

Average Building Replacement Value per Square Foot

Occupancy Class	Total \$/sq. ft.
Single Family Dwelling	77
Mobile Home	52
Multi-family Dwelling	98
Temporary Lodging	102
Institutional Dormitory	98
Nursing Home	89
Retail Trade	67
Wholesale Trade	53
Personal/Repair Services	92
Professional/Tech. Services	87
Banks	151
Hospital	145
Medical Office/Clinic	112
Entertainment & Recreation	131
Theaters	98
Parking	30
Heavy Industrial	69
Light Industrial	69
Food/Drugs/Chemicals	69
Metals/Minerals Processing	69
High Technology	69
Construction	69
Agriculture	26
Church/Non-Profit Offices	113
General Services	88
Emergency Response	130
Schools	91
Colleges/Universities	115

Source: HAZUS

Contents Value as Percentage of Building Replacement Value

Occupancy Class	Contents Value (%)
Residential (including temporary lodging, dormitory, and nursing homes)	50
Commercial (including retail, wholesale, professional, services, financial, entertainment & recreation)	100
Commercial (including hospital and medical office/clinic)	150
Commercial Parking	50
Industrial (including heavy, light, technology)	150
Industrial Construction	100
Agriculture	100
Religion/Non-Profit	100
Government Emergency Response	150
Government General Services	100
Education Schools/Libraries	100
Education Colleges/Universities	150

Source: HAZUS

Example 1

To find the annual sales from a 15,000 square foot grocery store, you would multiply the structure size by \$30 per square foot (from the table at right).

$$15,000 \times \$30$$

The annual sales would be \$450,000.

Example 2

If a public library will be lost for three months due to damage from a 100-year flood, you could determine the damages from the loss of function by multiplying the monthly budget of the library (overhead, rent, staff salaries, etc.) by three months.



Annual Gross Sales or Production (Dollars per Square Foot)

Occupancy Class	Annual Sales (\$ / ft ²)
Commercial	
Retail Trade	30
Wholesale Trade	43
Industrial	
Heavy	400
Light	127
Food/Drugs/Chemicals	391
Metals/Minerals Processing	368
High Technology	245
Construction	431
Agriculture	
Agriculture	83

Source: HAZUS

Appendix 14: History of Iowa Earthquakes



Appendix 15: TORRO Hailstorm Intensity Scale

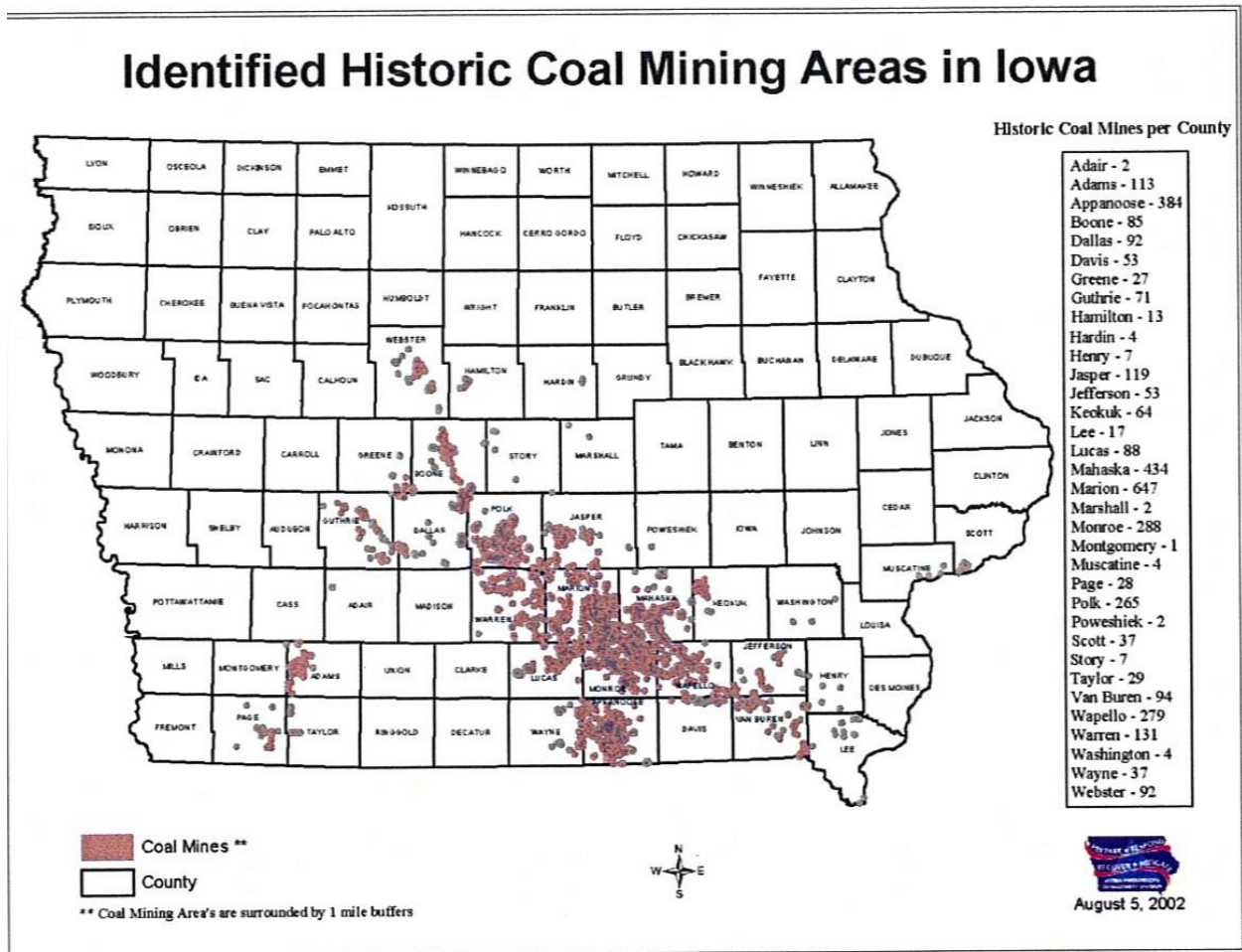
	Intensity Category	Typical Hail Diameter (mm)*	Probable Kinetic Energy, J-m ²	Typical Damage Impacts
H0	Hard Hail	5	0-20	No damage
H1	Potentially Damaging	10- 15	>20	Slight general damage to plants, crops
H2	Significant	10- 20	>100	Significant damage to fruit, crops, vegetation
H3	Severe	20- 30	>300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

* Approximate range (typical maximum size in bold), since other factors (e.g. number and density of hailstones, hail fall speed and surface wind speeds) affect severity.

Maximum Diameter (mm)	Description
5-9	Pea
10-15	Mothball
16-20	Marble, grape
21-30	Walnut
31-40	Pigeon's egg > squash ball
41-50	Golf ball > Pullet's egg
51-60	Hen's egg
61-75	Tennis ball > cricket ball
76-90	Large orange > Soft ball
91-100	Grapefruit
>100	Melon

Source: FEMA and Tornado and Storm Research Organization
(<http://www.torro.org.uk/TORRO/severeweather/hailscale.php>)

Appendix 16: Coal Mining Locations



The screenshot displays the Iowa Coal Mines web application interface. At the top, the browser address bar shows the URL <http://programs.iowadnr.gov/maps/coalmine/>. The page title is "Iowa Coal Mines". On the right side, there is a navigation menu with options: "Add maps", "Full Extent", "Previous Extent", "Next Extent", "Measure", and "Help". Below the menu is the "DNR" logo. The main map area shows an aerial photograph of Lucas County, Iowa, with several coal mine locations marked. The legend on the left side of the map lists the following symbols and descriptions:

- Coal Mine Entrances**
 - Air shaft
 - Escape shaft
 - Holding shaft
 - Slope shaft
- Coal Mines (point locations)**
 - Point location, 1/4 section
 - Point location, w/in section
- Coal Mines (brown approx. extent)**
 - Surveyed map, known locn and extent
 - No map, approx. extent, known locn
 - Surveyed map, locn known to section, known extent
- Surface mine**
- Unknown**

The base map is identified as "Aerial Photography". The map shows several mines with labels: "Elms Creek company mine", "Blakeney Shaft", "Ekin coal company", "Shampain mine", "Munson mine", "Kearney mine", "Williamson Shaft", "Candlones", "John W. Wilson mine", "Williamson & Brothers coal", and "McKerret's coal Co.". A scale bar at the bottom left indicates 0%, 50%, and 100% zoom levels. The system tray at the bottom right shows the date and time: "1:51 PM 8/12/2015".

<http://programs.iowadnr.gov/maps/coalmines/>

Iowa Coal Mines

Basemaps ▾

Legend

Coal Mines

- Coal Mine Entrances
 - Air shaft
 - Escape shaft
 - Hoisting shaft
 - Slope, adit
- Coal mines (point locations)
 - Point location, 1/4 section
 - Point location, w/in section
- Coal mines (known approx. extent)
 - Surveyed map, known lech and extent
 - No map, approx. extent, known lech
 - Surveyed map, lech known to section, known extent
 - Surface mine
 - Unknown

Base map: Aerial Photography

Scale: 0% 50% 100%
Solid Transparent

1:51 PM
8/12/2015

Iowa Coal Mines

Address
Enter an address
Derby, Iowa
Locate...

Legend
Locate...

Derby, Iowa, United States

0% 50% 100%
Solid Transparent

1:54 PM
8/7/2015

Iowa Coal Mines

Legend

Locate...

Address

Enter an address

Russell, Iowa

Locate

Ter, range, section

Full Extent

Previous Extent

Next Extent

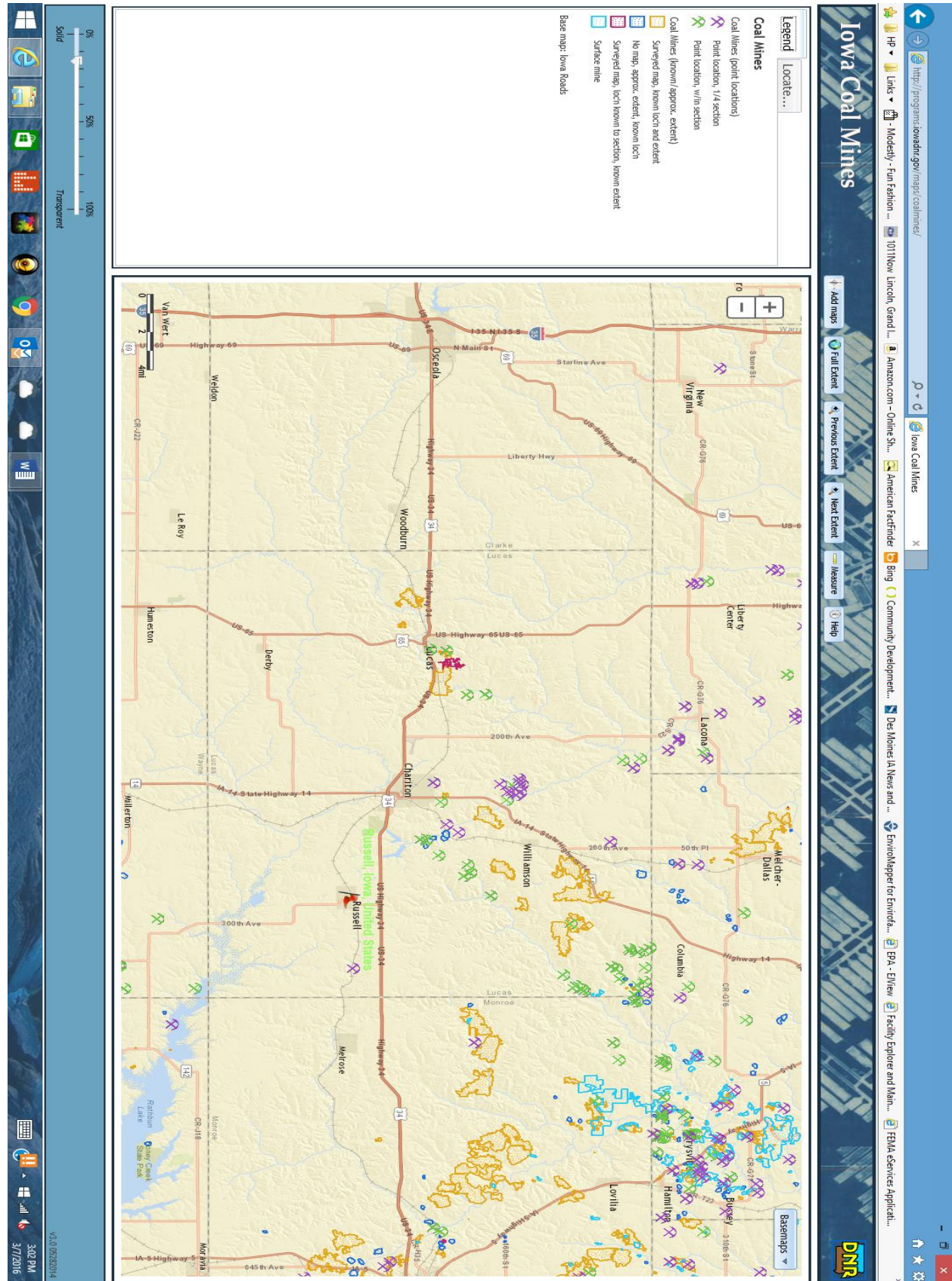
Measure

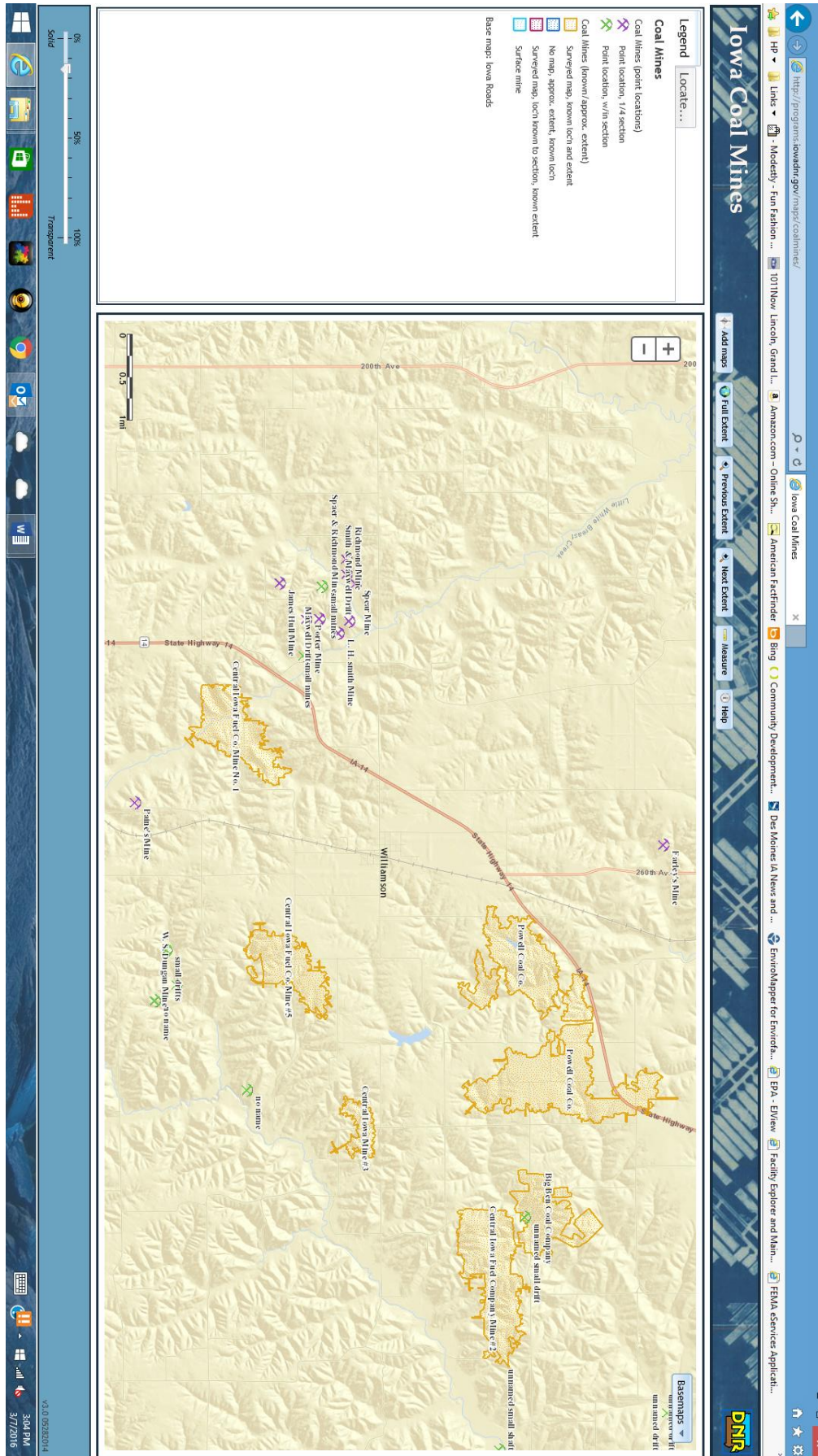
Help

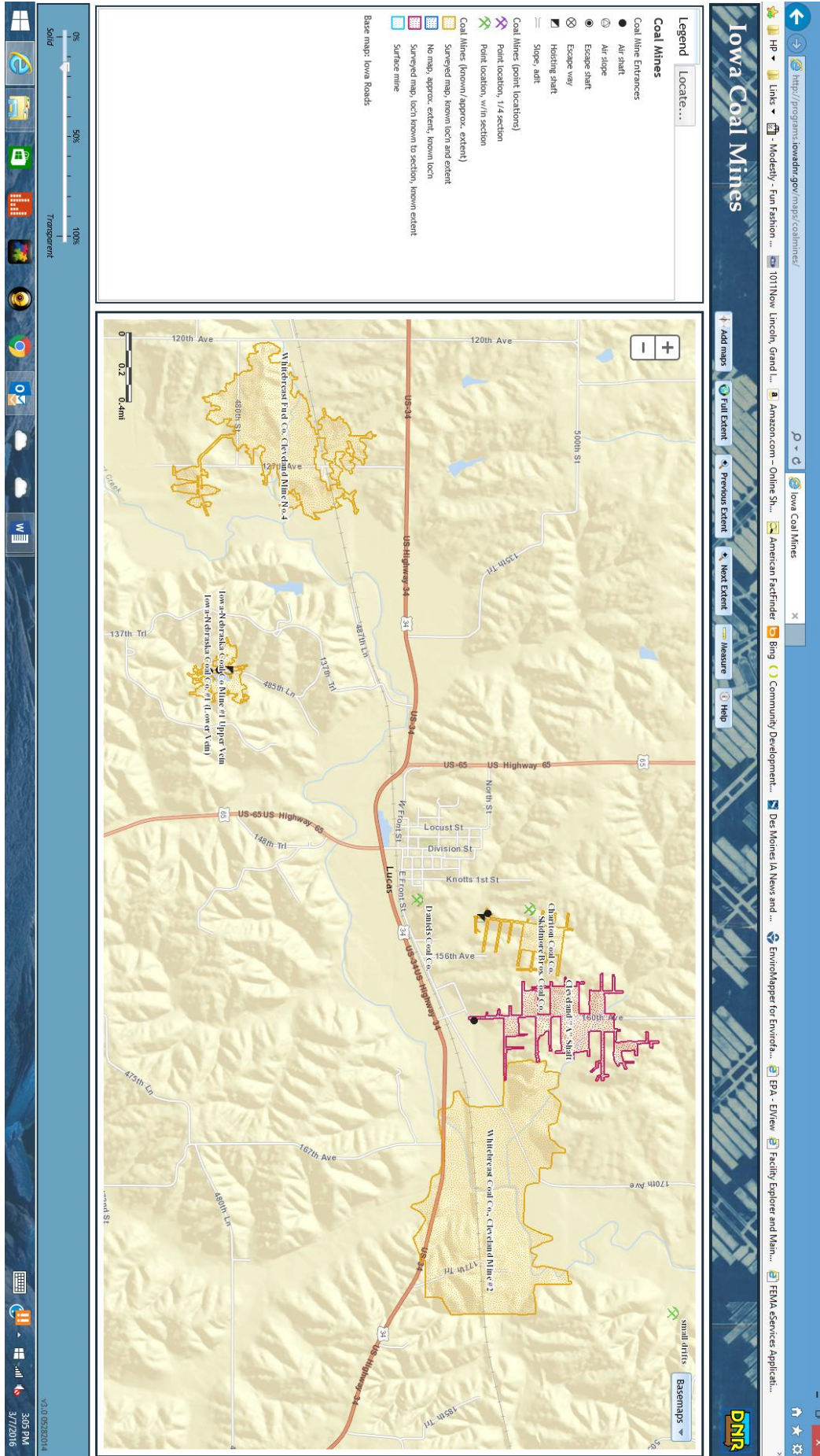
Russell, Iowa, United States

Basemaps

1:55 PM 8/12/2015













Appendix 17: Enhanced Fujita Parameters and Damage Details

Source: Wikipedia, retrieved June 24, 2009 (www.wikipedia.org)

Parameters

The six categories for the EF Scale are listed below, in order of increasing intensity. Although the wind speeds and photographic damage examples are updated, the damage descriptions given are those from the Fujita scale, which are more or less still accurate. However, for the actual EF scale in practice, one must look up the damage indicator (the type of structure which has been damaged) and consult the degrees of damage associated for that particular indicator.

Scale	Wind speed		Relative frequency	Potential damage	
	mph	km/h			
EF0	65–85	105–137	53.5%	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed Tornadoes with no reported damage (i.e. those that remain in open fields) are always rated EF0.	
EF1	86–110	138–178	31.6%	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.	
EF2	111–135	179–218	10.7%	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.	
EF3	136–165	219–266	3.4%	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.	

EF4	166– 200	267– 322	0.7%	<p>Devastating damage.</p> <p>Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.</p>	
EF5	>200	>322	<0.1%	<p>Exploding damage.</p> <p>Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (300 ft); steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation; incredible phenomena will occur.</p> <p>So far there have been two EF5 Tornadoes recorded since the Enhanced Fujita Scale was introduced on February 1, 2007. The most recent one occurred in Parkersburg, Iowa on May 25, 2008 and leveled half the city.</p>	

Damage Indicators and Degrees of Damage

The EF Scale currently has 28 Damage Indicators (DI), or types of structures and vegetation, with a varying number of Degrees of Damage (DOD) for each.

DI No.	Damage Indicator (DI)	Degrees of Damage (DOD)
1	Small Barns or Farm Outbuildings (SBO)	<u>8</u>
2	One- or Two-Family Residences (FR12)	<u>10</u>
3	Manufactured Home – Single Wide (MHSW)	<u>9</u>
4	Manufactured Home – Double Wide (MHDW)	<u>12</u>
5	Apartments, Condos, Townhouses [3 stories or less] (ACT)	<u>6</u>
6	Motel (M)	<u>10</u>
7	Masonry Apartment or Motel Building (MAM)	<u>7</u>
8	Small Retail Building [Fast Food Restaurants] (SRB)	<u>8</u>
9	Small Professional Building [Doctor’s Office, Branch Banks] (SPB)	<u>9</u>

10	Strip Mall (SM)	<u>9</u>
11	Large Shopping Mall (LSM)	<u>9</u>
12	Large, Isolated Retail Building [K-Mart, Wal-Mart] (LIRB)	<u>7</u>
13	Automobile Showroom (ASR)	<u>8</u>
14	Automobile Service Building (ASB)	<u>8</u>
15	Elementary School [Single Story; Interior or Exterior Hallways] (ES)	<u>10</u>
16	Junior or Senior High School (JHSH)	<u>11</u>
17	Low-Rise Building [1–4 Stories] (LRB)	<u>7</u>
18	Mid-Rise Building [5–20 Stories] (MRB)	<u>10</u>
19	High-Rise Building [More than 20 Stories] (HRB)	<u>10</u>
20	Institutional Building [Hospital, Government or University Building] (IB)	<u>11</u>
21	Metal Building System (MBS)	<u>8</u>
22	Service Station Canopy (SSC)	<u>6</u>
23	Warehouse Building [Tilt-up Walls or Heavy-Timber Construction] (WHB)	<u>7</u>
24	Electrical Transmission Lines (ETL)	<u>6</u>
25	Free-Standing Towers (FST)	<u>3</u>
26	Free-Standing Light Poles, Luminary Poles, Flag Poles (FSP)	<u>3</u>
27	Trees: Hardwood (TH)	<u>5</u>
28	Trees: Softwood (TS)	<u>5</u>

Appendix 18: Meeting Notes, Minutes, & Attendance

Hazard Mitigation Planning

Hazard Planning Before a Disaster

Lucas County LEPC & Mitigation Planning

Tuesday, September 09, 2014 at 4:00 PM
Lucas County Health Center,
1200 North 7th Street,
Chariton, Iowa

Mitigation planning is the process of determining what hazards are present or what disasters can potentially influence a community. Actions (mitigation measures) are identified to reduce or eliminate the impact of disasters and emergency situations in the area. Once the hazards are identified and critical facilities, the county and communities are able to apply for possible grant funding through FEMA and state funding sources to reduce or remove the impact of these hazards on the area.



Lucas Co. LEPC - AGENDA
Appanoose-Davis-Lucas-Monroe Counties

Emergency Management Agency (ADLM-EMA)
12307 Hwy. 5, P.O. Box 399
Moravia, IA 52571

Friday September 5th, 2014 4:00 pm
Lucas County Health Center Education Room

Proposed Agenda:

1. Call meeting to order
2. Approve agenda
3. Approve minutes of last meeting – June 10th, 2014
4. Old business
 - a. HMEP additional moneys for an electric vehicle extrication course approved. Scheduled September 25th 6pm at the Chariton Fire Department.
5. New Business:
 - a. ADLM Emergency Management staffing changes.
 - b. Available upcoming training:
 1. Hazardous Materials Symposium October 23-24 Ames IA.
 2. Iowa Homeland Security Conference. October 21-22 DSM.
 - c. Lucas County Multi-Jurisdictional Hazard Mitigation Plan update session with Chariton Valley Planning and Development.
 - d. Open Discussion
6. Member Update, Critical Infrastructure:
7. Set date and time of next meeting. **October 14th 4:00 pm**
8. Adjourn

The above agenda was prepared by the ADLM-EMA Coordinator Mike Lamb.

Lucas County LEPC
 Appanoose Davis Lucas Monroe Counties
 Emergency Management Agency
 12307 Highway 5, P.O. Box 399, Moravia, Iowa 52571

Minutes – September 9th 2014 Meeting

TO: All members of the Lucas County Local Emergency Management Planning Committee (LEPC)

SUBJECT: Lucas County LEPC Meeting Minutes

A meeting of the Lucas County LEPC was scheduled on Tuesday September 9th 2014 at Lucas County Health Center, Education Room, at 4:00 pm

I. The following LEPC membership was in attendance:

- | | |
|-------------------|--------------------|
| 1. Mike Lamb | ADLM-EMA |
| 2. Mark McCurdy | Disaster Planner |
| 3. Larry Davis | Lucas Co. BOS |
| 4. Todde Folkerts | Lucas Co. Engineer |
| 5. Nichole Moore | CVPD |
| 6. Julie Pribyl | CPVD |
| 7. Earl Comstock | GESAC |

II. <> 4:00pm Mike Lamb called the meeting to order

<> Item #2 Approval of agenda

Motion made by McCurdy. Second by Davis. to approve the agenda. Motion carried all in favor. None opposed

<> Item #3 Approval of minutes of the June 10th meeting

Motion made by McCurdy. Second by Davis. Motion carried all in favor. None opposed

<> Item #4 Old Business:

- a. HMEP additional moneys for an electric vehicle extrication course approved. Scheduled September 25th 6pm at the Chariton Fire Department. (Event canceled due to conflict)

<> Item #5 New Business:

- a. ADLM EMA Staffing changes (Misty left employment)
- b. Available upcoming training:
 - Hazardous Materials Symposium October 23-24 Ames IA. (Mark)
 - Iowa Homeland Security Conference. October 21-22 DSM. (Mark)
- c. Lucas County Multi-Jurisdictional Hazard Mitigation Plan update session with Chariton Valley Planning and Development. (Nichole & Julie See Attachment #1 from CPDV for detailed minutes on discussion)
- d. Open Discussion. (None)

<> Item #6 Critical Infrastructure/Member Updates: none

<> Item # Next meeting October 14th 4:00pm Lucas County Health Center, Education Room.

Motion by Davis. 2nd by McCurdy. All in favor. Meeting adjourned.

The minutes of the Lucas County LEPC meeting prepared by Mike L, ADLM EMA Coordinator

Attachment #1 CPDV

HMP – Kick off Meeting Minutes – Lucas County 2014

Information was shared about what hazard mitigation planning is and why it is important to the region. Chariton Valley Planning & Development Council of Governments (CVPD) staff held a “kickoff session” at the September LEPC committee meeting for the work to begin on the Lucas County Hazard Mitigation Plan update. The approved plan is reviewed by the county annually and an official update is required every five years. The original plan was developed and reviewed by both Iowa Homeland Security and FEMA during that process. FEMA approved the plan in 2011 and notes the required update must be completed and approved by 2016. It was emphasized that participation by all jurisdictions is critical in order to have a comprehensive plan and to have communities eligible for disaster funding. It was explained that some of the requirements in the document have changed and therefore much of the initial planning work will need to be completed again.

Information was shared about what hazard mitigation planning is and why it is important to the region. Nichole Moore and Julie Pribyl with CVPD provided numerous handouts to refresh all participants as to the importance of this plan to the jurisdictions in the region. Discussions included: “What is Hazard Mitigation Planning?”; the current “Goals & Objectives” of the plan; previous participating jurisdictions and potential new participants (possibly include the Lucas County Conservation Board, Iowa DNR, and county fair board regarding the fairgrounds along with City of Williamson); it was asked for any other additional participants to be identified and brought to the next meeting. The condensed 23 hazards identified in the 2010 State of Iowa Plan versus the 40+ potential hazards from the previous planning session; 2010 Lucas County hazard rankings and the corresponding mitigation strategies. Members had the opportunity to ask questions about the process and their required involvement. CVPD distributed electronic versions of the current plan for members to review before the next working session in October. Committee members were provided with a schedule of the monthly working sessions through December and were also provided with a flyer announcing a regional HMP planning meeting on October 29, 2014 at 6:30pm at ADLM. It was encouraged to share any/all information with citizens to emphasize that every meeting is intended for all members of the public to participate in the planning process.

Lucas County LEPC
updated 2013

9-9-2014

Organization	Position	Name	Signature	Phone	Email
Lucas County	County				
Elected Official	Bd of Supervisors	Steve Laing		641-203-0398	supervisors@lucasco.org
Emergency Mgmt	Coordinator	Mike Lamb		641-724-3223/641-895-0407	admema@iowatelecom.net
Emergency-Mgmt	Planner	Misty-Rosenberg		641-724-3223	admema@iowatelecom.net
Law Enforcement	Sheriff	Brett Tharp		641-774-5083	tharpb@lucasco.org
LC Public Health	Public Health Nurse	Mary Grismore		641-774-4312	grismorem@lucasco.org
LC Public Health	Registered Nurse	Maxine Willardson		641-774-4312	willardsonm@lucasco.org
LC Health Center	Clinical Service Assistant	Jayma Hoch		641-774-3267	jhoch@lchcia.com
Lucas County Health	Disaster Planner	Mark McCurdy		641-203-1477	mmccurdy@cityofindianola.com
Lucas County Health	Ambulance Manager	Kendall Wood		641-774-3815	kwood@lchcia.com
Environmental Health	Env. Pub. Health Dir.	Dianna Daly-Husted		641-724-3511/777-7512	Dhusted@adimcounties.com
ADLM Emergency Mgmt	Env. Pub. Health Officer	Leo Adams		641-724-3511	ladams@adimcounties.com
Chariton					
Law Enforcement	Police Chief	Jeff Johnson			
Law Enforcement	Police Officer				
City Manager	City of Chariton			641-774-5991	citymanager@iowatelecom.net
Fire Fighting	Fire Chief	Barry Smith		641-203-0774	bsmith@jimworks.com
Russell					
Fire Fighting	Fire Chief	Craig Alexander		641-203-1386	ineer224@iowatelecom.net
Williamson					
Fire Fighting	Fire Chief				
Industry and Other Organizations or Individuals					
HVee Dist Center	Compliance Manager	John Laing		641-774-7608	l.laing@hv-vee.com
Chariton Christian Church	Reverend	C.J. Latham		641-774-2375	pastorci.lcc@gmail.com
GESAC	Rep	Earl Comstock			

DATE:

Organization	Position	Name	Signature	Phone	Email
C.V.P.D.	Ex Director	Michael Macey		411-437-4351	mmdore@charitonvalleyplanning.org
LUTC	Planner	Julie Hays		641-437-4359	jprby@charitonvalleyplanning.org
LUCAS CO SUP	Supervisor	Frank McLaughlin		641-774-3444	mcmccr@lucasco.org
LUCAS CO.	ENGINEER	Kenny Shivers		641-203-0810	Supervisor@lucasco.org
		TODD W. FOLKERTS		641-203-0309	folkertst@lucasco.org

Hazard Mitigation Planning

Hazard Planning Before a Disaster

Lucas County LEPC & Mitigation Planning

Tuesday, October 14, 2014 at 4:00 PM
Lucas County Health Center,
1200 North 7th Street
Chariton, Iowa 50049

Mitigation planning is the process of determining what hazards are present or what disasters can potentially influence a community. Actions (mitigation measures) are identified to reduce or eliminate the impact of disasters and emergency situations in the area. Once the hazards are identified and critical facilities, the county and communities are able to apply for possible grant funding through FEMA and state funding sources to reduce or remove the impact of these hazards on the area.



Lucas Co. LEPC - AGENDA
Appanoose-Davis-Lucas-Monroe Counties

Emergency Management Agency (ADLM-EMA)
12307 Hwy. 5, P.O. Box 399
Moravia, IA 52571

Friday October 14th, 2014 4:00 pm
Lucas County Health Center Education Room

Proposed Agenda:

1. Call meeting to order
2. Approve agenda
3. Approve minutes of last meeting – September 9th, 2014
4. Old business
 - a. ADLM Staffing change.
 - b. Available upcoming training:
 1. Hazardous Materials Symposium October 23-24 Ames IA. Grant Full
 2. Iowa Homeland Security Conference. October 21-22 DSM. Grant Full
5. New Business:
 - a. Lucas LEPC HMEP planning/training grant NOI acceptance.
 - b. Lucas County Multi-Jurisdictional Hazard Mitigation Plan update session with Chariton Valley Planning and Development. (Nichole & Julie)
 - c. Open Discussion
6. Member Update, Critical Infrastructure:
7. Set date and time of next meeting. **November 18th 4:00 pm**
8. Adjourn

The above agenda was prepared by the ADLM-EMA Coordinator Mike Lamb.

HMP work session plans: Risk Assessment & Scoring

1. Review the 23 hazards identified by the State of Iowa Hazard Mitigation Plan.
 - a. Use definitions to determine whether to include all hazards in the local plan.
 - b. Do we want to include all 23 hazards? Are there any additional hazards to include?
2. Complete the "Hazards by Jurisdiction" Chart.
 - a. Marked boxes indicated if the hazard was identified in the 2010 planning. Yellow boxes are the blank/vacant areas that the committee needs to consider if applies.
 - i. Can use historical data & state plan as additional resources to make decision.
3. Complete the Hazard Scoring chart using Hazard Analysis Risk Assessment guidelines. The scoring criteria is given on a separate form but there is also a summary caption on the side of the chart. Each form will be for a separate jurisdiction. Be sure to review the "Hazards by Jurisdiction" chart previously completed to make sure the hazards are included for the corresponding jurisdiction.

IF THERE'S TIME – Review the jurisdiction profiles from the approved plan. Is the information still accurate? Any new certifications by emergency personnel, emergency equipment purchased, disaster plans created/changed, etc.?

- NEXT STEPS:
1. Jurisdictions/community profile data review if not completed.
 2. Review existing Goals & Objectives for the HMP plan. Recommendations/Approval.
 3. Existing mitigation strategies for each jurisdiction. Are there changes, additions, and goals to achieve?

Lucas County LEPC

Appanoose Davis Lucas Monroe Counties
Emergency Management Agency
12307 Highway 5, P.O. Box 399, Moravia, Iowa 52571

Minutes – October 14th 2014 Meeting

TO: All members of the Lucas County Local Emergency Management Planning Committee (LEPC)

SUBJECT: Lucas County LEPC Meeting Minutes

A meeting of the Lucas County LEPC was scheduled on Tuesday October 14th 2014 at Lucas County Health Center, Education Room, at 4:00 pm

I. The following LEPC membership was in attendance:

- | | |
|------------------|-----------------------|
| 1. Mike Lamb | ADLM-EMA |
| 2. Mark McCurdy | LCHC Disaster Planner |
| 3. Jayma Hoch | LCHC |
| 4. Steve Davis | Chariton FD |
| 5. Nichole Moore | CVPD |
| 6. Julie Pribyl | CPVD |
| 7. Earl Comstock | GESAC |

II. <> 4:00pm Mike Lamb called the meeting to order

<> Item #2 Approval of agenda

Motion made by Hoch. Second by McCurdy. to approve the agenda. Motion carried all in favor. None opposed

<> Item #3 Approval of minutes of the June 10th meeting

Motion made by McCurdy. Second by Hoch. Motion carried all in favor. None opposed

<> Item #4 Old Business:

- a. ADLM planner resignation discussed and timeline for filling the position.
- b. HSEMD Conference and Haz-Mat symposium Grants full due to opening up to entire state rather than to individual counties first. Mike explained that he will argue against this practice next year so we have a better chance to send LEPC members.

<> Item #5 New Business:

- a. Lucas LEPC HMEP planning/training NOI acceptance discussed
- b. Lucas County Multi-Jurisdictional Hazard Mitigation Plan update session with Chariton Valley Planning and Development. (Nichole & Julie See Attachment #1 from CPDV for detailed minutes on discussion)
- c. Open Discussion. (None)

<> Item #6 Critical Infrastructure/Member Updates: McCurdy noted that RFD acquired a new 5 man rescue truck that is now in service.

<> Item # Next meeting November 18th 4:00pm Lucas County Health Center, Education Room.

Motion by Hoch. 2nd by McCurdy. All in favor. Meeting adjourned.

The minutes of the Lucas County LEPC meeting prepared by Mike L, ADLM EMA Coordinator

1

Attachment #1 CPDV

Lucas County LEPC / Hazard Mitigation Planning
October 14, 2014
4:00 PM

The committee members were provided with the definition of the current 23 hazards identified by the State of Iowa. It was explained that previously there were over 40 hazards included in the mitigation planning. Many of them are now combined and the "Hazard Definition" handout will clarify the new categories. Discussion was held regarding which hazards could impact Lucas County. Members quickly agreed that all 23 hazards need to be included in the overall local plan because each has the potential to affect any area of the region. Members then began to work on hazards by jurisdiction. Emergency Management director, Mike Lamb, led discussion about the potential that every jurisdiction could be impacted every type of disaster listed. Discussion among community representatives, the police & emergency personnel were able to provide historical information to illustrate how specific disaster have impacted the area. All members agreed that the seven Human Caused/Combination Hazards of Human Disease, Hazardous Materials, Transportation Incident, Infrastructure Failure, Terrorism, Radiological, & Animal/Plant/Crop Disease were applicable to every participating jurisdiction.

CVPD reviewed the 16 Natural Hazards that will be identified in the new update. Mark McCurdy from the City of Chariton pointed out that 13 natural hazards: Flash Flooding, Tornado, Windstorm, Extreme Heat, Hailstorm, Grass or Wild land fire, Sink Holes, Severe Winter Storm, Drought, Earthquake, Landslide, Expansion Soils, and Thunderstorm/Lightning effect every jurisdiction participating in the plan. Jayma Davis, representative from the Lucas County Health Center, made the motion to have all jurisdictions be affected by all 23 hazards. Mark McCurdy, Disaster Planner 2nd the motion. Members then agreed to with this approach but recognized the need to revisit the hazards with a limited impact area. Julie Pribyl of CVPD out that three of the hazards were really dependent on location to a jurisdiction – Levee Failure, Dam Failure, and River Flooding. Members discussed that River Flooding can indirectly affect all areas of the county transportation wise. It was recommended that the hazard of River Flooding could potentially affect the livelihood of any resident so it will be included in all jurisdiction hazards. It was also determined that the previous plan identified the following jurisdictions impact only the following locations:

Levee Failure: Unincorporated Lucas County, Chariton, Lucas, and Red Haw Lake

Dam Failure: Unincorporated Lucas County, Chariton, Lucas, and Red Haw Lake




Committee members reviewed information from the FEMA approved Lucas County Hazard Mitigation Plan for the 2 hazards above and agreed the same jurisdictions were affected. It was recommended that CVPD proceed with this information with the stipulation that each community will have opportunity to review and adjust the information before the final draft of the plan is complete. CVPD's Nichole Moore discussed each community must participate and all decisions regarding specific entities will be made by those specific jurisdictions. Community/jurisdiction representatives then were given a Hazard Risk Assessment Scoring chart. Each jurisdiction representative was then provided with a chart of the 23 hazards and the explained out to score each hazard by probability, severity/magnitude, warning time, and duration of any given event. Members worked individually to provide accurate data for each area. Questions by members were addressed on an individual basis. As participants finished the task, CVPD provided each community representative with the current jurisdiction profile that is the approved plan. Representatives were asked to take the profile home to share with other community members and make any appropriate changes, updates, and accomplishments of the entity.

Oct 14th 2014

**Lucas County LEPC
updated 2014**

Organization	Position	Name	Signature	Phone	Email
Lucas County	County				
Elected Official	Bd of Supervisors	Steve Laing		641-203-0398	supervisors@lucasco.org
Elected Official	Bd of Supervisors	Larry Davis		641-203-0810	supervisors@lucasco.org
Emergency Mgmt	Coordinator	Mike Lamb		641-724-3223/641-895-0407	admema@lowatelecom.net
Law Enforcement	Sheriff	Brett Tharp		641-774-5083	tharpb@lucasco.org
Lucas County Engineer	County Engineer	Todde Folkerts		641-203-0309	folkerts@lucasco.org
LC Public Health	Public Health Nurse	Mary Grismore		641-774-4312	grismorem@lucasco.org
LC Public Health	Registered Nurse	Maxine Willadson		641-774-4312	willadsonm@lucasco.org
LC Health Center	Clinical Service Assistant	Jayma Hoch		641-774-3267	jhoch@lchcia.com
Lucas County Health	Disaster Planner	Mark McCurdy		641-203-1477	mmmccurdy@cityofindianola.com
Lucas County Health	Ambulance Manager	Kendall Wood		641-774-3815	kwood@lchcia.com
Environmental Health	Env. Pub. Health Dir.	Dianna Daly-Husted		641-724-3511/777-7512	Dhusted@adimcounties.com
Environmental Health	Env. Pub. Health Officer	Sherry Lutz		641-724-3511	Slutz@adimcounties.com
Chariton					
Law Enforcement	Police Chief	Jeff Johnson			
Law Enforcement	Police Officer				
City Manager	City of Chariton			641-774-5991	citymanager@lowatelecom.net
Fire Fighting	Fire Chief	Barry Smith		641-203-0774	bsmith@jmwworks.com
Russell					
Fire Fighting	Fire Chief	Craig Alexander		641-203-1386	ineer224@lowatelecom.net
Williamson					
Fire Fighting	Fire Chief				
Industry and Other Organizations or Individuals					
HyVee Dist Center	Compliance Manager	John Laing		641-774-7608	jlaing@hy-vee.com
Chariton Christian Church	Reverend	C.J. Latham		641-774-2375	pastorci.ccc@gmail.com
GESAC	Rep	Earl Comstock			

Lucas County LEPC
updated 2014

Organization	Position	Name	Signature	Phone	Email
CVEF	Pr. Asst. Chief	Steve Davis		641-203-5292	sdcm@bfc@yahoo.com
CVFD	Co. Director	Ned Milzore		641-457-4859	nmilzore@firewell.org
CWA	Program Support	Judie Taylor		641-437-4339	judietaylor@lucaskyplanning.com

Hazard Mitigation Regional Meeting

October 29, 2014 6:30pm

This regional meeting was held for all jurisdictions and residents in Appanoose, Lucas, and Monroe Counties in Iowa. The purpose for this meeting was to educate the region on the importance of Hazard Mitigation Planning. Chariton Valley Planning & Development (CVPD) Council of Governments has been contracted by the counties to develop this document. This meeting was an opportunity for CVPD & ADLM Emergency Management to share information about the planning process and for the community representatives to have a chance to express needs/desires of a jurisdiction.

The meeting began at 6:30 PM with introductions and a few housekeeping items. Nichole Moore, with Chariton Valley Planning & Development, reviewed the agenda and began explaining what "Hazard Mitigation" is. Moore discussed how each of the three counties have a current FEMA approved Hazard Mitigation plan from 2010. The plan was originally developed to identify hazards this region could potentially face and how we can reduce the impact of each hazard. Respective county LEPC committees participated for two years to develop this plan. It is now a federal requirement to update the document and this process has recently begun with the LEPC committees in each county. The updating process will again take approximately two years until completion.

This plan is intended to be a working document that will assist communities and counties in preparation of a disaster. Moore continued to explain that this document is also essential for any jurisdiction to apply for disaster preparedness grant funds and/or disaster recovery funds after an event occurs. "This document is the cornerstone for disaster recovery" states Mike Lamb, ADLM Emergency Management Coordinator of all three counties. "When applying for any type of FEMA funding, the federal government will ask upfront if you have a Hazard Mitigation Plan, is this type of event identified and did the affected community participate in this plan?", Mike continued. Moore pointed out these are the exact reasons it is essential to have all communities participate in this process.

Mike Lamb explained there are different funding sources available to individuals, communities, and counties depending on the type of disaster. The distinct difference can be whether it is deemed a "proclamation or declaration". A disaster proclamation is deemed by the state after an event occurs and a declaration is declared by the President to release federal funds after an incident occurs. Jay Dillard of Centerville asked several questions on how can communities know that things are in order to ensure a limited impact, a quick recovery and know there is a recovery system developed. Lamb explained that each county has a "Disaster Recovery Plan" that details out the approach and partnerships with organizations to handle potential disasters. Julie Pribyl of Chariton Valley Planning explained that the plans have two separate intentions. The Disaster Recovery Plan deals with what occurs after the event happens, whereas, the Mitigation Planning is intended to identify the potential disasters and how we can lessen the impact of any event before it occurs. She gave the example of a city identifying the risk of river flooding on the edge of a community and therefore developing an ordinance that restricts individuals from building in this floodplain. Lamb invited all attendees to LEPC meetings to further discuss the Recovery Plans.

Moore continued to describe the updating process. Currently, information is being gathered by the participating residents attend the local LEPC meetings in each county. The next few meeting dates were shared and all attendees were encouraged to attend. Posters were hanging to show the current participating jurisdictions in each county.

Appanoose County: Unincorporated County, Centerville, Cincinnati, Exline, Moravia, Moulton, Mystic, Numa, Plano, Rathbun, Udell, Unionville, Lake Rathbun, Centerville Public Schools, Moravia Community School, Indian Hills Community College (new this update), Mercy Medical Center (new this update), & Moulton Community Schools (new this update).

Lucas County: Unincorporated County, Chariton, Derby, Lucas, Russell, Williamson (new this update), Chariton Public Schools, Lucas County Health Center.

Monroe County: Unincorporated County, Albia, Lovilia, Melrose, Albia Community Schools, & Monroe County Hospital (new this update).

Members discussed if it were necessary to include all state parks since Lake Rathbun is included. Also, they wondered if it's necessary to include Stephens Forrest where people can camp or congregate? CVPD staff made note of the questions and will consult with Iowa Homeland Security for guidance.

The previously approved Goals & Objectives were shared as a handout to each representative. Consensus of all attendees was that the established would still be applicable for this update and such recommendation will be shared at the next LEPC planning meetings. The Goals & Objectives for all three counties are as follows:

Goal 1: Protect critical facilities, infrastructure, and other community assets from the impacts of hazards

Objective 1.1 Seek mitigation projects that provide the highest degree of hazard protection at the least cost.

Objective 1.2 Strengthen partnerships and collaboration of jurisdictions, as well as, invite corporate partners, education systems, agencies and faith based representatives to participate in emergency planning and recovery.

Objective 1.3 Utilize public funds/grant opportunities to protect critical facilities, public services & transportation entities.

Goal 2: Protect the health, safety & quality of life for Appanoose/Lucas/Monroe County residents by minimizing the vulnerability of people and property in Lucas County.

Objective 2.1 Ensure that property owners can maintain & improve their properties.

Objective 2.2 Ensure that disaster recovery can proceed promptly following a disaster.

Objective 2.3 Provide back-up energy supplies in all vital assets identified in this plan.

Objective 2.4 Promote improving zoning codes, building codes, nuisance abatement, and health codes, especially in relation to areas with older buildings.

Objective 2.5 Continued participation in NFIP

Objective 2.6 Review the protocol, education & necessary medications/interventions to deal with airborne & human transmitted hazards that directly deal with impact of health & life.

Goal 3: Reduce losses due to natural and man-made hazards.

Objective 3.1 Educate members of the county about hazards, how to be prepared, & shelter locations.

Objective 3.2 Review & upgrade warning systems and communications for sufficient coverage

Objective 3.3 Provide certified shelters/safe rooms

Objective 3.4 Provide adequate training, equipment and exercises to train responding emergency personnel.

Objective 3.5 Maintain current & create new planning and exercises related to any terrorism event.

Objective 3.6 Identify and map locations of accidents in an annual public report in order to determine locations where improvements are necessary.

Moore presented the 23 hazards identified by the State of Iowa and shared that the three counties have chosen to include all 23 as potential hazards to the respective area.

Those include the Natural Disasters of: Flash Flood, Tornadoes, Windstorms, Extreme Heat, Hailstorms, Grass or Wild Land Fire, Sinkholes, River Flooding, Severe Winter Storms, Drought, Earthquake, Landslide, Expansive Soils, Thunderstorm & Lightning, Dam Failure and Levee Failure.

The Human Caused/ Combination Hazards of: Human Disease, Hazardous Materials, Transportation Incident, Infrastructure Failure, Terrorism, Radiological, & Animal/Plant/Crop Disease.

Dien Judge, Interim Monroe County Supervisor, pointed out that all 23 hazards can affect all three counties but that each hazard may not affect every community. It may "indirectly" affect the well-being of residents but each jurisdiction should evaluate whether the effects are worth addressing in the plan. Lamb led a discussion that if there is an outside chance an event can occur in a community then it's best to have it included in this document. CVPD personnel responded that we can proceed with including all the hazards if each jurisdiction recommends that and can provide the justification that would be included in the plan.

Pribyl handed out the preliminary hazard rankings that have been made by each jurisdiction representative at the past meeting. Emphasis was made that the information provided has not been approved but rather is ready for review and input from other members. Participants were again encouraged to come to the next LEPC meeting.

Moore explained the next steps in the planning process is to pair hazards with an acceptable mitigation strategy. The strategies will vary by community and their capabilities. Handouts were given to show the current mitigation strategies identified each city and the priority strategy the communities had identified to work on. Participants were encouraged to take the documents home and review to make changes, updates and show accomplishments. Also given was the list of critical facilities given for each jurisdiction and the estimated value of it if it were to be lost in a disaster.

Due to time restrictions, the work sessions were and the documents were given to the participants and asked to return them to CVPD in the next two weeks. Moore explained that once the information and data is collected, it will be compiled into a comprehensive document. The draft document will be ready for review next summer and submission to Iowa Homeland Security / FEMA next fall for recommendations. Once all revisions are complete, FEMA will offer final acceptance for the plan. The last critical step is for all participating jurisdictions to adopt/approve by resolution.

All participants were encouraged to contact Mike at ADLM for any disaster related questions. All Hazard Mitigation Planning questions can be directed to CVPD. The meeting was dismissed at 7:50 PM.

Regional Hazard Mitigation Planning – Appanoose, Lucas and Monroe Counties
 Date: October 29, 2014
 Location: ADLM EMA, 12307 Highway 5, Moravia, Iowa 52571

Name	Title	County, City, Agency	Email	Address	City	State	Zip	Phone/Cell phone	Signature
Karina Nally-Husted	ADLM Adviser	ADLM Environmental Public Health	kdallyhusted@adlm counties.com	P.O. Box 319	Moravia	IA	52571	641-777-7512	Karina Nally-Husted
Mike Lane	ADLM Adviser	ADLM Public Health	adlm@adlm.com	10472 Hwy 5 Box 319	Moravia	IA	52571	641-724-3223	[Signature]
Dien Judge	MONROE BOB	MONROE Co.	dien.judge@monroecounties.com	1780 715 Ave A	Albia	IA	52538	641-895-1822	[Signature]
Deb Olinny	MONROE BOB	MONROE Co.	debo@monroecounties.com	16472 Hwy 5 Box 319	Centerville	IA	52534	641-895-0115	[Signature]
Frank Collins	MONROE BOB	MONROE Co.	frank@monroecounties.com	16472 Hwy 5 Box 319	Centerville	IA	52534	641-895-0115	[Signature]
Carl Clark	MONROE BOB	MONROE Co.	carl@monroecounties.com	16472 Hwy 5 Box 319	Centerville	IA	52534	641-895-0115	[Signature]
Gene Rantz	MONROE BOB	MONROE Co.	gene@monroecounties.com	16472 Hwy 5 Box 319	Centerville	IA	52534	641-895-0115	[Signature]
Fody McNamee	MONROE BOB	MONROE Co.	fody@monroecounties.com	16472 Hwy 5 Box 319	Centerville	IA	52534	641-895-0115	[Signature]
James Brooks	MONROE BOB	MONROE Co.	james@monroecounties.com	16472 Hwy 5 Box 319	Centerville	IA	52534	641-895-0115	[Signature]
Tammy Cole	MONROE BOB	MONROE Co.	tammy@monroecounties.com	16472 Hwy 5 Box 319	Centerville	IA	52534	641-895-0115	[Signature]
George Robinson	MONROE BOB	MONROE Co.	george@monroecounties.com	16472 Hwy 5 Box 319	Centerville	IA	52534	641-895-0115	[Signature]
Dave Walther	MONROE BOB	MONROE Co.	dave@monroecounties.com	16472 Hwy 5 Box 319	Centerville	IA	52534	641-895-0115	[Signature]
Jay Dillard	MONROE BOB	MONROE Co.	jay@monroecounties.com	16472 Hwy 5 Box 319	Centerville	IA	52534	641-895-0115	[Signature]

Regional Hazard Mitigation Planning – Appanoose, Lucas and Monroe Counties
 Date: October 29, 2014
 Location: ADLM-EMA, 12307 Highway 5, Moravia, Iowa 52571

Name	Title	County, City, Agency	Email	Address	City	State	Zip	Phone/Cell phone	Signature
Steve Lamy	Superior	Lucas CO	STKLamy@iex.com		Alexton	IA	50049	641-203-0998	Steve Lamy
Bob Hughes	Emergency	Monroe County			Albia	IA	52531	641-451-5519	
Steve Schubel		CVHA	jschubel@charitonvalleyplanning.com		Centerville	IA	52034	641-437-4349	Steve Schubel
Neel Mall		CVPP			Charitonville	IA	52844	641-437-1332	Neel Mall

Press Release

-For Immediate Release-

September 19, 2014

Contact: Chariton Valley Planning & Development Council of Governments
308 North 12th Street
Centerville, Iowa 52544
Phone: 641-437-4359 or Fax: 641-437-1161

Multi-Jurisdictional Hazard Mitigation Plan Updates Planning Before the Disaster

Centerville, Iowa --- Mitigation planning is the process of determining what hazards are present or what disasters can potentially influence a community. After the concerns have been determined, actions (mitigation measures) are identified to reduce or eliminate the impact of disasters and emergency situations in the area. Once the hazards are identified and critical facilities, the county and communities are able to apply for possible grant funding through FEMA and state funding sources to reduce or remove the impact of these hazards on the area.

The hazard mitigation plans for Appanoose, Lucas and Monroe counties were originally written and prepared by Chariton Valley Planning & Development (CVPD) Council of Governments. Those documents were approved by Iowa Homeland Security and Federal Emergency Management Agency (FEMA) in 2011.

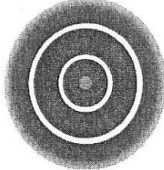
FEMA requires that the Multi-Jurisdictional Hazard Mitigation Plan to be reviewed annually by local governments and the community and formally update every five years. Appanoose, Lucas and Monroe counties have recently contracted with CVPD Council to begin the updating process. The work will be a collaborated effort with the Emergency Management Coordinator at ADLM as well as county and community representatives. The public is invited to participate in the update development by attending the local LEPC meetings in each county and dates are provided below. The committees will evaluate hazards, recent occurrences, provide new mitigation strategies to be implemented locally, and determine further mitigation plans to benefit the region. It is critical to have all communities within the counties participate on behalf of their citizens. Community representatives must have documented involvement during the development to be eligible for potential grants funds or for the maximum disaster recovery assistance funds after a disaster occurs.

The hazard mitigation plans are available for review at the respective County Board of Supervisor's offices in the county courthouses or Chariton Valley Planning & Development Council of Governments office, 308 North 12th Street, Centerville, Iowa. They are also available at www.charitonvalleyplanning.com.

Meetings for October and November have been set for each county and are as follows:

measure things such as pH, carbon dioxide, and soil moisture to name a few. The LabQuest units will allow the students to graph and analyze their experiments as they go.






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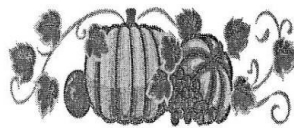
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PLAN TO ATTEND
Preparing for disasters



Please join Chariton Valley Planning & Development Council of Governments along with ADLM Emergency Management in the preparation & update of information for the Appanoose, Lucas & Monroe counties Multi-Jurisdictional Hazard Mitigation Plan on

Wed., October 29 at 6:30 p.m. at the
ADLM Emergency Management Office
located at 12307 Highway 5, Moravia, Iowa

*Become active in your county & community
for disaster preparedness.*

Please contact Mike Lamb EMA at 641-724-3223
or email: adlmema@iowatelecom.net
if you have questions.

The Chariton Leader
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Tracy and Bill Morris and girls
Jim and Renee Ballard and boys

**PLAN TO ATTEND
Preparing for disasters**

Please join Chariton Valley Planning & Development Council of Governments along with ADLM Emergency Management in the preparation & update of information for the Appanoose, Lucas & Monroe counties Multi-jurisdictional Hazard Mitigation Plan on **Wed., October 29 at 6:30 p.m. at the ADLM Emergency Management Office located at 12307 Highway 5, Moravia, Iowa** Become active in your county & community for disaster preparedness.
Please contact **Mike Lamb EMA at 641-724-3223** or email: admeme@iowatelecom.net if you have questions.

VOTE
Tuesday, November 4, 2014
FOR
TEDDY WALKER
Appanoose County Recorder



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Thank you!

Rod Wolver and family would like to thank all who

Y (no gifts)

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Hazard Mitigation Planning

Hazard Planning Before a Disaster

Lucas County LEPC & Mitigation Planning

Tuesday, November 18, 2014 at 4:00 PM
Lucas County Health Center,
1200 North 7th Street,
Chariton, Iowa

Mitigation planning is the process of determining what hazards are present or what disasters can potentially influence a community. Actions (mitigation measures) are identified to reduce or eliminate the impact of disasters and emergency situations in the area. Once the hazards are identified and critical facilities, the county and communities are able to apply for possible grant funding through FEMA and state funding sources to reduce or remove the impact of these hazards on the area.



Lucas Co. LEPC - AGENDA
Appanoose-Davis-Lucas-Monroe Counties

Emergency Management Agency (ADLM-EMA)
12307 Hwy. 5, P.O. Box 399
Moravia, IA 52571

November 18th, 2014 4:00 pm
Lucas County Health Center Education Room

Proposed Agenda:

1. Call meeting to order
2. Approve agenda
3. Approve minutes of last meeting – October 14th, 2014
4. Old business
 - a. Lucas LEPC HMEP planning/training grant NOI acceptance. Contracts to vendors now signed.
5. New Business:
 - a. Alert Iowa Update.
 - b. Third Lucas County Multi-Jurisdictional Hazard Mitigation Plan update session with Chariton Valley Planning and Development. (Nichole & Julie)
 - c. Open Discussion
6. Member Update, Critical Infrastructure:
7. Set date and time of next meeting. **February 17th 4:00 pm**
8. Adjourn

The above agenda was prepared by the ADLM-EMA Coordinator Mike Lamb.

HMP – Lucas County***November 18, 2014******Agenda***

1. Review and approve Goals & Objectives.
2. Preliminary Hazard Rankings from completed forms. Discussion.
3. Critical Facilities previously identified. Update with changes or additions.

HOMEWORK – Review Mitigation strategies previously identified. Indicate those accomplished and those that are still a goal.

Lucas County LEPC

Appanoose Davis Lucas Monroe Counties
 Emergency Management Agency
 12307 Highway 5, P.O. Box 399, Moravia, Iowa 52571

Minutes – November 18th 2014 Meeting

TO: All members of the Lucas County Local Emergency Management Planning Committee (LEPC)

SUBJECT: Lucas County LEPC Meeting Minutes

A meeting of the Lucas County LEPC was scheduled on Tuesday November 18th 2014 at Lucas County Health Center, Education Room, at 4:00 pm

I. The following LEPC membership was in attendance:

- | | |
|-------------------|-------------------------|
| 1. Mike Lamb | ADLM-EMA |
| 2. Steve Lange | Lucas Co. BOS |
| 3. Brett Tharp | Lucas Co. Sheriff |
| 4. Mark McCurdy | LCHC Disaster Planner |
| 5. Jayma Hoch | LCHC |
| 6. Mary Grismore | Lucas Co. Public Health |
| 7. Steve Davis | CFD |
| 8. Nichole Moore | CVPD |
| 9. Julie Pribyl | CPVD |
| 10. Earl Comstock | GESAC |

II. <> 4:00pm Mike Lamb called the meeting to order

<> Item #2 Approval of agenda

Motion made by McCurdy. 2nd by Comstock. to approve the agenda. Motion carried all in favor. None opposed

<> Item #3 Approval of minutes of the October 14th meeting

Motion made by McCurdy. 2nd by Hoch. Motion carried all in favor. None opposed

<> Item #4 Old Business:

- a. Lucas LEPC HMEP planning/training grant NOI acceptance. Lamb-Contracts to vendors now signed. Planning Robyn Reese and Training PRI, Jerry Eslick.

<> Item #5 New Business:

- a. Alert Iowa Update: Lamb, All paperwork into the state awaiting approval.
- b. Third part of the Lucas County Multi-Jurisdictional Hazard Mitigation Plan update session with Chariton Valley Planning and Development. (Nichole & Julie See Attachment #1 from CPDV for detailed minutes on discussion)
- c. Open Discussion. (None)

<> Item #6 Critical Infrastructure/Member Updates: None

<> Item # Next meeting January 13th 4:00pm Lucas County Health Center, Education Room.

Motion by Grismore. 2nd by Hoch. All in favor. Meeting adjourned.

The minutes of the Lucas County LEPC meeting prepared by Mike L, ADLM EMA Coordinator

Attachment #1 CPDV

Lucas County HMP Meeting minutes (3rd Meeting) – November 18, 2014

Moore presented Goals & Objectives that were previously approved for the Lucas County Hazard Mitigation Plan. A brief discussion was held to read over each item. Consensus from the group was that the information and intent for the plan was still accurate. Pribyl & Mike Lamb, ADLM Emergency Management Coordinator pointed out that the goals and objectives were very similar to neighboring counties. Moore asked for a recommendation to use existing Goals & Objectives and the entire group consented.

The preliminary hazard rankings were provided to the group based on the scoring sheets completed by the participants at last month's planning meeting. Representatives reviewed the information and there were questions if "it were a problem if all the cities have hazards ranked differently". Moore explained that it is acceptable and that different communities may be at different risks based on location but that as long as the list is comprehensive of the hazards that it could occur, the ranking may be irrelevant. Mike Lamb explained that the State and Federal representative are most concerned about the top five hazards or so and how much potential loss could occur in the area and recognize the other hazards may only be a slight risk. Members were asked to individually review the hazards on their respective jurisdictions and provide written comment as to if they felt the ranking was accurate and acceptable. Pribyl explained that the some of the hazards based on location (river flooding, levee failure, sinkholes, dam failure & landslide) will need to identify as specific susceptible areas, any structures that are at risk of each hazard and what the potential financial damage could be. This discussion will be held in upcoming meetings. Members completed their review of the preliminary rankings and were approved as accurate.

Each member was provided with the current list of "Critical Facilities" that are given in the Lucas County HMP. Individuals were asked to review such information and provide additional input. Examples of additions include: city sewer lift stations, electrical booster stations, and rural water towers. Participants worked independently to provide comments and additions for jurisdictions.

Moore explained that the next steps will be to begin working on the selection of mitigation strategies as a response to the identified hazards. Although these meetings will occur after the first of the new year, members were provided with copies of the current mitigation strategies identified in the plan. A brief discussion provided examples of what should be included, such as the additions of 2 new sirens in Chariton at the north and south edges of town. The documents were intended to be as "homework" because it may require extra time and input from community members. Information can returned back to CVPD via mail or the next meeting. Everyone was asked to review the strategies and identify if any of them had been accomplished, if they were still relevant to the city's/jurisdiction's desires and any other additional comments.

During the holiday months of the end of November, December and January, CVPD will begin to compile the information already gathered at the planning meetings. Time will also be spent gathering data to create profiles of new jurisdictions that will be added in this update.

Nov 18th 2014

**Lucas County LEPC
updated 2014**

Organization	Position	Name	Signature	Phone	Email
Lucas County	County				
Elected Official	Bd of Supervisors	Steve Laing ✓		641-203-0398	supervisors@lucasco.org
Elected Official	Bd of Supervisors	Larry Davis ✓		641-203-0810	supervisors@lucasco.org
Emergency Mgmt	Coordinator	Mike Lamb ✓		641-724-3223/641-895-0407	admema@iowatelecom.net
Law Enforcement	Sheriff	Brett Therp ✓		641-774-5083	tharpb@lucasco.org
Lucas County Engineer	County Engineer	Todde Folkerts ✓		641-203-0309	folkerts@lucasco.org
LC Public Health	Public Health Nurse	Mary Grismore ✓		641-774-4312	grismorem@lucasco.org
LC Public Health	Registered Nurse	Maxine Willadson ✓		641-774-4312	willadsonm@lucasco.org
LC Health Center	Clinical Service Assistant	Jayma Hoch ✓		641-774-3267	ihoch@lchcia.com
Lucas County Health	Disaster Planner	Mark McCurdy ✓		641-203-1477	mmccurdy@cityofindianola.com
Lucas County Health	Ambulance Manager	Kendall Wood ✓		641-774-3815	kwood@lchcia.com
Environmental Health	Env. Pub. Health Dir.	Dianna Daly-Husted		641-724-3511/777-7512	Dhusted@adlmcounties.com
Environmental Health	Env. Pub. Health Officer	Sherry Lutz		641-724-3511	Slutz@adlmcounties.com
Charlton					
Law Enforcement	Police Chief	Jeff Johnson			
Law Enforcement	Police Officer				
City Manager	City of Charlton			641-774-5991	citymanager@iowatelecom.net
Fire Fighting	Fire Chief	Barry Smith		641-203-0774	bsmith@jmwworks.com
Russell					
Fire Fighting	Fire Chief	Craig Alexander		641-203-1386	ineer224@iowatelecom.net
Williamson					
Fire Fighting	Fire Chief				
Industry and Other Organizations or Individuals					
HyVee Dist Center	Compliance Manager	John Laing		641-774-7608	ilainq@hy-vee.com
Charlton Chris* Church	Reverend	C.J. Latham		641-774-2375	pastorccc@gmail.com
GESAC	Rep	Earl Comstock ✓		<i>641-203-0450</i>	<i>641-774-44</i>

**Lucas County LEPC
updated 2014**

Organization	Position	Name	Signature	Phone	Email
Shelton VFD	Fire Chief	John Shelton	[Signature]	641-203-5000	sheltonj@sheltonvfd.com
CVFD	Support Specialist	Jacobi Farbyl	[Signature]		
CVPP	Ex. Dir.	Michael Allen	[Signature]		

Mitigating Disasters

Please plan to attend the Local Emergency Planning Committee (LEPC) to assist in the development of the Lucas County Hazard Mitigation Plan. Public is invited to attend.

DATE: Tuesday, September 22, 2015

TIME: 4:00 PM

LOCATION: Lucas County Health Center, 1200 N 7th St, Chariton, IA



308 North 12th Street, Centerville, IA

641-437-4359

***Hazard Mitigation Planning Session #4 – Lucas County
September 22, 2015***

1. ***Sign in sheet***
2. ***Share draft plan for each community- each will be an appendix in the comprehensive plan.***
 - a. Review format of the plan layout per hazard.
 - b. Red font needs changed or updated.
 - c. Please review on own for changes or improvements throughout the document.
 - d. Complete the city questionnaire about precise flash flood locations, deteriorated buildings. Etc.
 - e. Some hazards have notes to re-visit whether to keep in or dismiss if not really pertinent to the community.
3. ***Comprehensive County Scoring.***
 - a. Need to score and rank the hazards as the comprehensive scoring for the entire region.
4. ***Mitigation Strategies.***
 - a. Review & update accomplishments.
 - b. Changes to strategies from previous approved plan?

Lucas County LEPC

Appanoose Davis Lucas Monroe Counties
Emergency Management Agency
12307 Highway 5, P.O. Box 399, Moravia, Iowa 52571

Minutes – Tuesday September 22nd, 2015 Meeting

TO: All members of the Lucas County Local Emergency Management Planning Committee (LEPC)

SUBJECT: Lucas County LEPC Meeting Minutes

A meeting of the Lucas County LEPC was held on Tuesday September 22nd, 2015 at Lucas County Health Center, Education Room, at 4:00 pm

I. The following LEPC membership was in attendance:

- | | |
|-------------------|-----------------------|
| 1. Mike Lamb | ADLM-EMA |
| 2. Mark McCurdy | LCHC Disaster Planner |
| 3. Steve Laing | Lucas Co. BOS |
| 4. Richard Warren | GESAC |
| 5. Earl Comstock | GESAC |
| 6. Julie Pribyl | CVPD |
| 7. Nichole Moore | CVPD |

II. <> 4:00pm Mike Lamb called the meeting to order

<> Item #2 Approval of agenda

Motion made by Laing, 2nd by Comstock. to approve the agenda. Motion carried all in favor. None opposed

<> Item #3 Approval of minutes of the October 14th meeting

Motion made by Laing, 2nd by Warren. Motion carried all in favor. None opposed

<> Item #4 Old Business:

- a. Alert Iowa update. Lamb attended the online training with Inspiron Technologies March 24th. The system is activated in Lucas County and is slowly being rolled out for public signup
- b. Bakken Crude by Rail update: Lamb updated the committee on the current Bakken crude oil shipments traveling the counties rail system.

<> Item #5 New Business:

- a. ESF 10 submission with previously suggested changes. Lamb updated the group that 2015 updated ESF 10 previously submitted to the state had been approved and adopted by the ADLM Emergency Management Commission
- b. Lucas County Multi-Jurisdictional Hazard Mitigation Plan update session was conducted by Julie Pribyl of Chariton Valley Planning and Development. HMP Discussion minutes attached below
- c. Open Discussion: None

<> Item #6 Critical Infrastructure/New ESF 10 discussion: None

◇ Item # Next meeting October 13th, 4:00pm Lucas County Health Center, Education Room.

Motion by McCurdy. 2nd by Comstock. All in favor. Meeting adjourned.

The minutes of the Lucas County LEPC meeting prepared by Mike L, ADLM EMA Coordinator

**Lucas County HMP Meeting minutes (4th Meeting) –
September 22, 2015**

Attending members were presented with the draft plans for the communities represented. Julie from CVPD reviewed the format that the information is presented for each hazard. The mitigation strategies given in the previous approved plan were also included in the document to save on printing expenses. The committee members are to review the information in the draft plan, make corrections, and plan to update any mitigation strategy changes/accomplishments at the next meeting.

It was explained that the natural events listed in the “past events/history” section were from NOAA. It provides events that only cause financial loss or crop damage in this community or county. For example, there have been countless thunderstorms and lightning over the past five years, however NOAA may only list six events that had personal or crop losses associated with those particular storms.

Julie also pointed out that “Levee Failure” can be removed from local plans because there are no Levees in this county identified in the State or Federal Plan. The additional corrections were also made in the corresponding plans: Derby dismissed Dam Failure; Russell dismissed Dam Failure; and Williamson dismissed Dam Failure.




CVPD will soon begin to make appointments with community representatives from Williamson to gather local data and input.

Committee Members reviewed the individual jurisdictions hazard rankings to determine how to come up with a comprehensive county ranking for the overall plan/county. Members recommended computing a score by using each jurisdictions ranking to come up with an average comprehensive score. See the attached draft comprehensive ranking. When members looked over the initial comprehensive ranking. Mike Lamb, with ADLM Emergency Management, explained that the hazards the cause the greatest losses throughout this county would include Flash Flooding and Severe Winter Storms, however, the greatest economic impact could be Animal/Plant/Crop disease in this agricultural region. Discussion was held that it is essential to have a comprehensive list but that the ranking ultimately doesn’t influence possible funding from Homeland Security. Present committee members agreed to accept the initial comprehensive ranking for the entire county as the final ranking in the document.

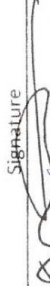



NEXT MEETING TASKS: review existing mitigation strategies for each community and the strategies previously selected to make corrections/updates/changes.

Lucas County LEPC
updated 2015

9/22/15

Organization	Position	Name	Signature	Phone	Email
Lucas County	County				
Elected Official	Bd of Supervisors	Steve Laing		641-203-0398	supervisors@lucasco.org
Elected Official	Bd of Supervisors	Larry Davis		641-203-0810	supervisors@lucasco.org
Emergency Mgmt	Coordinator	Mike Lamb		641-724-3223/641-895-0407	adimema@iowatelecom.net
Law Enforcement	Sheriff	Brett Tharp		641-774-5083	tharpb@lucasco.org
Lucas County Engineer	County Engineer	Todde Folkerts		641-203-0309	folkertst@lucasco.org
LC Public Health	Public Health Nurse	Mary Grismore		641-774-4312	grismorem@lucasco.org
LC Public Health	Registered Nurse	Maxine Willadson		641-774-4312	willadsonm@lucasco.org
LC Health Center	Clinical Service Assistant	Jayma Hoch		641-774-3267	ihoch@lchcia.com
Lucas County Health	Disaster Planner	Mark McCurdy		641-203-1477	mmccurdy@cityofindianola.com
Lucas County Health	Ambulance Manager	Kentel Wood		641-774-3815	kw@lchcia.com 641-774-3815 J a L o m
Environmental Health	Env. Pub. Health Dir.	Dianna Daly-Husted		641-724-3511/777-7512	Dhusted@adimcounties.com
Environmental Health	Env. Pub. Health Officer	Sherry Lutz		641-724-3511	Slutz@adimcounties.com
Chariton					
Law Enforcement	Police Chief	Jeff Johnson			
Law Enforcement	Police Officer				
City Manager	City of Chariton			641-774-5991	citymanager@iowatelecom.net
Fire Fighting	Fire Chief	Steve Davis		641-203-0774	bsmith@imworks.com
Russell					
Fire Fighting	Fire Chief	Craig Alexander		641-203-1386	ineer224@iowatelecom.net
Williamson					
Fire Fighting	Fire Chief				
Industry and Other Organizations or Individuals					
HyVee Dist Center	Compliance Manager	John Laing		641-774-7608	laing@hy-vee.com
Chariton Christian Church	Reverend	C.J. Latham		641-774-2375	pastor@ccc@gmail.com

Lucas County LEPC
updated 2015

Organization	Position	Name	Signature	Phone	Email
GESAC	Rep	Earl Cornstock		641-203-0450	lindacomstock@yahoo.com
GESAC	Rep	Richard Warren		641-218-9084	diskwarren51@gmail.com
COB	Rep	Judith Ribol		641-437-4359	jribol@cityoflucas.com
COB	Rep	Nicholas Moore		641-437-4359	nmoore@cityoflucas.com

Mitigating Disasters

Please plan to attend the Local Emergency Planning Committee (LEPC) to assist in the development of the Lucas County Hazard Mitigation Plan. Public is invited to attend.

DATE: Tuesday, October 13, 2015

TIME: 4:00 PM

LOCATION: Lucas County Health Center, 1200 N 7th St, Chariton, IA



308 North 12th Street, Centerville, IA

641-437-4359

Lucas County LEPC
Appanoose Davis Lucas Monroe Counties
Emergency Management Agency (ADLM-EMA)
12307 Hwy. 5, P.O. Box 399
Moravia, IA 52571

October 13, 2015
4:00 p.m.
Lucas County Health Center Education Room

Proposed Agenda:

1. Call meeting to order
2. Approve agenda
3. Approve minutes of last meeting – September 22nd, 2015
4. Old business
 - a. None
5. New Business:
 - a. Lucas County Multi-Jurisdictional Hazard Mitigation Plan update session with Chariton Valley Planning and Development. Nichole/Julie.
 - b. Open Discussion
6. Critical Infrastructure Update & ESF 10 new discussion:
7. Set date and time of next meeting.
8. Adjourn

The above agenda was prepared by the ADLM-EMA Coordinator Mike Lamb.

Hazard Mitigation Planning Session #5 – Lucas County

October 13, 2015

1. Sign in sheet
2. Review decisions on comprehensive hazard ranking for the entire county.
3. Supply draft document for jurisdiction representatives that may not have been present last time.
4. Mitigation Strategy Planning
 - a. Review & update existing mitigation strategies for each jurisdiction and recent improvements.
 - b. Review & update previously selected mitigation strategies from approved plan.
 - i. Were any of these accomplished by any given jurisdiction?
 - ii. Remove any strategies? Add any new strategies??
5. Wrap up for meetings. CVPD shouldn't need to return to LEPC for a few more months. The next several months the agency will be contacting community representatives that have not been very involved in order to gather their specific data. Once all that is compiled, it will be included in the draft plan as well. When all the jurisdiction data is complete, those pieces of the puzzle will be used to create the comprehensive "Multi-Jurisdictional hazard mitigation plan". Each jurisdiction's plan will be an appendix to the document. CVPD will return to the LEPC near the end of the year with the completed draft document. Should there be any further questions, we will make contact with you sooner.

Lucas County LEPC – HMP Meeting October 13, 2015

Lucas County LEPC committee had a participation of different members this meeting so the recent accomplishments in the HMP process were re-visited. Members reviewed the proposed comprehensive hazard rankings for the entire county that was drafted last month. All members approved the rankings as provided at this meeting.

Individual community representatives were provided with a list of current ordinances, plans, mapping and associations identified as existing in the community previously. Representatives were asked to review the current status of these elements and update.

Members reviewed the existing mitigation strategies in each community. Discussion was held about improvements in the past five years:

- *All first responders meet regularly but frequency varies by community & as needed but they are required to have 24 hours of formal training each year.
- *the mobile communication trailer is still available at the Appanoose County law center in disaster incident.
- *Hydro-Clean is designated as the hazardous clean-up.
- *Chariton has improved storm sewer drainage & street conditions in multiple places.
- *Williamson has approximately 15 people on fire department now.
- *There are 28E agreements for communities for fire coverage.

Discussion then led to the review of current mitigation strategies that were previously identified in the federally approved plan. Members were provided with all strategies to update. The committee discussed:

- *Backup generators exist in fire department, public health dept, hospital, & sewer station.
- *Additional early storm warning sirens were placed in South Gate & North Park in Chariton. There are now 3 in place.
- * Narrowband broadcast communication has replaced hand held radios for most first responders.
- * National Weather Service has launched a large promotion and education regarding the meaning of warnings vs watches and how to have precaution.
- * No longer a trailer park near the school.
- *County and all jurisdictions have updated evacuation plans in the ESF plan.

*Hazardous Material Disposal – Marion County Landfill in Knoxville is designated as site for all of Lucas County. Communities also offer special collections drives throughout the year. All communities have recycle trailers available.

*Terrorism hazard – also needs to have the mitigation strategy “Mass Casualty Preparation” included. _____, from _____, proposed a mitigation strategy of “ALICE training” at any public facility to cope with an active shooter situation. There was one training offered at the school.

*Public Health Department accepts walk-ins for immunizations – no longer offer special clinics due to efficiency. Seasonal specialty clinics are offered by the local pharmacies. IE during flu season.

*Radon kits are available to residents at ADLM environmental health and the public health department.

*Chariton recently added building code enforcement officer position.

*No burn permits are issued in the county. Chariton allows residents to burn debris.

*Russell & Chariton fire department have smoke detectors available to residents free.





*A recent chimney fire brought to light that there are no chimney cleaners/repair available locally. Need to find options for residents.

Committee members accepted all other mitigation strategies as previously proposed.

CVPD will be updating the draft plan with the current information decided upon at LEPC meetings. The agency will be reaching out to other communities for specific information. The information will be incorporated into a draft document and presented to the committee in early 2016.

10/13/15

Lucas County LEPC
updated 2015

Organization	Position	Name	Signature	Phone	Email
Lucas County	County				
Elected Official	Bd of Supervisors	Steve Laing		641-203-0398	supervisors@lucasco.org
Elected Official	Bd of Supervisors	Larry Davis		641-203-0810	supervisors@lucasco.org
Emergency Mgmt	Coordinator	Mike Lamb		641-724-3223/641-895-0407	admema@lowatelecom.net
Law Enforcement	Sheriff	Brett Tharp		641-774-5083	tharpb@lucasco.org
Lucas County Engineer	County Engineer	Toddie Folkerts		641-203-0309	folkerts@lucasco.org
LC Public Health	Public Health Nurse	Mary Grismore		641-774-4312	grismorem@lucasco.org
LC Public Health	Registered Nurse	Maxine Willadsen		641-774-4312	willadsenn@lucasco.org
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Lucas County Health	Ambulance Manager	Kendall Wood		641-774-3815	kwood@lchcia.com
Environmental Health	Env. Pub. Health Dir	Dianna Daly Husted		641-724-3511/777-7512	Dhusted@adimcounties.com
Environmental Health	Env. Pub. Health Officer	Sherry Lutz		641-724-3511	Slutz@adimcounties.com
Chariton					
Law Enforcement	Police Chief	Jeff Johnson			
Law Enforcement	Police Officer				
City Manager	City of Chariton				
Fire Fighting	Fire Chief	Steve Davis		641-774-5991 641- 774 203-5252	citymanager@lowatelecom.net bsmith@mmworks.com <i>sclembs@lchcia.com</i>
Russell					
Fire Fighting	Fire Chief	Craig Alexander		641-203-1386	ineer224@lowatelecom.net
Williamson					
Fire Fighting	Fire Chief				
Industry and Other Organizations or Individuals					
HyVee Dist Center	Compliance Manager	John Laing		641-774-7608	jlaing@hy-vee.com
Chariton Christian Church	Reverend	C.J. Latham		641-774-2375	pastorclccc@gmail.com

Lucas County LEPC
updated 2015

Organization	Position	Name	Signature	Phone	Email
GESAC	Rep	Earl Comstock		641-203-0450	lindacomstock@yahoo.com
GESAC	Rep	Richard Warren		641-218-9084	diskwarren51@gmail.com

CVPD

Julie Pribyl

641-437-4359

jpribyl@charstonvalleyplanning.com

CVPD

Nicki Marie

641-437-4359

www.charstonvalleyplanning.com

Lucas County HMP

March 15, 2016

Lucas County Health Center

1. Draft document is 90% completed.
 - a. Review for remaining information yet needed.

2. Proposed re-wording of a couple sections in the “Goals & Objectives” – simply for more clarification.

3. Community prioritize Mitigation Strategies to accomplish over the next 4-5 years during life of this plan.

Lucas County HMP

March 15, 2016

Chariton City Hall

CVPD presented the existing draft copy of the Lucas County Multi-Jurisdictional Hazard Mitigation Plan. Staff discussed the format of the plan. It was previously noted that the document would have separate Appendix of information specific to each jurisdiction. That has since become a very complicated process and CVPD has followed the same format presented in the federally approved plan. All committee members accepted this change. Staff members discussed the remaining items needed to complete the plan.

Participants were informed that the smaller outlying communities have now all designated a person as a contact for Hazard Mitigation planning. They have been providing critical information about their community and their intentions.

Committee members were presented with a different format of the plan Goals & Objectives that were previously approved. This document combined the strategies as well. CVPD recognized in the State's previous plan review comments it was recommended to clarify an objective with a change in terminology. The intent of the objective remained the same but committee members selected the following narrative (old in black font, replacement in red font):

Objective 2.5 Participation in NFIP

IMPROVE PROTECTION OF RESIDENTS & STRUCTURES FROM EFFECTS OF FLOODING

Objective 3.6 Identify and map locations of accidents in an annual public report in order to determine locations where improvements are necessary.

IDENTIFY AND MAP THE GREATEST RISK POTENTIAL OF HAZARDS IN ORDER TO DETERMINE LOCATIONS WHERE IMPROVEMENTS COULD BE MADE.

The committee then worked together to complete to rank 2016 Mitigation Strategies. Numerical values were given by the number of hazards effected, cost associated, priority, timeline to accomplish, if political support is required, if it prevent death/injury, and will it reduce or eliminate damage to structures/infrastructure. The highest scoring strategy will be place as priority and decrease throughout the values. See attached document.

Jurisdictions were reminded that all will need to pass resolutions adopting the plan. That process will begin as soon as the changes from Iowa Homeland Security are made. Any further questions of committee members will be via phone calls, emails or another meeting if committee consensus is required.

Lucas County LEPC
updated 2016

3/15/2016

Organization	Position	Name	Signature	Phone	Email
Lucas County	County				
Elected Official	Bd of Supervisors	Steve Laing		641-203-0398	supervisors@lucasco.org
Elected Official	Bd of Supervisors	Larry Davis		641-203-0810	supervisors@lucasco.org
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Chariton					
Law Enforcement	Police Chief	Jeff Johnson			
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Russell					
Fire Fighting	Fire Chief	Craig Alexander		641-203-1386	ineer224@iowatelecom.net
Williamson					
Fire Fighting	Fire Chief				
Industry and Other Organizations or Individuals					
HV-vee Dist Center	Compliance Manager	John Laing	<i>John W. Laing</i>	641-774-7608	jlaing@hv-vee.com
Chariton Christian Church	Reverend	C.J. Latham		641-774-2375	pastor@ccc@gmail.com

Lucas County Iowa Hazard Mitigation Planning – Hazard Scoring

Human Caused / Combination Hazards	Natural Hazards				
	Probability	Magnitude/ Severity	Warning Time	Duration	
Flash Flood	10	2	4	2	11
Tornadoes	13	4	3	1	10
Windstorms	20	3	1	2	11
Extreme Heat	5	2	4	4	13
Hailstorms	11	3	4	2	11
Grass or Wild Land Fire	15	2	4	2	10
Sinkholes	17	2	4	2	10
River Flooding	1	4	4	4	15
Severe Winter Storms	9	3	2	3	11
Drought	21	2	1	4	9
Earthquakes	8	4	4	1	10
Landslide	23	2	4	1	8
Expansive Soils	28	2	4	1	8
Thunderstorm & Lightning	14	3	4	1	10
Dam Failure	14	3	4	2	10
Levee Failure	12	3	4	3	11
Human Disease	19	3	1	4	9
Hazardous Materials	3	4	4	3	13
Transportation Incident	6	4	4	2	12
Infrastructure Failure	8	4	4	4	14
Terrorism	8	3	4	4	12
Radiological	4	4	4	4	13
Animal/Plant/Crop Disease	9	3	3	4	12

Scoring Criteria

PROBABILITY:

- 1- Unlikely
- 2- Occasional
- 3- Likely
- 4- Highly Likely

MAGNITUDE/SEVERITY:

- 1 Negligible
- 2 Limited
- 3 Critical
- 4 Catastrophic

WARNING TIME:

- 1 24+ hours
- 2 12-24 hours
- 3 6-12 hours
- 4 Minimal (less than 6hrs)

DURATION:

- 1 Less than 6 hrs
- 2 Less than 1 day
- 3 Less than 1 week
- 4 More than 1 wk

Jurisdiction:

Lucas County University

Date:

12/14/14

Lucas County Iowa Hazard Mitigation Planning – Hazard Scoring

	Probability	Magnitude/ Severity	Warning Time	Duration
Flash Flood	2 N/A	2	4	3
Tornadoes	5 yes 3	2	4	1
Windstorms	1 yes 3	2	4	1
Extreme Heat	3 yes 3	1	4	3
Hailstorms	10 yes 2	1	4	1
Grass or Wild Land Fire	14 yes 2	1	3	1
Sinkholes	17 yes 1	1	3	1
River Flooding	18 N/A	1	3	3
Severe Winter Storms	9 yes 2	2	2	2
Drought	11 yes 2	2	1	4
Earthquakes	16 yes 1	1	4	1
Landslide	21 yes 1	1	1	1
Expansive Soils	20 yes 1	1	1	1
Thunderstorm & Lightning	4 yes 2	2	4	1
Dam Failure				
Levee Failure				
Human Disease	15 2	1	1	1
Hazardous Materials	7 2	1	4	3
Transportation Incident	8 1	1	4	3
Infrastructure Failure	6 1	1	4	3
Terrorism	13 1	1	4	2
Radiological	12 1	1	4	2
Animal/Plant/Crop Disease	19 1	1	1	2

Scoring Criteria

PROBABILITY:

- 1- Unlikely
- 2- Occasional
- 3- Likely
- 4- Highly Likely

MAGNITUDE/SEVERITY:

- 1 Negligible
- 2 Limited
- 3 Critical
- 4 Catastrophic

WARNING TIME:

- 1 24+ hours
- 2 12-24 hours
- 3 6-12 hours
- 4 Minimal (less than 6hrs)

DURATION:

- 1 Less than 6 hrs
- 2 Less than 1 day
- 3 Less than 1 week
- 4 More than 1 wk

Jurisdiction: Williamson

Date: 14 Oct 14

Lucas County Iowa Hazard Mitigation Planning – Hazard Scoring

		Probability	Magnitude/ Severity	Warning Time	Duration		
Natural Hazards	Flash Flood	17	2	2	3	9	
	Tornadoes	2	4	3	4	13	
	Windstorms	3	4	3	4	13	
	Extreme Heat	21	2	1	4	9	
	Hailstorms	18	2	3	2	9	
	Grass or Wild Land Fire	19	1	4	2	9	
	Sinkholes	15	1	4	3	10	
	River Flooding	10	2	3	4	11	
	Severe Winter Storms	8	3	2	3	11	
	Drought	14	2	1	4	10	
	Earthquakes	14	1	4	3	10	
	Landslide	12	2	4	3	11	
	Expansive Soils	11	2	4	3	11	
	Thunderstorm & Lightning	1	4	4	2	13	
	Dam Failure						
	Levee Failure						
	Human Caused / Combination Hazards	Human Disease	13	2	1	4	10
		Hazardous Materials	5	2	4	3	14
	Transportation Incident	4	2	4	3	12	
	Infrastructure Failure	9	3	1	4	11	
	Terrorism	7	1	4	4	12	
	Radiological	6	1	4	4	12	
	Animal/Plant/Crop Disease	20	2	1	4	9	

Scoring Criteria

PROBABILITY:

- 1- Unlikely
- 2- Occasional
- 3- Likely
- 4- Highly Likely

MAGNITUDE/SEVERITY:

- 1 Negligible
- 2 Limited
- 3 Critical
- 4 Catastrophic

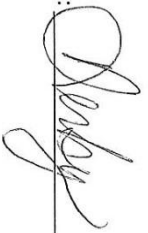
WARNING TIME:

- 1 24+ hours
- 2 12-24 hours
- 3 6-12 hours
- 4 Minimal (less than 6hrs)

DURATION:

- 1 Less than 6 hrs
- 2 Less than 1 day
- 3 Less than 1 week
- 4 More than 1 wk

Jurisdiction:



Date:

Lucas County Iowa Hazard Mitigation Planning – Hazard Scoring

	Probability	Magnitude/ Severity	Warning Time	Duration
Flash Flood	3	3	3	3
Tornadoes	2	2	4	1
Windstorms	3	2	4	3
Extreme Heat	3	2	4	1
Hailstorms	2	2	4	2
Grass or Wild Land Fire	4	3	4	4
Sinkholes	1	2	4	3
River Flooding	3	3	3	3
Severe Winter Storms	3	3	1	2
Drought	3	3	2	4
Earthquakes	1	2	4	1
Landslide	1	2	4	2
Expansive Soils	1	2	4	2
Thunderstorm & Lightning	3	3	3	2
Dam Failure	1	2	3	3
Levee Failure	1	2	3	3
Human Disease	1	3	1	4
Hazardous Materials	2	3	4	2
Transportation Incident	3	3	4	2
Infrastructure Failure	1	3	4	3
Terrorism	1	3	4	4
Radiological	1	3	4	4
Animal/Plant/Crop Disease	1	3	1	4

Scoring Criteria

PROBABILITY:

- 1- Unlikely
- 2- Occasional
- 3- Likely
- 4- Highly Likely

MAGNITUDE/SEVERITY:

- 1 Negligible
- 2 Limited
- 3 Critical
- 4 Catastrophic

WARNING TIME:

- 1 24+ hours
- 2 12-24 hours
- 3 6-12 hours
- 4 Minimal (less than 6hrs)

DURATION:

- 1 Less than 6 hrs
- 2 Less than 1 day
- 3 Less than 1 week
- 4 More than 1 wk

Jurisdiction: Chariton

Date: 10-14

Lucas County Iowa Hazard Mitigation Planning – Hazard Scoring

	Probability	Magnitude/ Severity	Warning Time	Duration	
Flash Flood	2	1	3	3	8
Tornadoes	5	2	4	2	10
Windstorms	3	1	3	1	9
Extreme Heat	1	1	4	3	8
Hailstorms	15	1	3	1	11
Grass or Wild Land Fire	17	1	3	1	7
Sinkholes	20	1	1	3	7
River Flooding	16	1	2	3	6
Severe Winter Storms	4	2	1	3	7
Drought	2	1	4	4	11
Earthquakes	12	1	1	1	5
Landslide	25	1	1	1	4
Expansive Soils	18	1	4	1	7
Thunderstorm & Lightning	4	2	4	1	9
Dam Failure	11	1	3	3	8
Levee Failure	12	1	3	3	8
Human Caused / Combination Hazards					
Human Disease	14	1	1	3	7
Hazardous Materials	10	2	4	1	8
Transportation Incident	7	1	4	2	8
Infrastructure Failure	4	1	4	2	8
Terrorism	13	1	4	2	9
Radiological	14	1	4	1	7
Animal/Plant/Crop Disease	21	1	1	2	5

Scoring Criteria

PROBABILITY:

- 1- Unlikely
- 2- Occasional
- 3- Likely
- 4- Highly Likely

MAGNITUDE/SEVERITY:

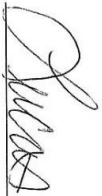
- 1 Negligible
- 2 Limited
- 3 Critical
- 4 Catastrophic

WARNING TIME:

- 1 24+ hours
- 2 12-24 hours
- 3 6-12 hours
- 4 Minimal (less than 6hrs)

DURATION:

- 1 Less than 6 hrs
- 2 Less than 1 day
- 3 Less than 1 week
- 4 More than 1 wk

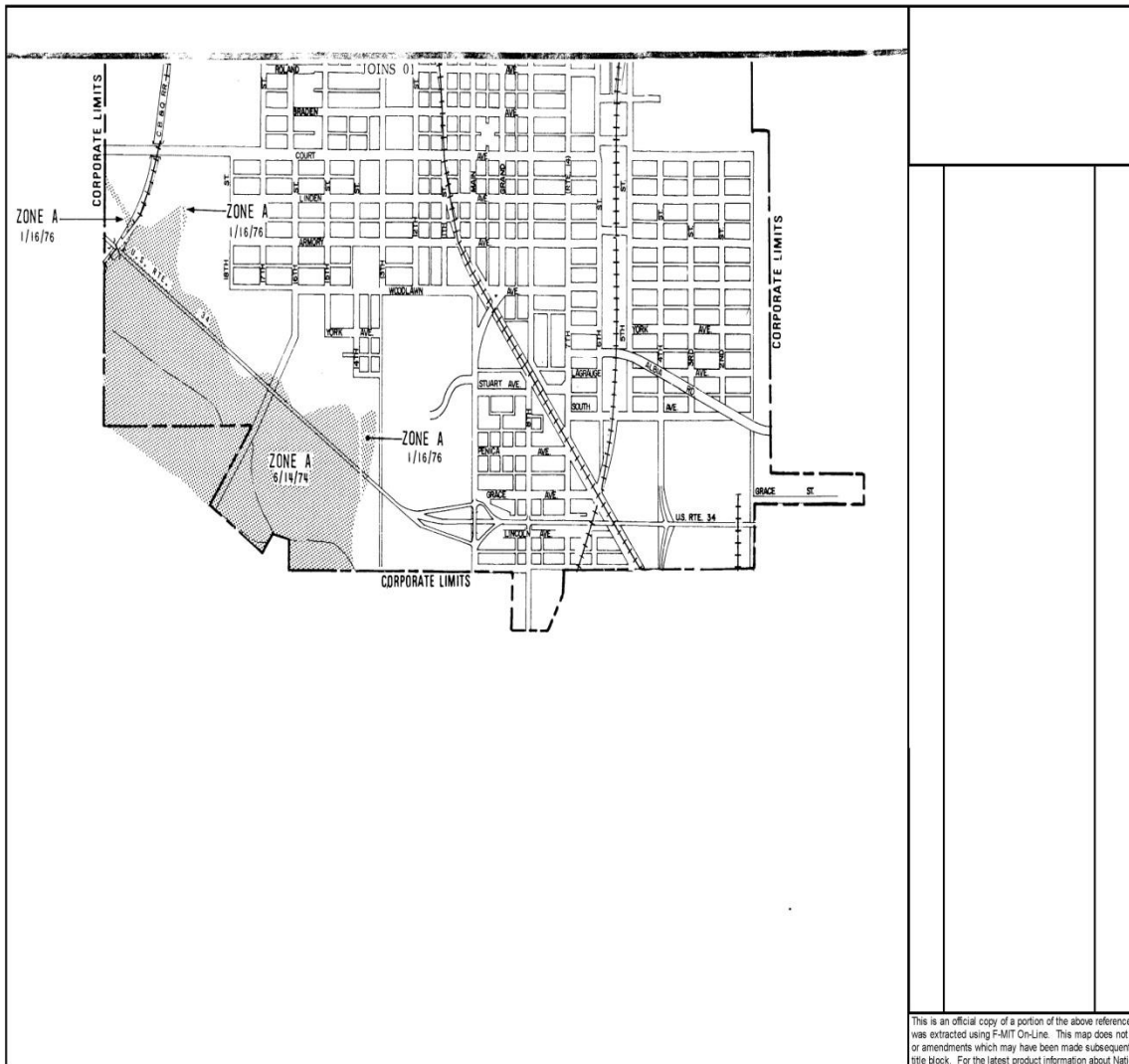
Jurisdiction: 

Date: 14 Oct 14

Appendix 19: Hazards by Jurisdiction

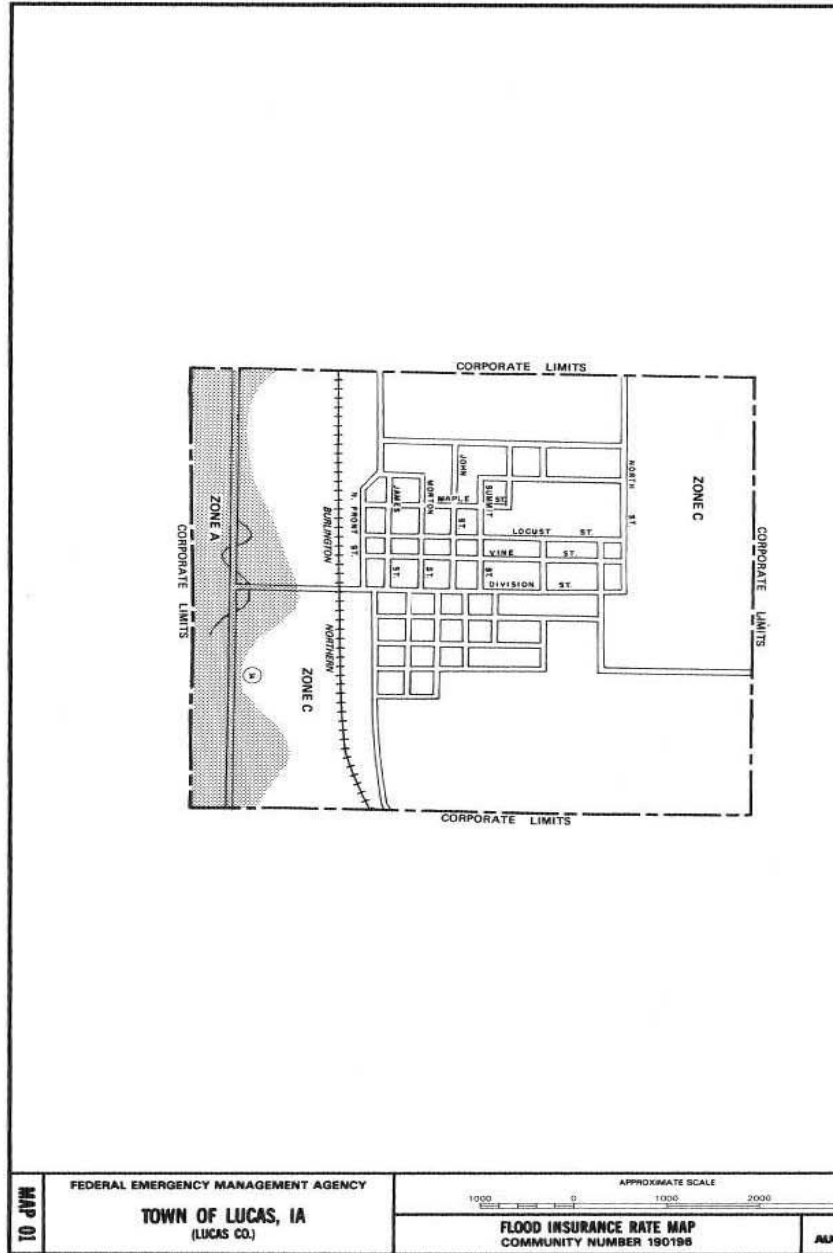
		LUCAS COUNTY- Unincorp	CHARITON	RUSSELL	WILLIAMSON	LUCAS	DERBY	Chariton Public School	Lucas Co Health Center	Red Haw Lake
Natural Hazards	HAZARDS									
	Flash Flood	X	X	X	X	X	X	X	X	X
	Tornado	X	X	X	X	X	X	X	X	X
	Windstorms	X	X	X	X	X	X	X	X	X
	Extreme Heat	X	X	X	X	X	X	X	X	X
	Hailstorm	X	X	X	X	X	X	X	X	X
	Grass / Wild land fire	X	X	X	X	X	X	X	X	X
	Sink Holes	X	X	X	X	X	X	X	X	X
	River Flooding	X	X	X	X	X	X	X	X	X
	Severe Winter Storm	X	X	X	X	X	X	X	X	X
	Drought	X	X	X	X	X	X	X	X	X
	Earthquake	X	X	X	X	X	X	X	X	X
	Landslide	X	X	X	X	X	X	X	X	X
	Expansive Soils	X	X	X	X	X	X	X	X	X
	Thunderstorm / Lightning	X	X	X	X	X	X	X	X	X
	Dam Failure	X	X				X			X
Levee Failure	X	X				X			X	
Human Caused / Combination Hazards										
	Human Disease	X	X	X	X	X	X	X	X	X
	Hazardous Materials	X	X	X	X	X	X	X	X	X
	Transport. Incident	X	X	X	X	X	X	X	X	X
	Terrorism	X	X	X	X	X	X	X	X	X
	Radiological	X	X	X	X	X	X	X	X	X
	Animal/plant/crop disease	X	X	X	X	X	X	X	X	X
Infrastructure Failure	X	X	X	X	X	X	X	X	X	

Appendix 20: Chariton FIRM

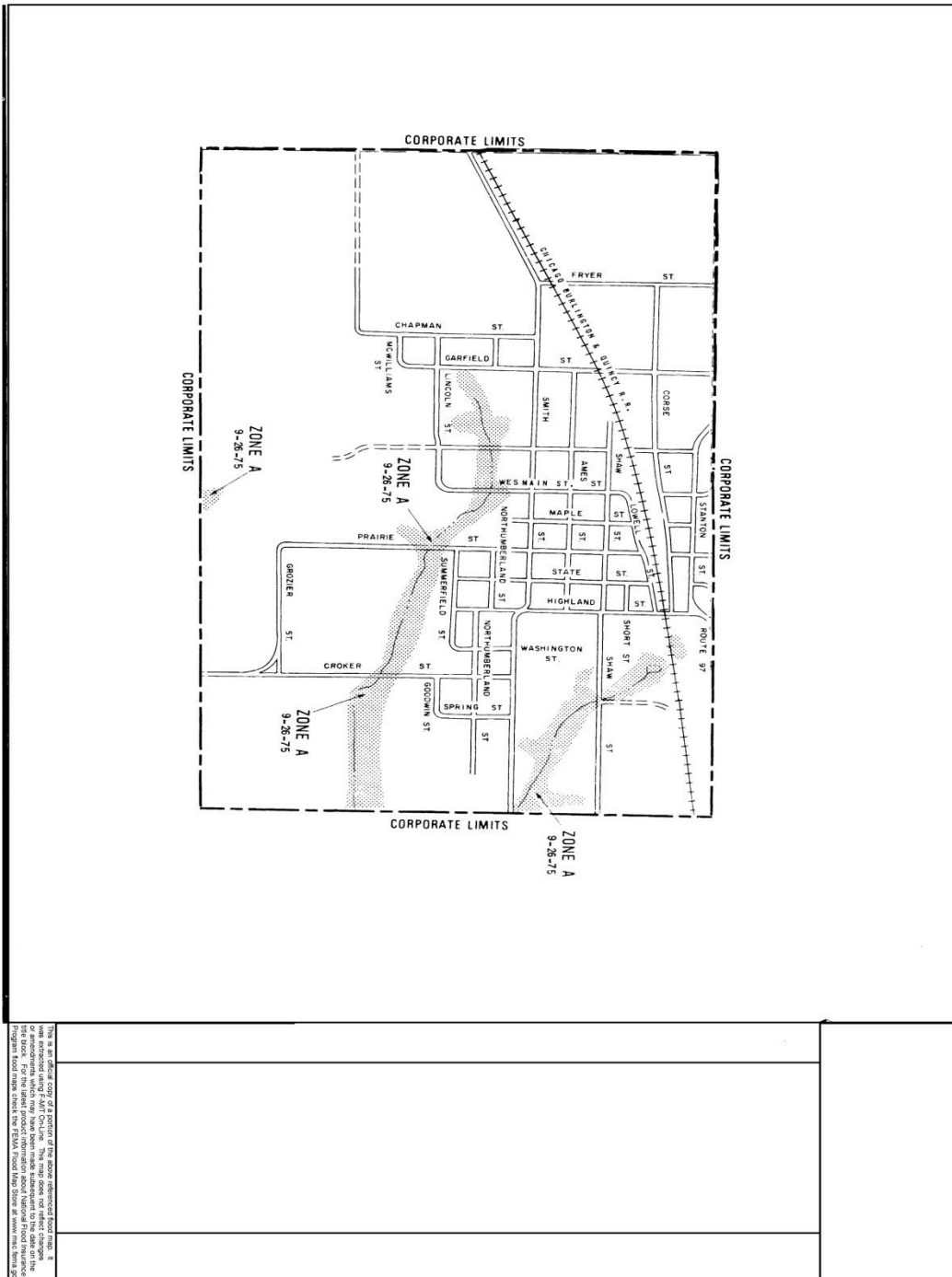


This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

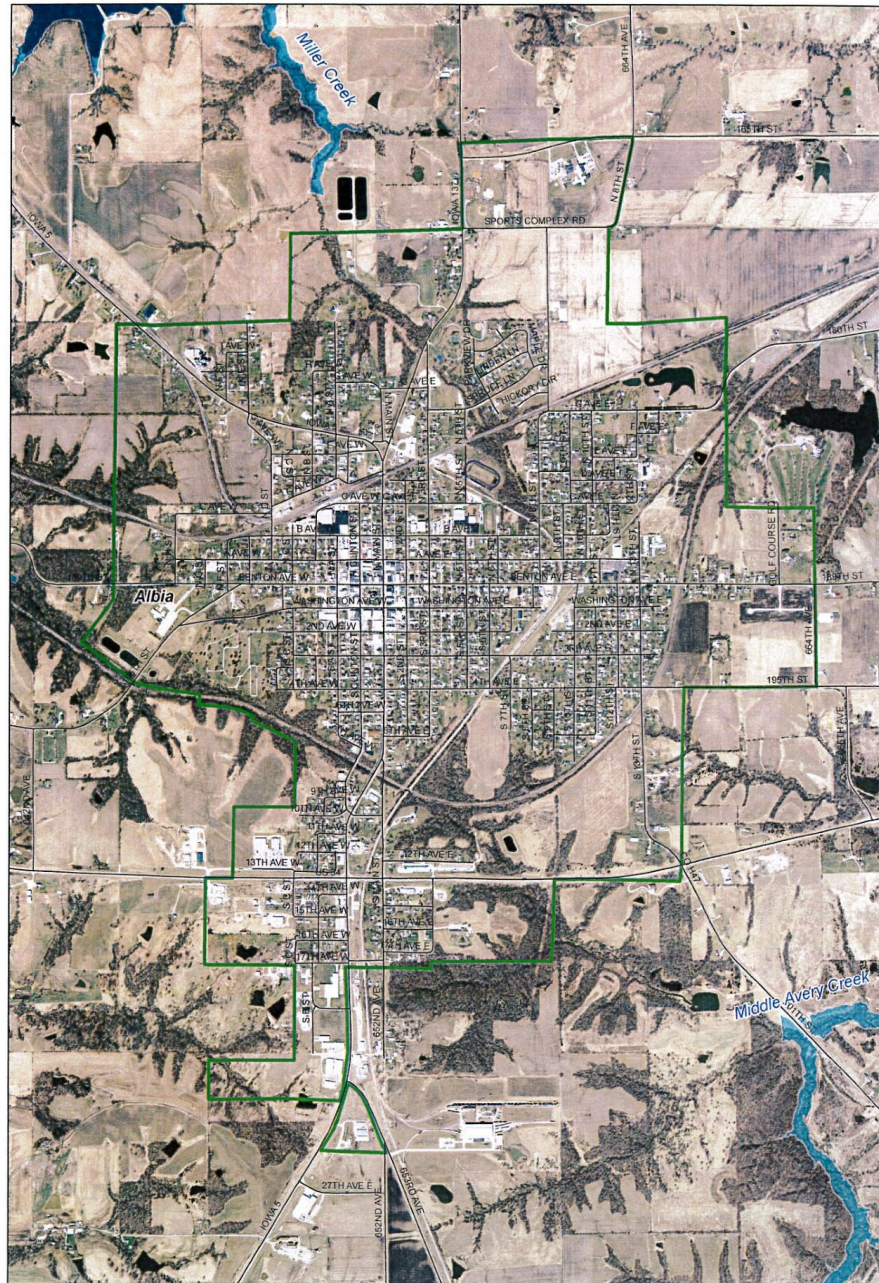
Appendix 21: Lucas FIRM



Appendix 22: Russell FIRM



Appendix 23: Iowa DNR Draft Floodplain Mapping



Iowa Draft Flood Hazard Products

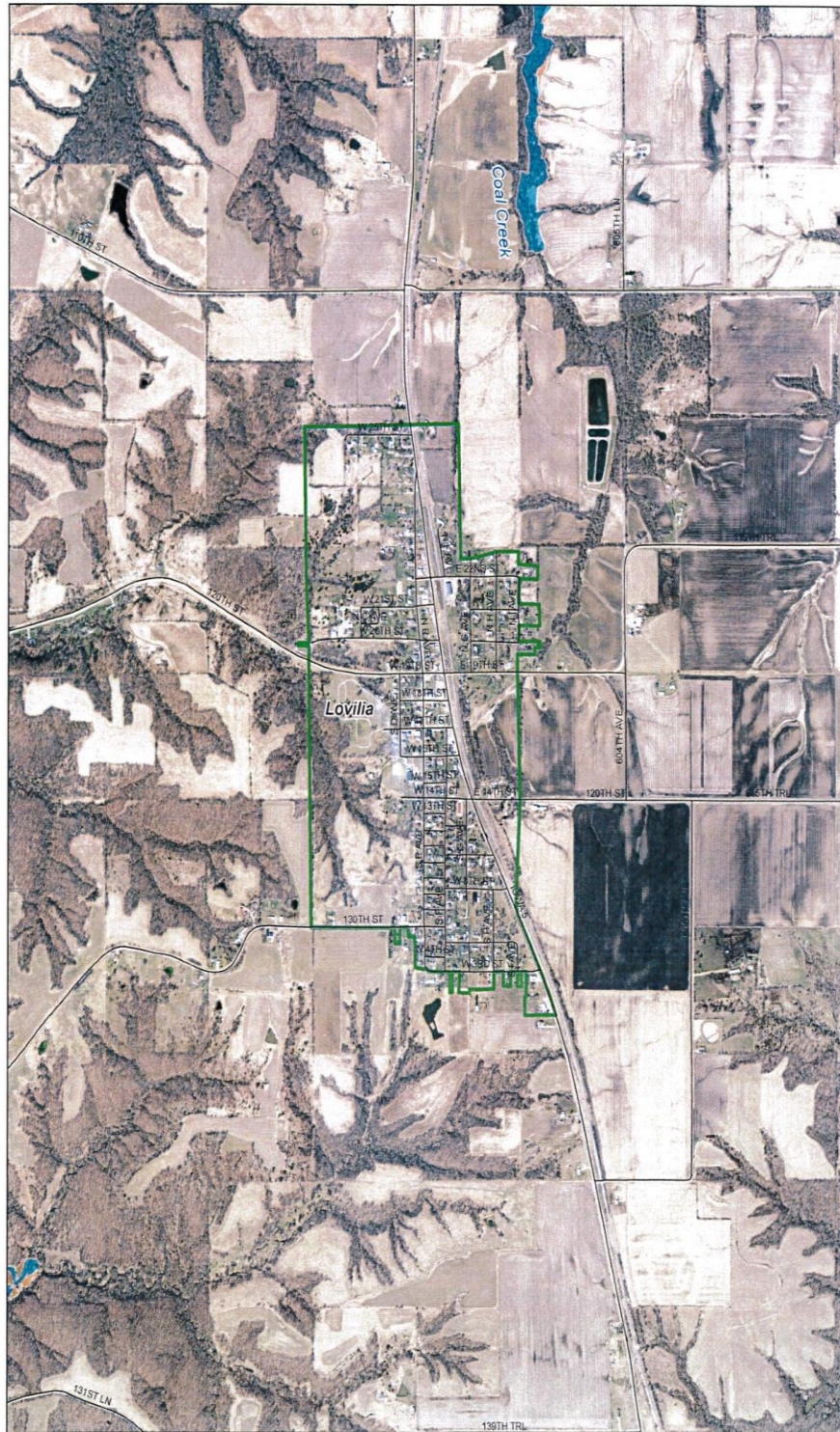


The digital spatial files of the Preliminary Flood Hazard Information for Monroe County, IA will be released upon your understanding and concurrence to the following conditions:
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DRAFT
City of Albia
 1 inch = 1,250 feet

- Flood Zone Legend**
- A-1 PCT ANNUAL CHANCE
 - AE-1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products

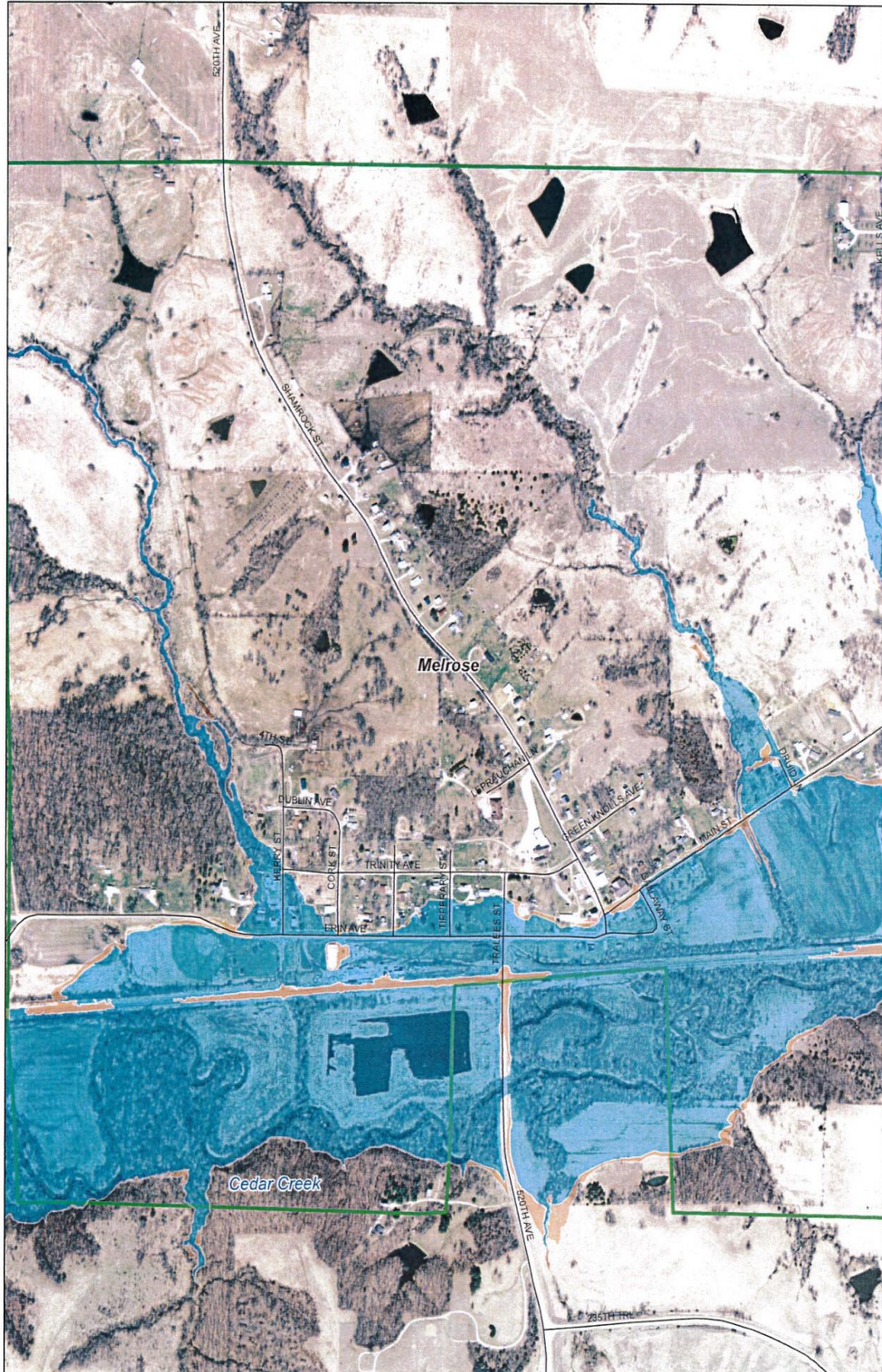


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DRAFT
 City of Lovilia
 1 inch = 1,000 feet

Flood Zone Legend
 A - 1 PCT ANNUAL CHANCE
 AE - 1 PCT ANNUAL CHANCE
 02 PCT ANNUAL CHANCE








Iowa Draft Flood Hazard Products

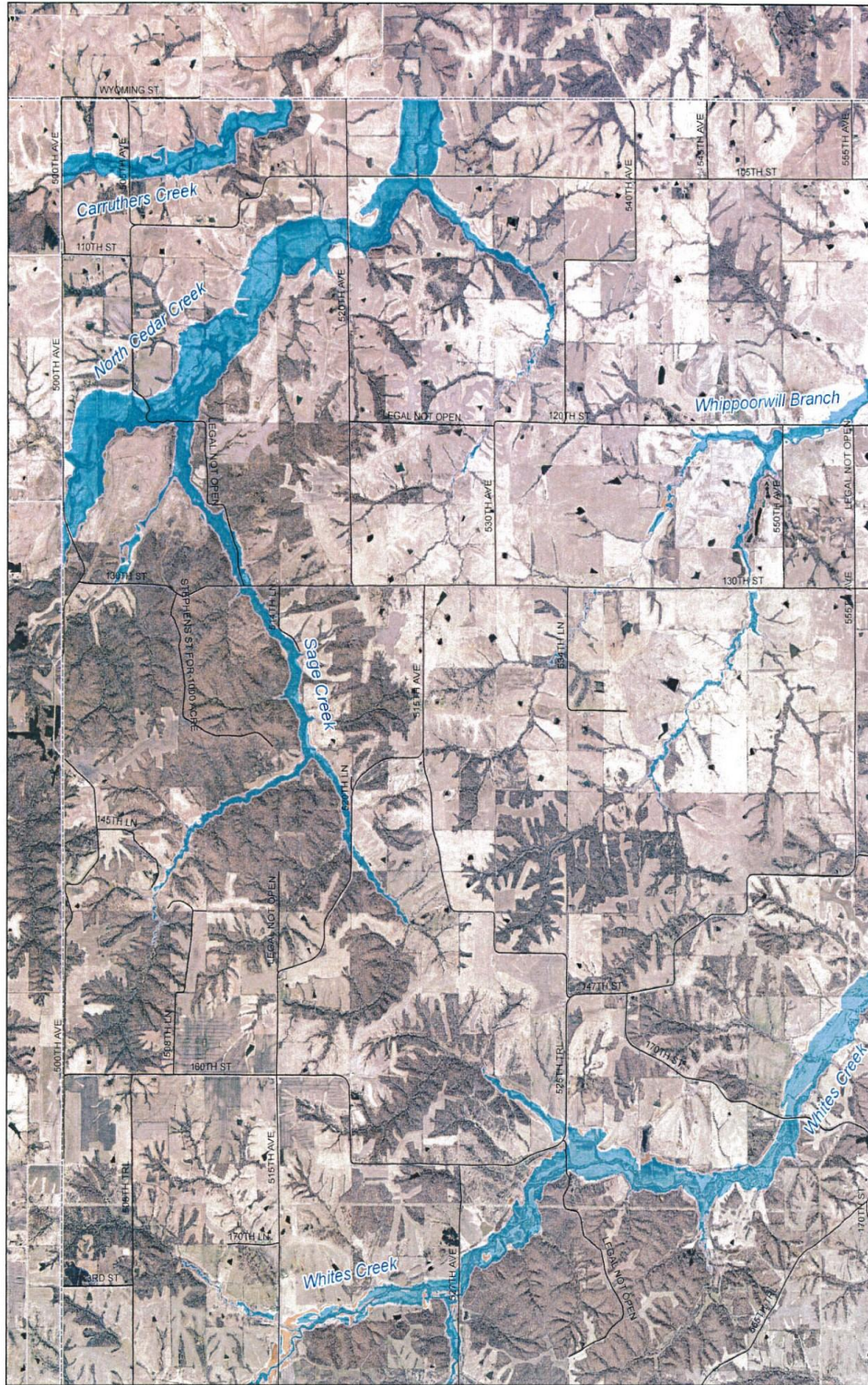
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DRAFT
City of Melrose
 1 inch = 500 feet



- Flood Zone Legend**
-  A - 1 PCT ANNUAL CHANCE
 -  AE - 1 PCT ANNUAL CHANCE
 -  0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



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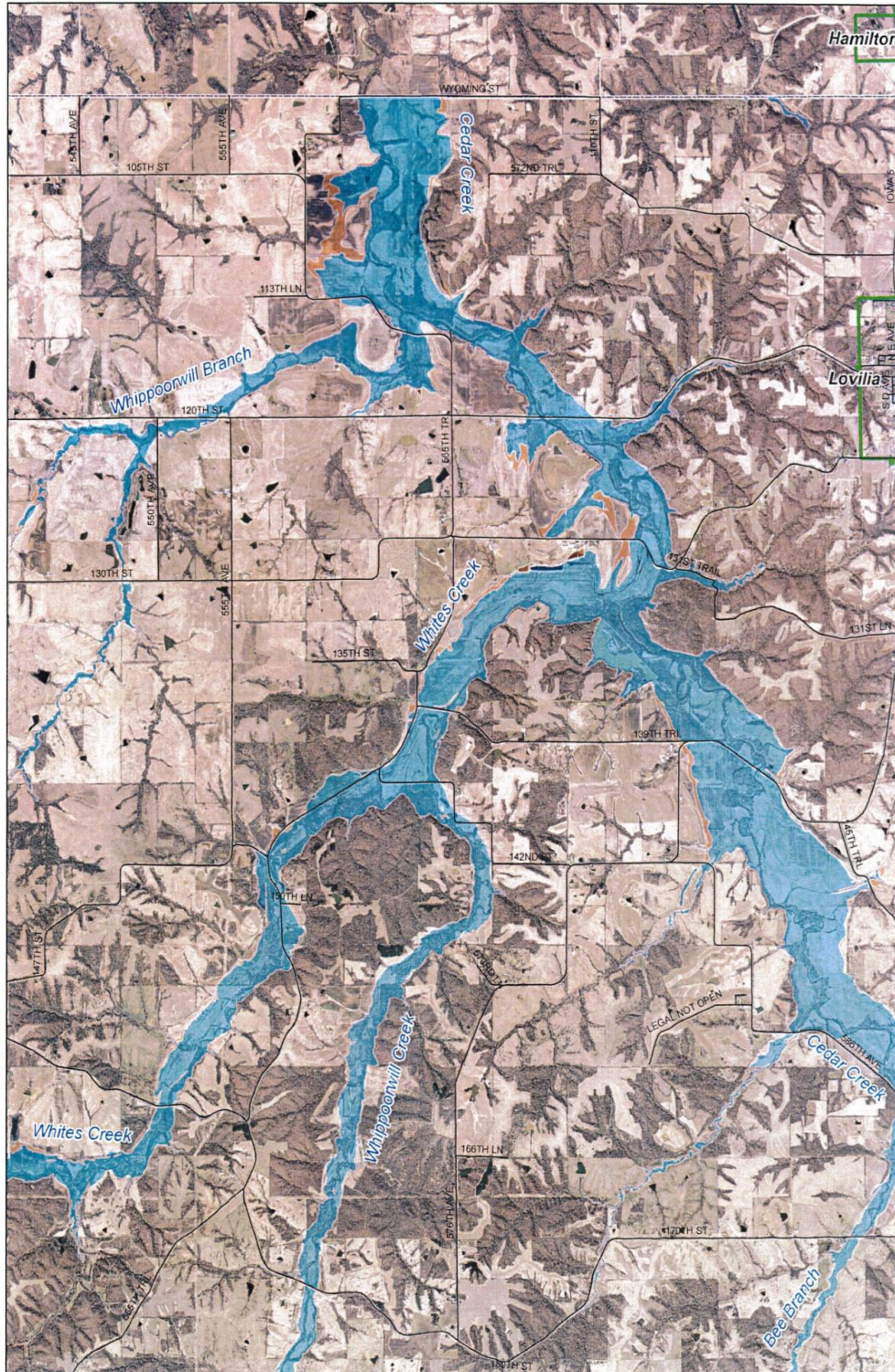
INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map A1
 1 inch = 3,000 feet

- Flood Zone Legend**
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



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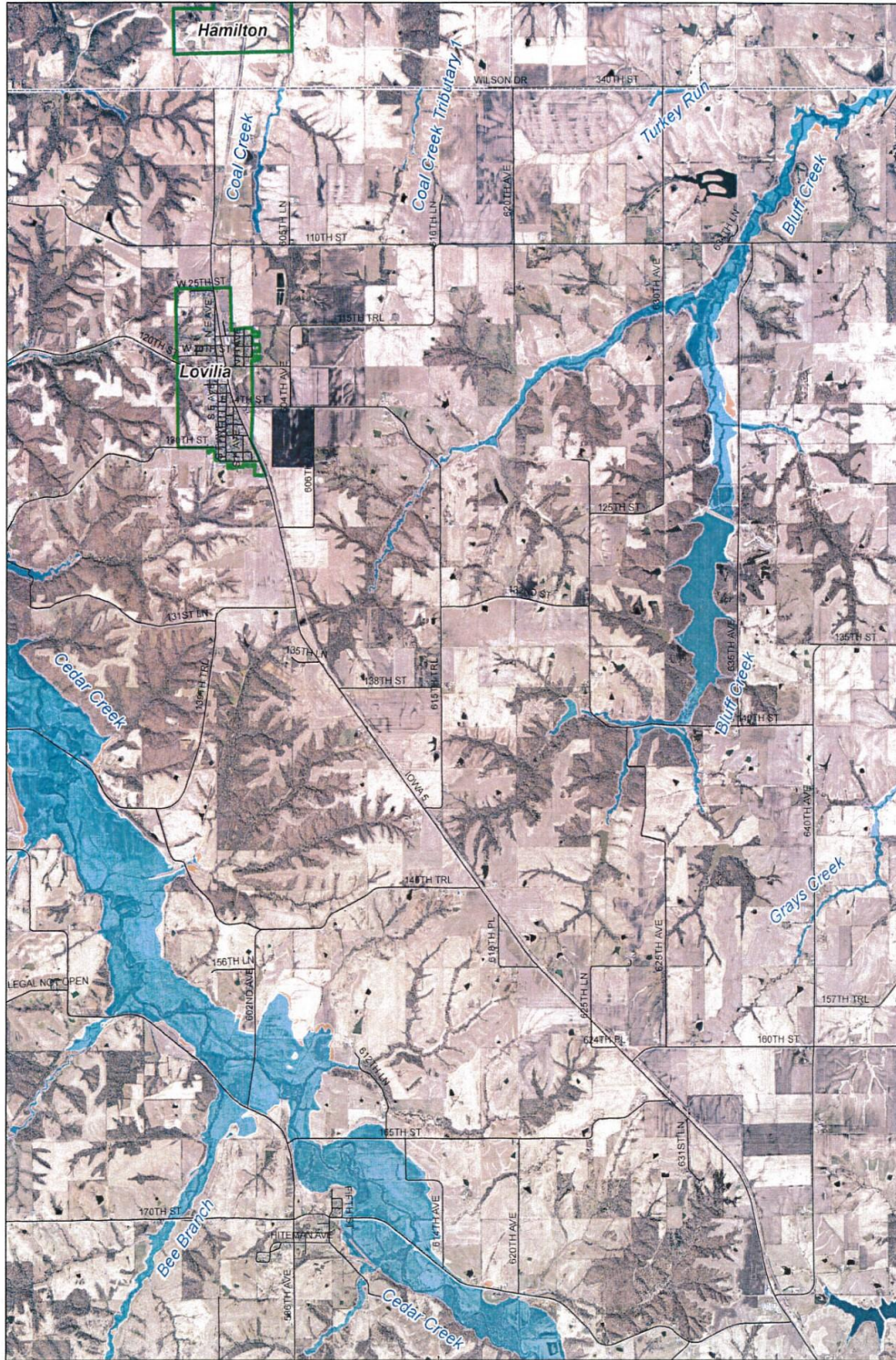
INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map A2
 1 inch = 3,000 feet

- Flood Zone Legend
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



The digital spatial files of the Preliminary Flood Hazard Information for Monroe County, IA will be revised upon your understanding and concurrence to the following conditions.
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 *This flood hazard information should not be used for mandatory flood insurance requirement purposes.

INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map A3
 1 inch = 3,000 feet

- Flood Zone Legend**
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



The digital spatial files of the Preliminary Flood Hazard Information for Lucas County, IA will be released upon your understanding and concurrence to the following conditions:

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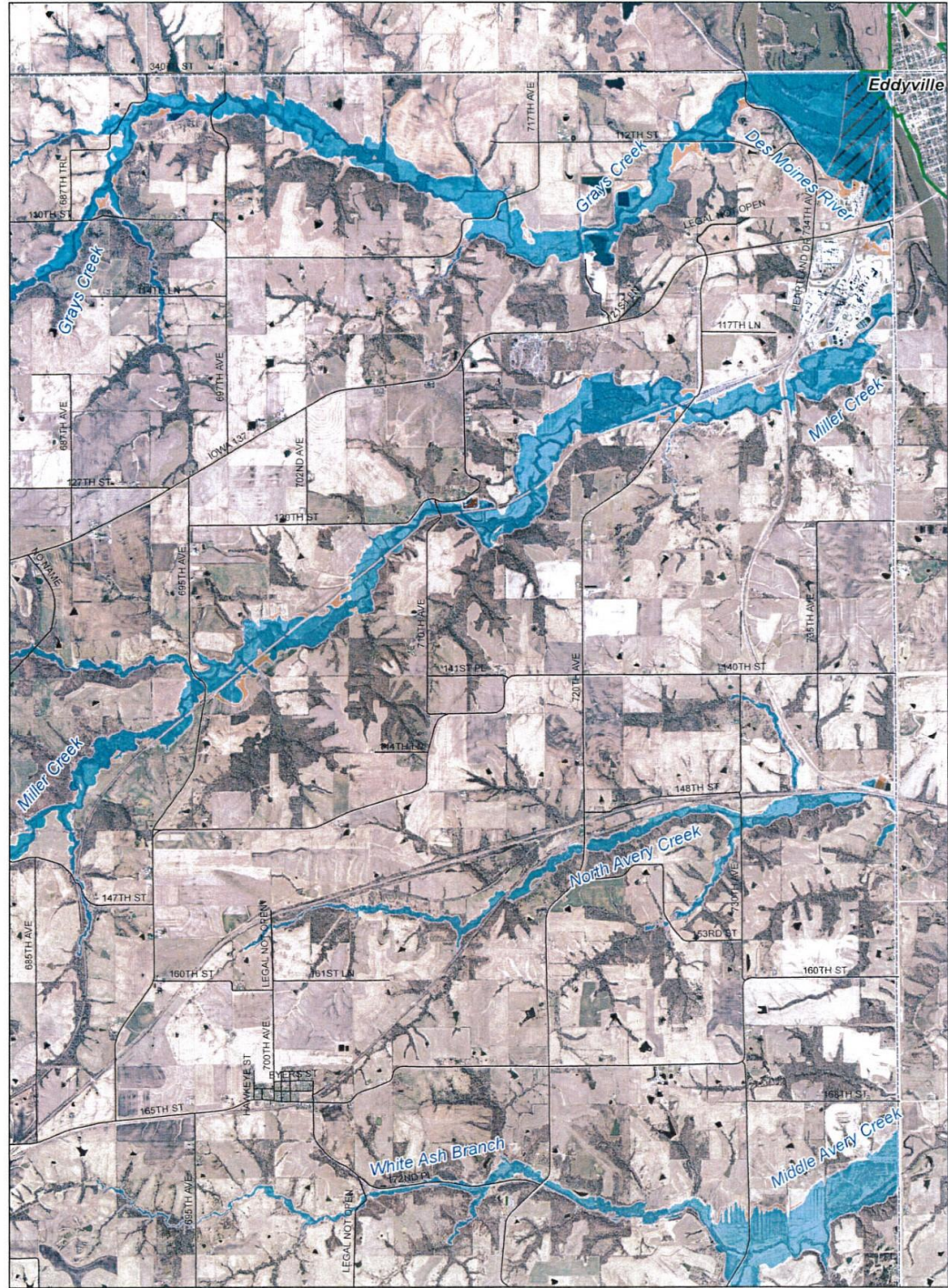
INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map A4
 1 inch = 3,000 feet

- Flood Zone Legend**
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - O2 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



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INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map A5
 1 inch = 3,000 feet

- Flood Zone Legend**
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



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INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map B1
 1 inch = 3,000 feet

- Flood Zone Legend
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



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INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map B2
 1 inch = 3,000 feet

Flood Zone Legend

- A - 1 PCT ANNUAL CHANCE
- AE - 1 PCT ANNUAL CHANCE
- 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



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INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

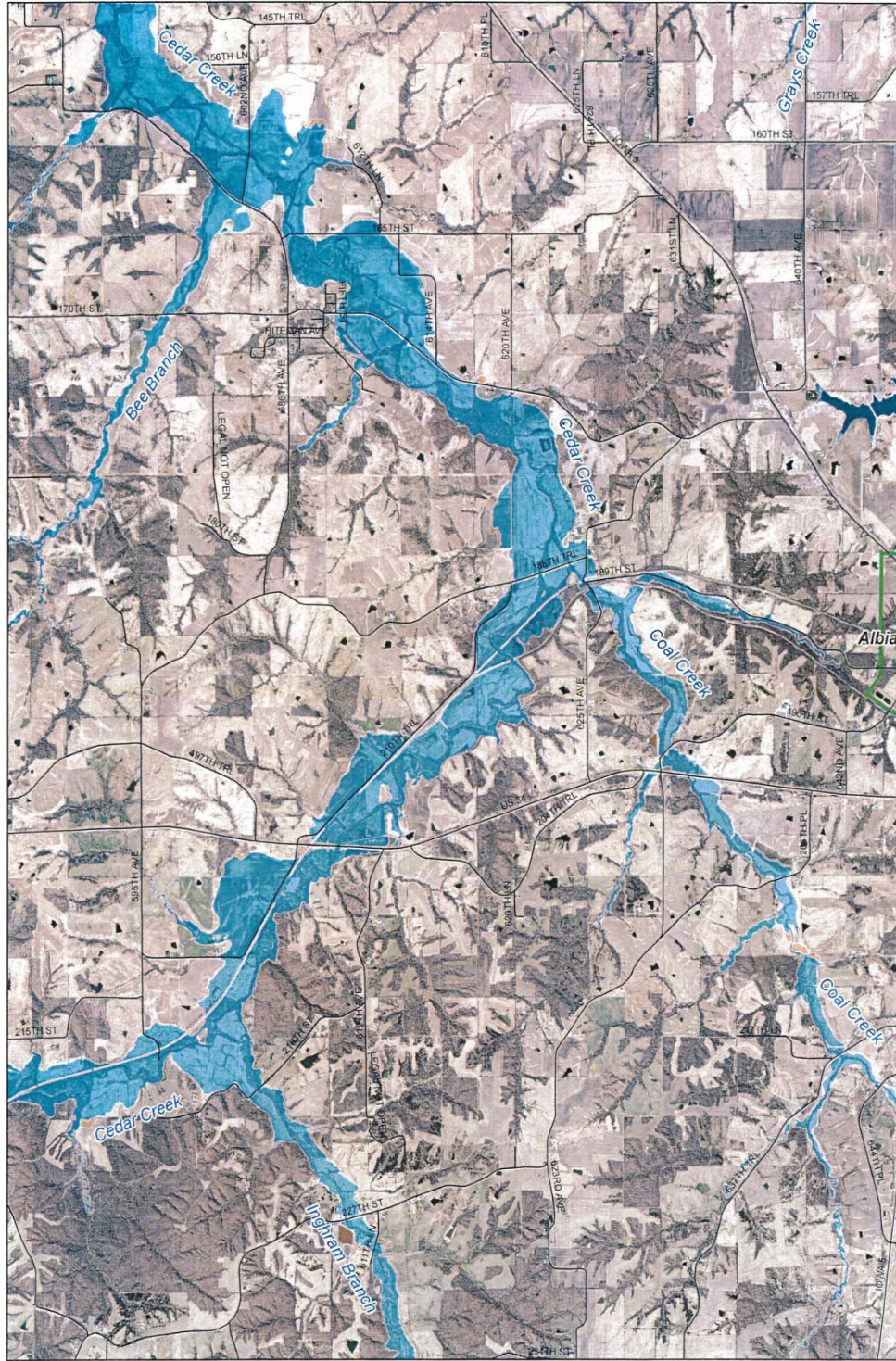
DRAFT

Map B3

1 inch = 3,000 feet

- Flood Zone Legend**
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



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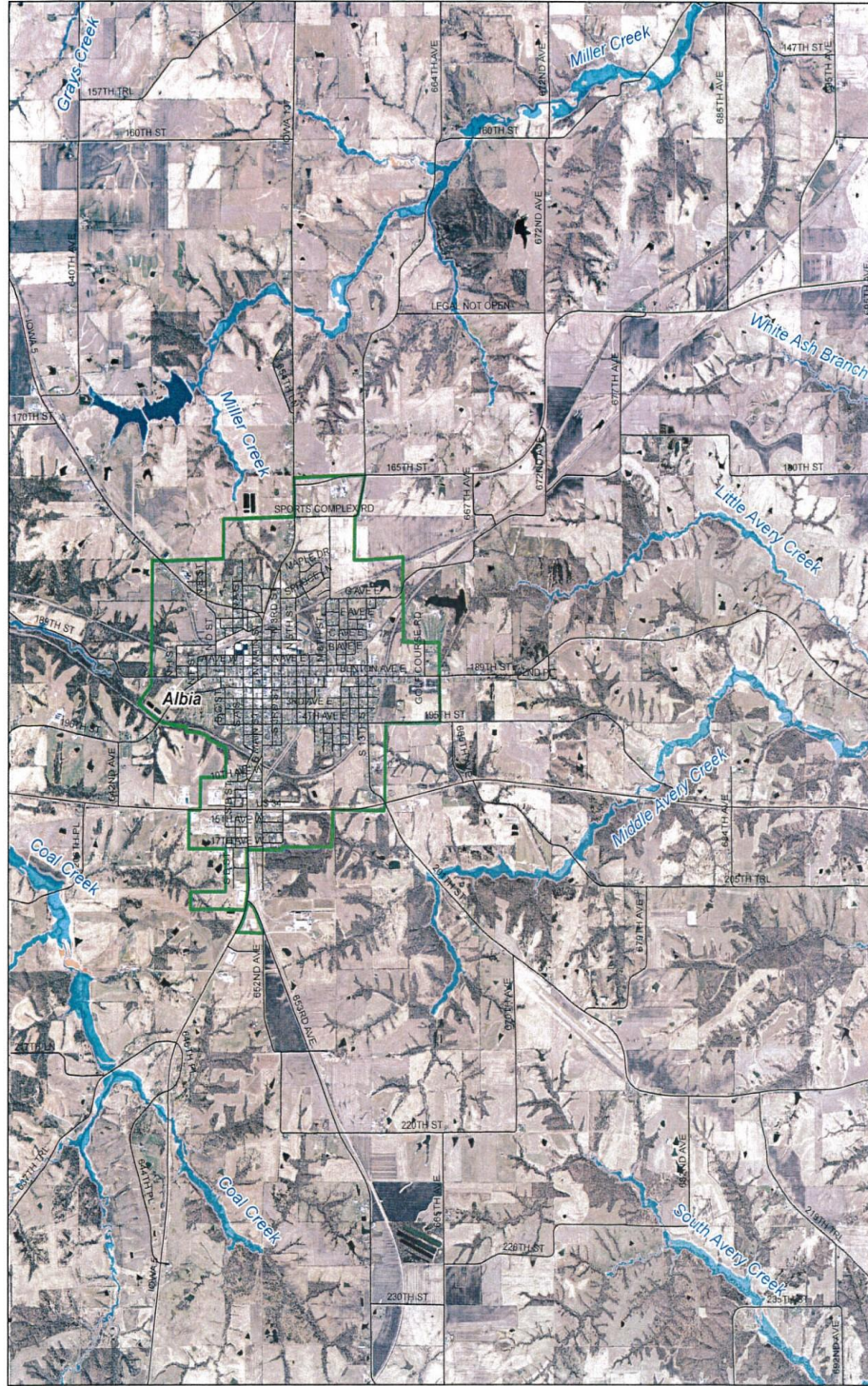
INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map B3
 1 inch = 3,000 feet

- Flood Zone Legend**
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



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INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map B4
 1 inch = 3,000 feet

- Flood Zone Legend
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



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 *The flood hazard information should not be used for mandatory flood insurance requirement purposes.

INDEX MAP				
A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map B5
 1 inch = 3,000 feet

- Flood Zone Legend**
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





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*The flood hazard information should not be used for mandatory flood insurance requirement purposes.

Iowa Draft Flood Hazard Products

INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map B5
1 inch = 3,000 feet



- Flood Zone Legend**
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



The digital spatial files of the Preliminary Flood Hazard Information for Lucas County, IA will be released upon your understanding and concurrence to the following conditions:
 *This flood hazard information is preliminary and for outreach, advisory and review purposes only.
 *This flood hazard information is preliminary and subject to revision.
 *This flood hazard information should not be used for regulation, enforcement or insurance rating purposes.
 *This flood hazard information should not be distributed.
 *The flood hazard information should not be used for mandatory flood insurance requirement purposes.

INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map C1
 1 inch = 3,000 feet

- Flood Zone Legend
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



The digital spatial files of the Preliminary Flood Hazard Information for Monroe County, IA will be released upon your understanding and concurrence in the following conditions:
 *This flood hazard information is preliminary and for outreach, advisory and review purposes only.
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 *This flood hazard information should not be distributed.
 *This flood hazard information should not be used for mandatory flood insurance requirement purposes.

INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map C1
 1 inch = 3,000 feet

- Flood Zone Legend
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



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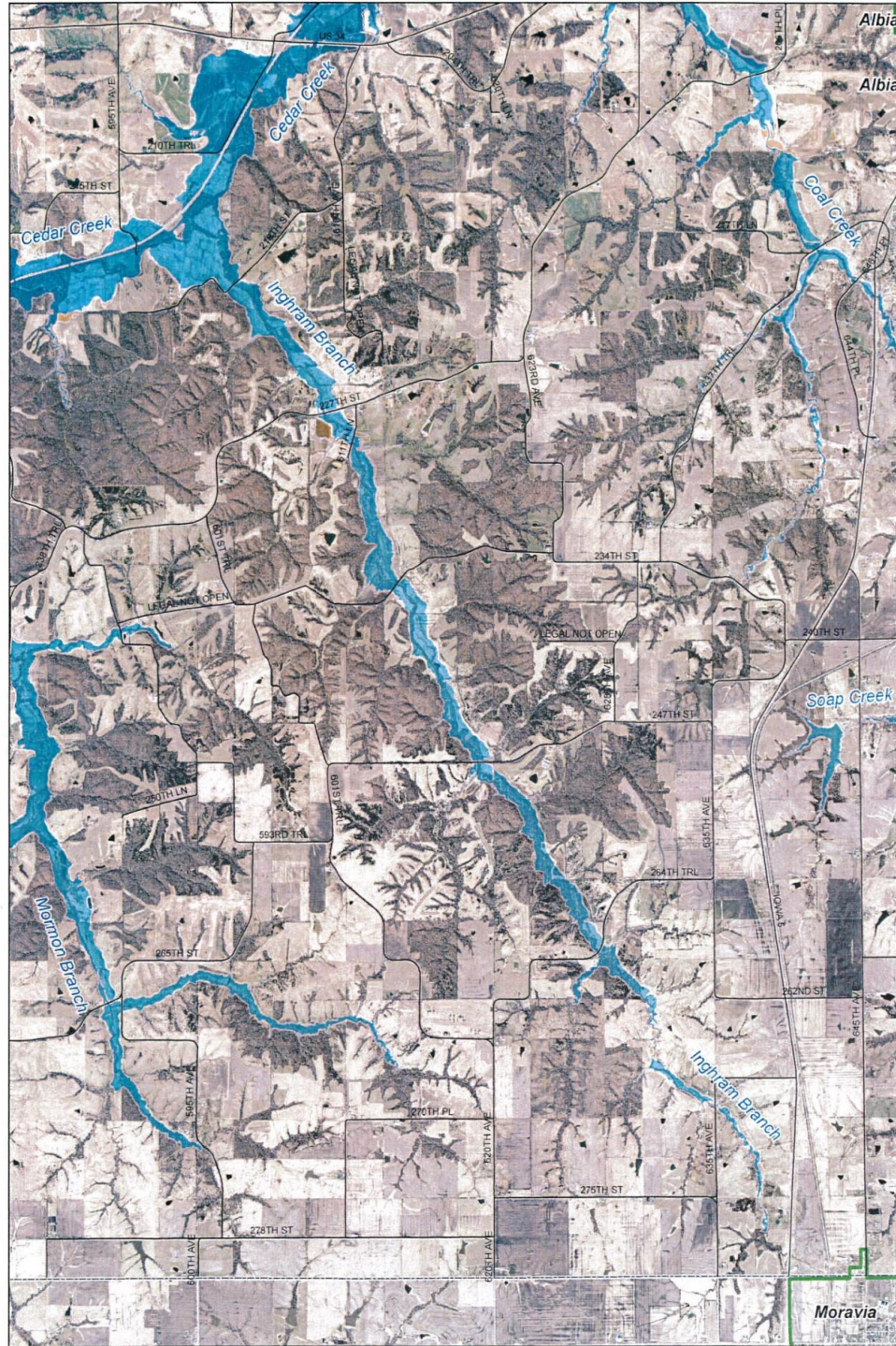
INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map C2
 1 inch = 3,000 feet

- Flood Zone Legend**
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



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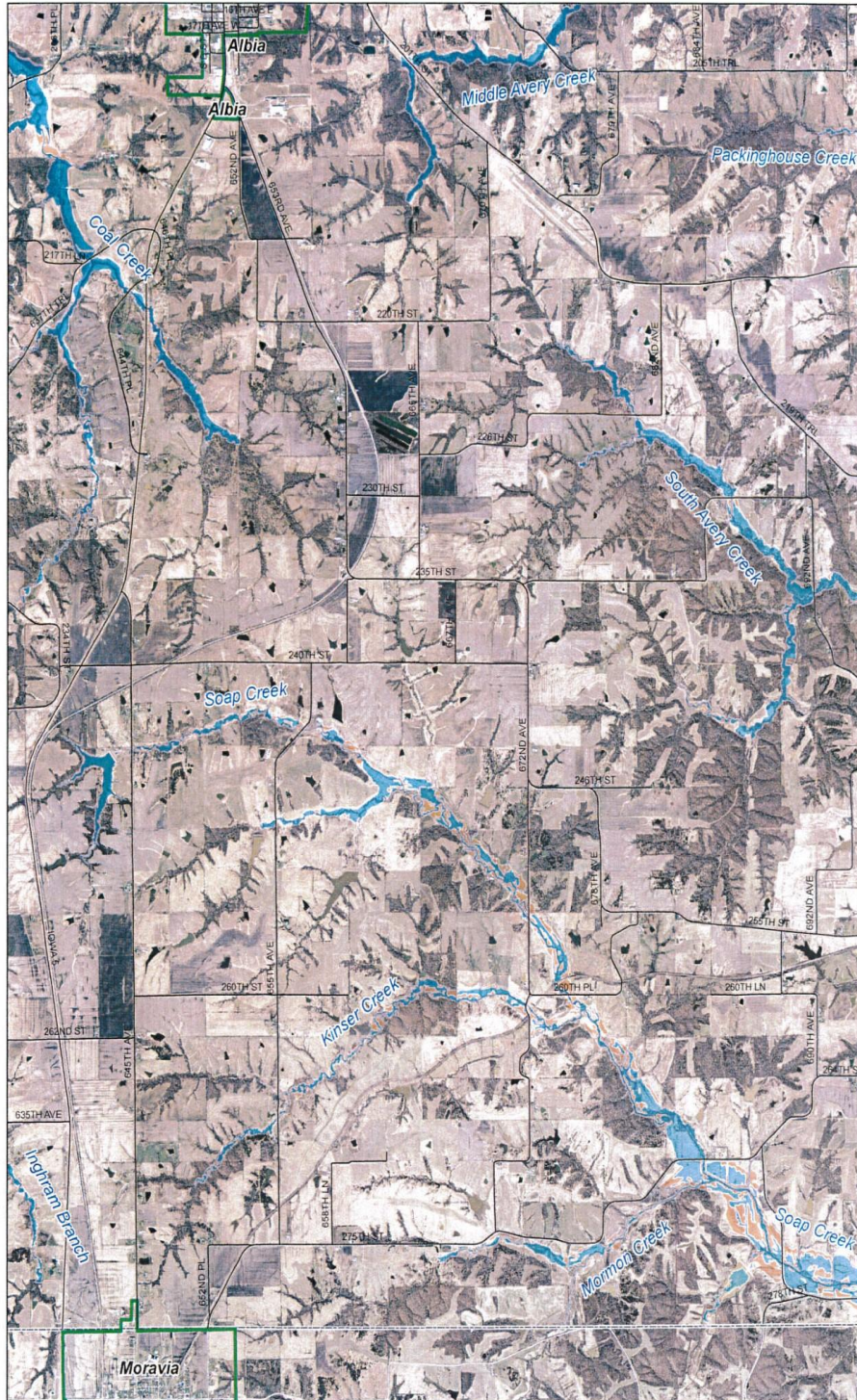
INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map C3
 1 inch = 3,000 feet

- Flood Zone Legend
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



The digital spatial files of the Preliminary Flood Hazard Information for Monroe County, IA will be released upon your understanding and concurrence to the following conditions:
 *This flood hazard information is preliminary and for review, advisory and review purposes only.
 *This flood hazard information is preliminary and subject to revision.
 *This flood hazard information should not be used for regulation, enforcement or insurance rating purposes.
 *This flood hazard information should not be distributed.
 *This flood hazard information should not be used for mandatory flood insurance requirement purposes.

INDEX MAP

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map C4
 1 inch = 3,000 feet

- Flood Zone Legend**
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE





Iowa Draft Flood Hazard Products



The digital spatial files of the Preliminary Flood Hazard Information for Monroe County, IA will be released upon your understanding and acceptance to the following conditions:
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 *This flood hazard information is preliminary and subject to revision.
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 *This flood hazard information should not be distributed.
 *The flood hazard information should not be used for mandatory flood insurance requirement purposes.

INDEX MAP				
A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5

DRAFT
Map C5
 1 inch = 3,000 feet

- Flood Zone Legend**
- A - 1 PCT ANNUAL CHANCE
 - AE - 1 PCT ANNUAL CHANCE
 - 0.2 PCT ANNUAL CHANCE



Appendix 24: Fixed Hazardous Materials Locations – ESF10

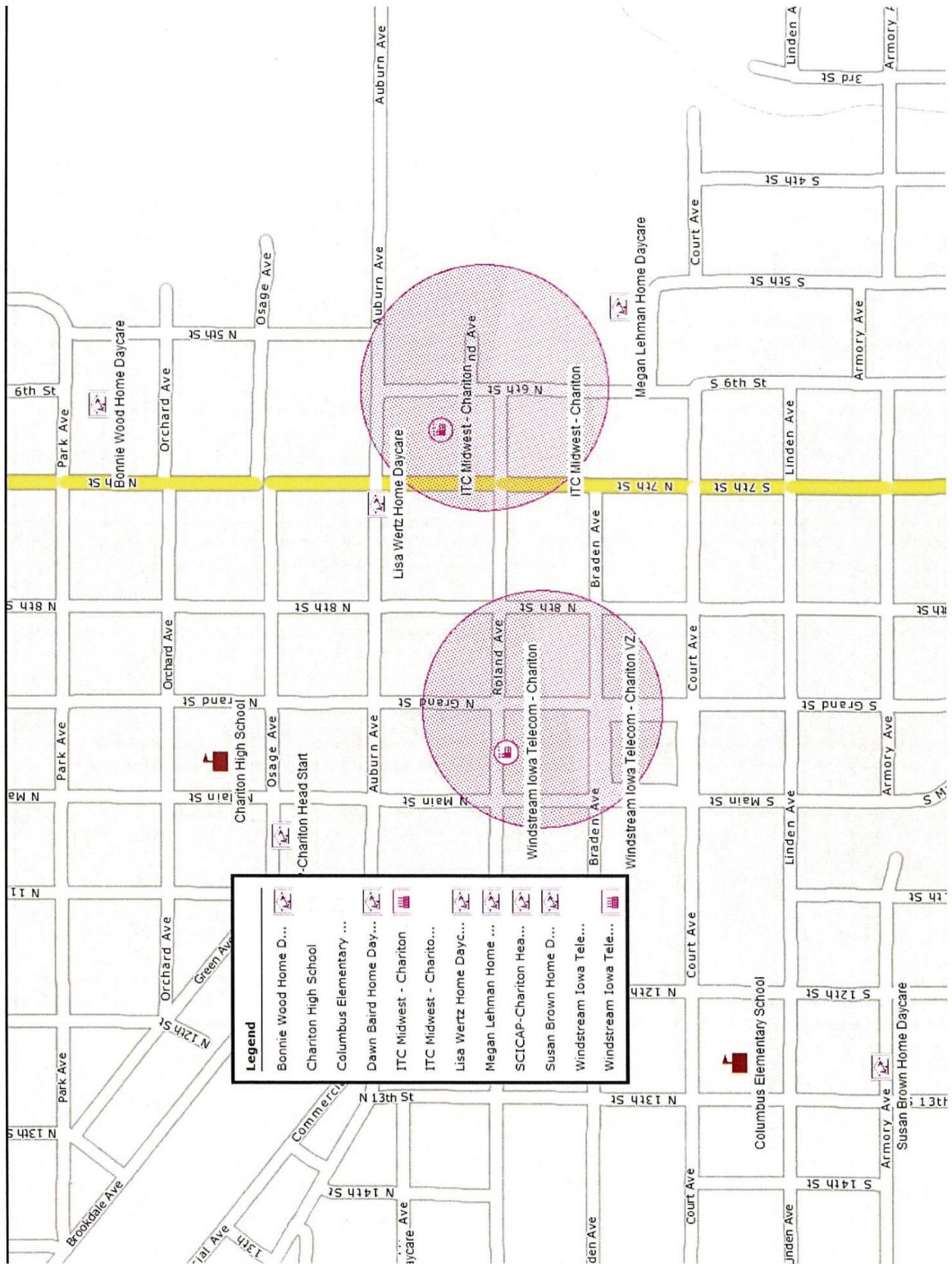
Attachment B-a
Hazard Vulnerability: Listed below are Lucas County Tier Two facilities storing a threshold quantity of Extremely Hazardous Substances, the facility coordinator and the facility phone numbers.
 The planning vulnerability zones were recommended by the Lucas County LEPC. The recommendations considered the downwind distance provided from the DOT's Emergency Response Guidebook, the EPA's Risk Management Program alternate and worst case scenario data, the EPA's Cameo Screenings modeling and Cameo's ALOHA modeling software. Please use caution with the Cameo screenings data as its purpose is a planning tool to identify potential vulnerability zones for a worst-case chemical release and is not used in actual responses.
 Attachment A contains mapping and concentric circles around of the Lucas County EHS facility locations. The concentric circles range from 1/10ths of a mile to 2 miles. The concentric circles identify schools, preschools, daycare centers, nursing homes and hospitals to facilitate emergency identification and communication.

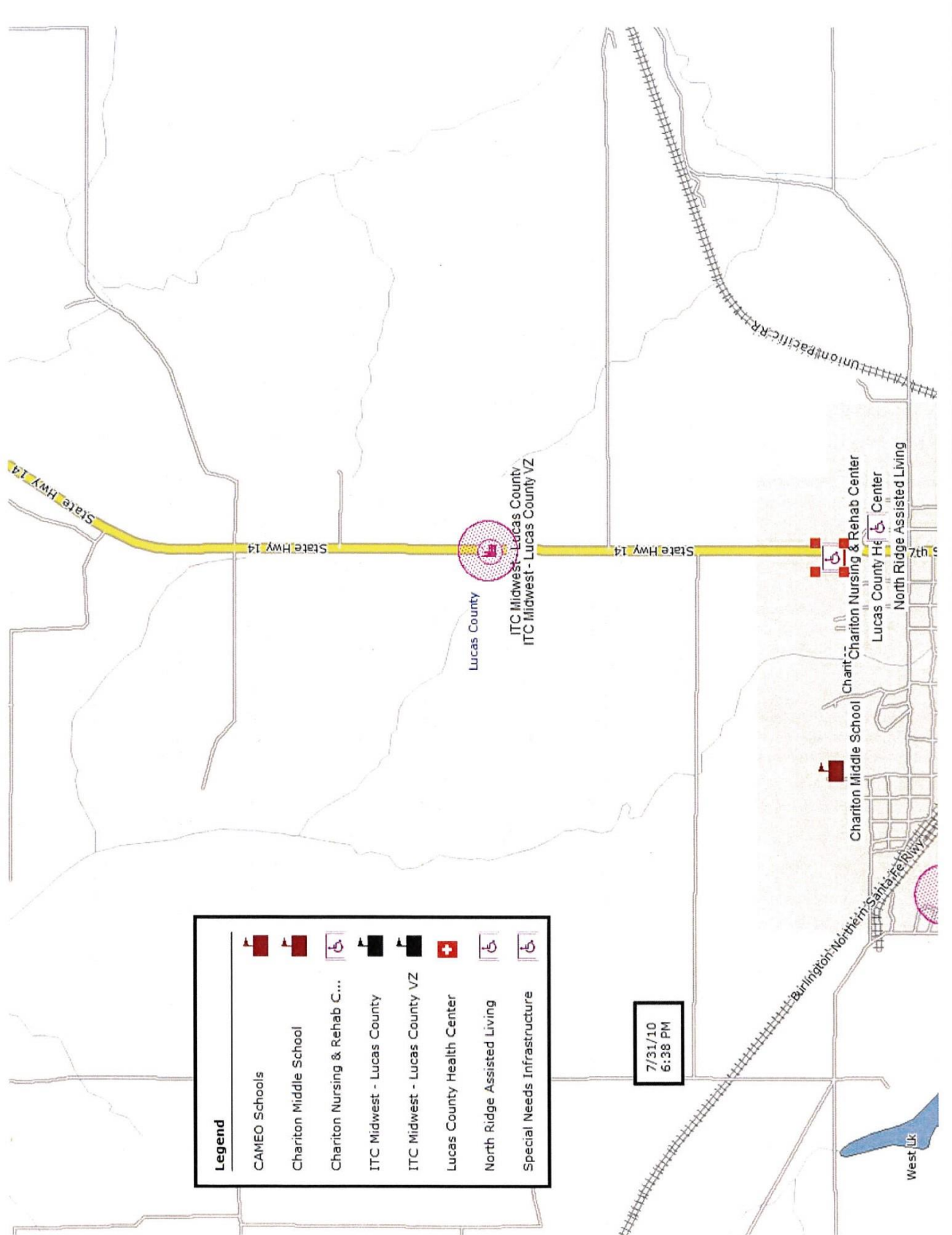
FACILITY	FACILITY COORDINATOR	EMERGENCY PHONE NUMBER	SECTION 302 EHS CHEMICAL NAME	CONTAINERS	CAMEO SCREENING WORST CASE	LEPC Planning Concentric Circle	School, Day Care Centers, Preschools, Care Facilities Within LEPC Planning Concentric
ITC Midwest – Chariton 6 th & Roland Chariton, IA 50049	On Duty	866-474-3751	Sulfuric Acid	Lead Acid Batteries	.10 miles	.10 miles	18
Windstream Iowa Telecom 220 N Grand Street Chariton, IA 50049	Gary Wilson	641-990-0410	Sulfuric Acid	Lead Acid Batteries	.10 miles	.10 miles	NONE
ITC Midwest – Lucas County 50415 State Hwy 14 Chariton, IA 50049	On Duty	866-414-3751	Sulfuric Acid	Lead Acid Batteries	.10 miles	.10 miles	NONE
South Central Coop 49297 215th Street Chariton, IA 50049	Don Brown	641-203-3397	Anhydrous Ammonia	Tank	>10 miles	2 miles	NONE
HyVee Perishable Distribution Center 21591 490 th Street Chariton, IA 50049	John Laing	641-774-6804	Anhydrous Ammonia	Tank	>10 miles	2 miles	2,6,19,22
HyVee Grocery Distribution Center 1801 Osceola Avenue Chariton, IA 50049	John Laing	641-774-6804	Sulfuric Acid	Lead acid batteries	.10 miles	.10 miles	6
HyVee HBC Distribution Center 1800 Osceola Avenue Chariton, IA 50049	John Laing	641-774-6804	Sulfuric Acid	Lead Acid Batteries	.10 miles	.10 miles	6

Red denotes change for 2015
 Blue denotes not in IDNR database

LUCAS COUNTY VULNERABLE FACILITIES
2015

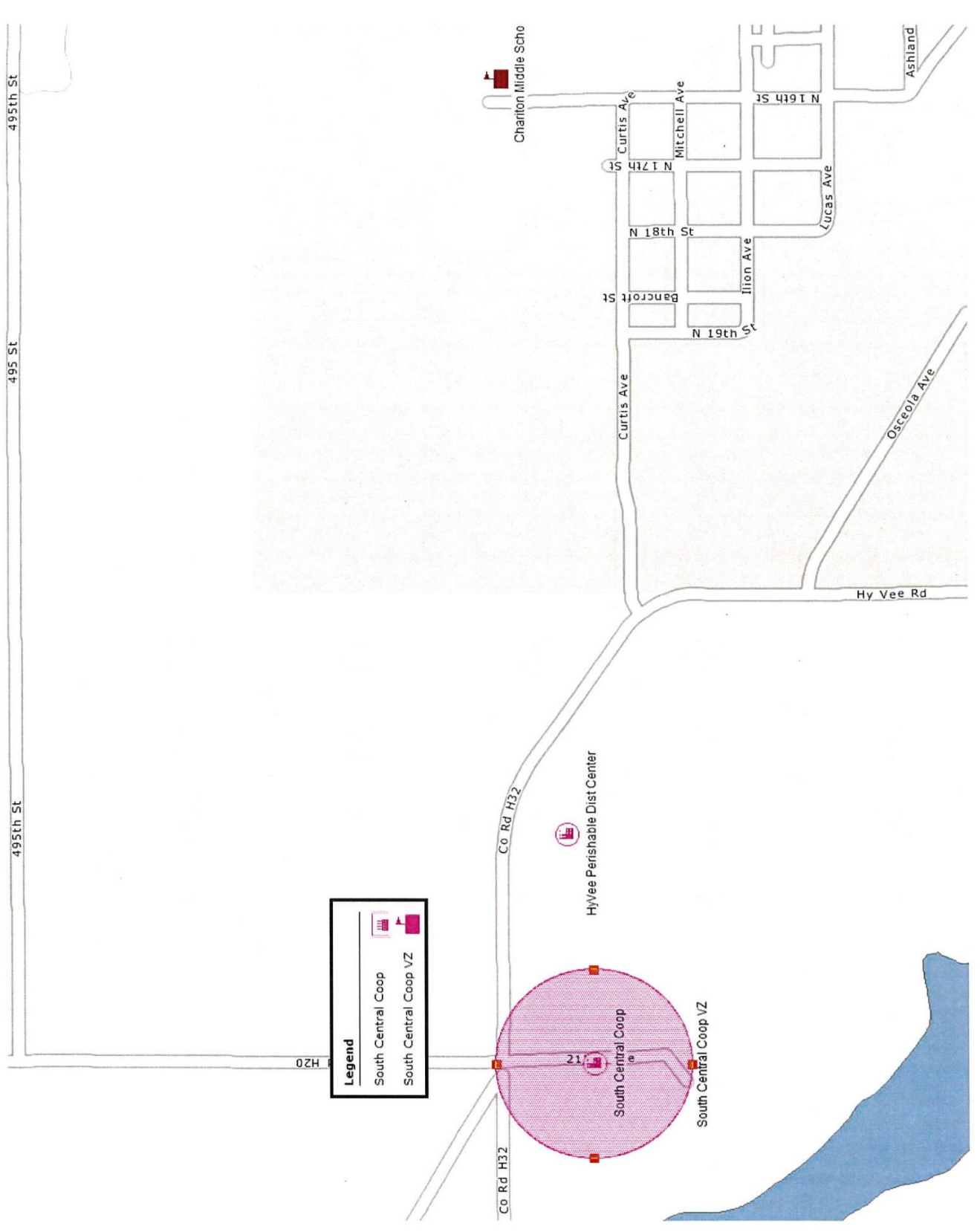
NO	FACILITY	ADDRESS	CITY	ST	ZIP	PHONE
1	Chariton High School	501 N Grand	Chariton	IA	50049	641-774-5066
2	Chariton Middle School	1300 N 16th	Chariton	IA	50049	641-774-5114
3	Columbus Elementary	1215 Linden Ave	Chariton	IA	50049	641-774-4712
4	The Other Hand High School	140 E Albia Road	Chariton	IA	50049	641-774-4723
5	Van Allen Elementary School	1129 Ashland	Chariton	IA	50049	641-774-5047
6	Discovery Preschool/Childcare (Chariton Preschool)	1711 Osceola Ave	Chariton	IA	50049	641-774-3215
7	Lucas County Health Center	1200 N 7th Street	Chariton	IA	50049	641-774-3000
8	North Ridge Assisted Living	1110 N 6th Street	Chariton	IA	50049	641-774-2303
9	Chariton Nursing and Rehab Center	1214 N 7th St	Chariton	IA	50049	641-774-5921
10	SCICAP - Chariton Head Start	418 N Main St	Chariton	IA	50049	641-774-4723
11	Amanda Sue Smith	554 Prairie Ave	Derby	IA	50068	641-533-2317
12	Bonnie Wood	511 Orchard Ave	Chariton	IA	50049	641-217-8122
13	Carmen Baker	506 Vine St	Lucas	IA	50151	641-766-8122
14	Dawn Baird	26986 550th St	Chariton	IA	50049	641-203-6544
15	Kathy Mills	511 McWilliams St	Russell	IA	50238	641-535-8881
16	Kristie Schmidt	1120 N Grand St	Chariton	IA	50049	641-774-4876
17	Kyla Dhabolt	720 N 7th St	Chariton	IA	50049	641-203-7067
18	Lisa Wertz	334 N 7th St	Chariton	IA	50049	641-203-7682
19	Tammy McRoberts	1721 Ilion Ave	Chariton	IA	50049	641-774-4510
20	Megan Lehman	437 Court Ave	Chariton	IA	50049	515-975-9657
21	Melissa Colburn	806 S 7th St	Chariton	IA	50049	641-203-3861
22	Sheri Jessip	1430 Franklin Ave	Chariton	IA	50049	641-774-5360
23	Susan Brown	311 S 12th St	Chariton	IA	50049	641-

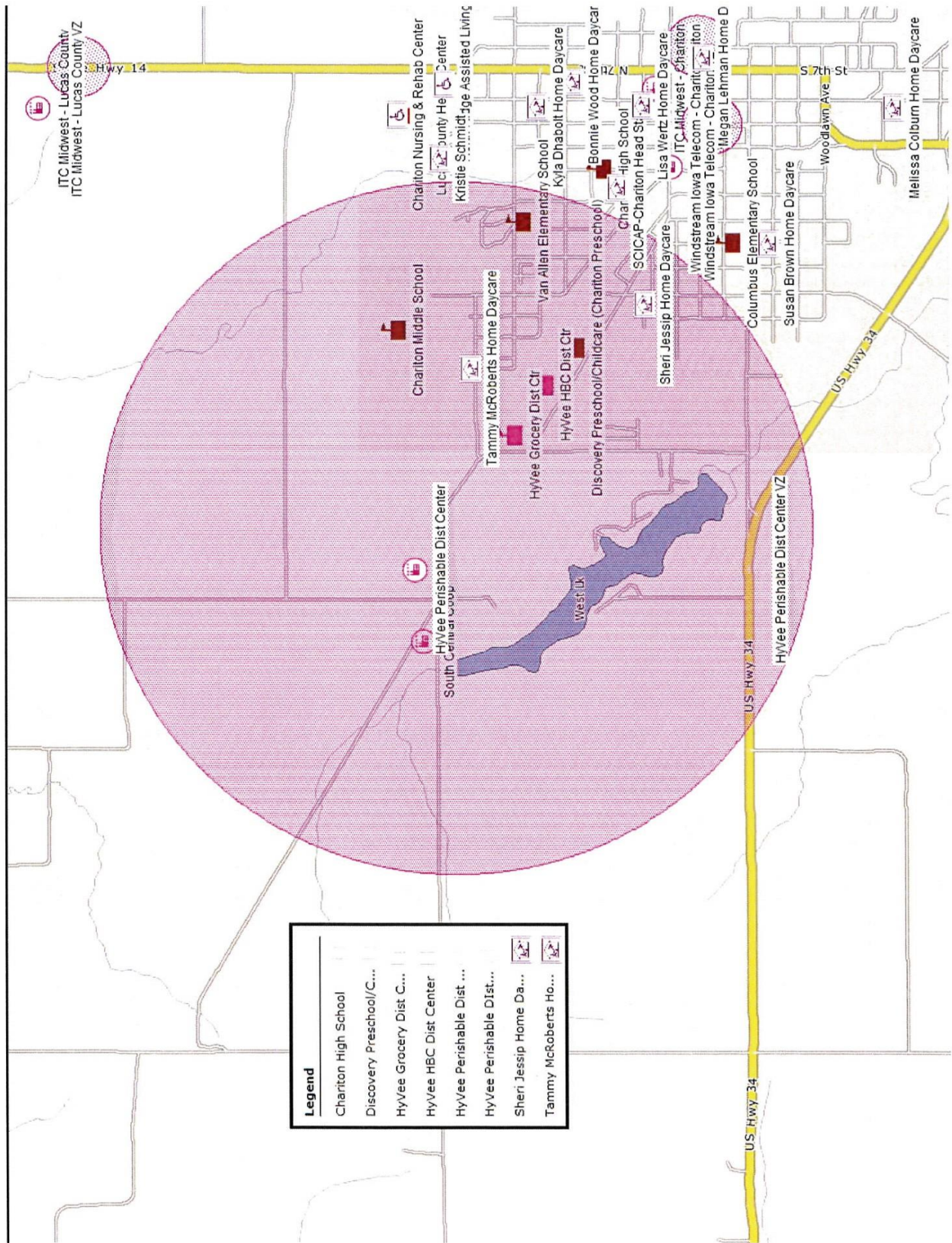


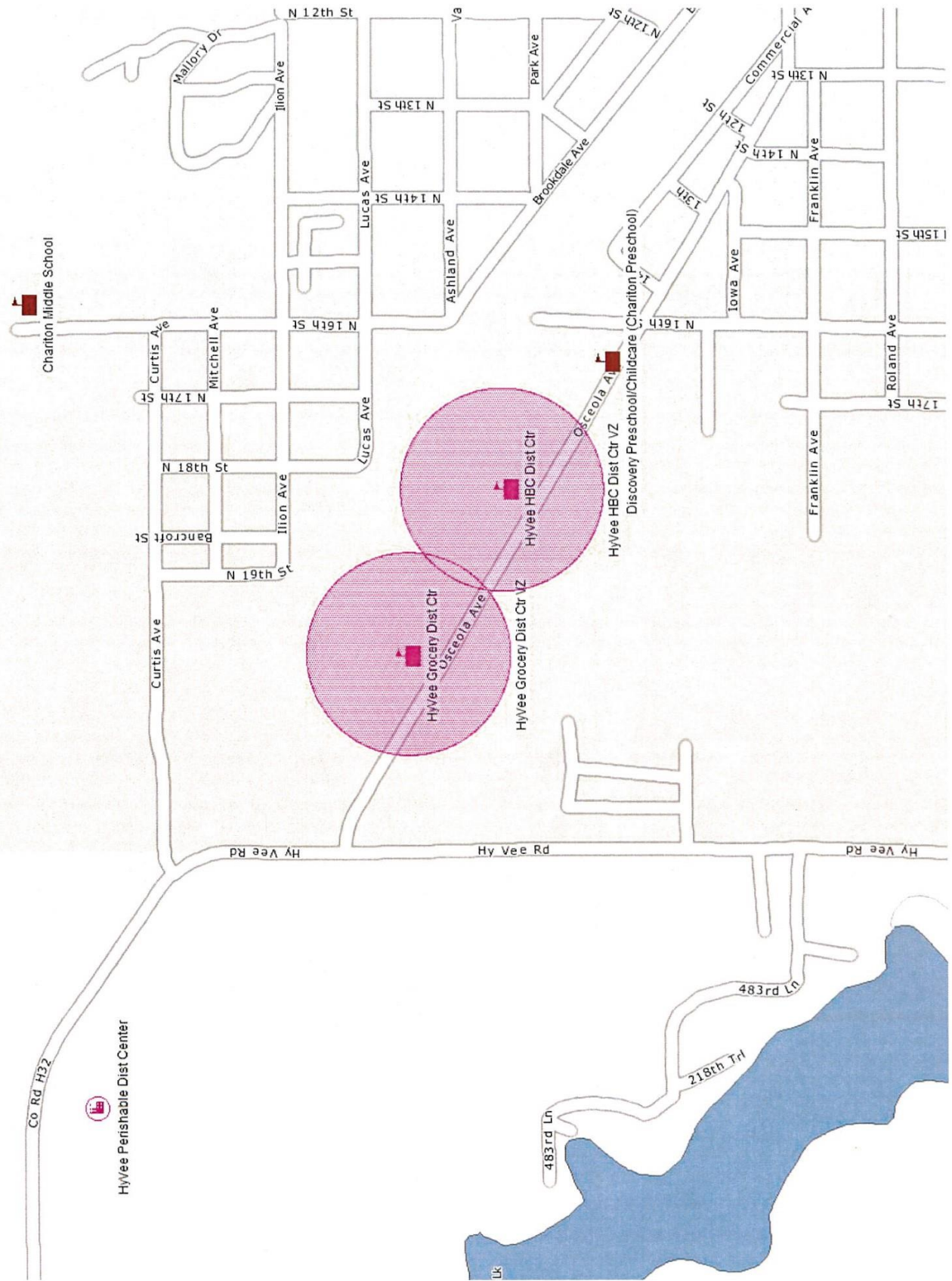


Legend	
	CAMEO Schools
	Chariton Middle School
	Chariton Nursing & Rehab C...
	ITC Midwest - Lucas County
	ITC Midwest - Lucas County VZ
	Lucas County Health Center
	North Ridge Assisted Living
	Special Needs Infrastructure

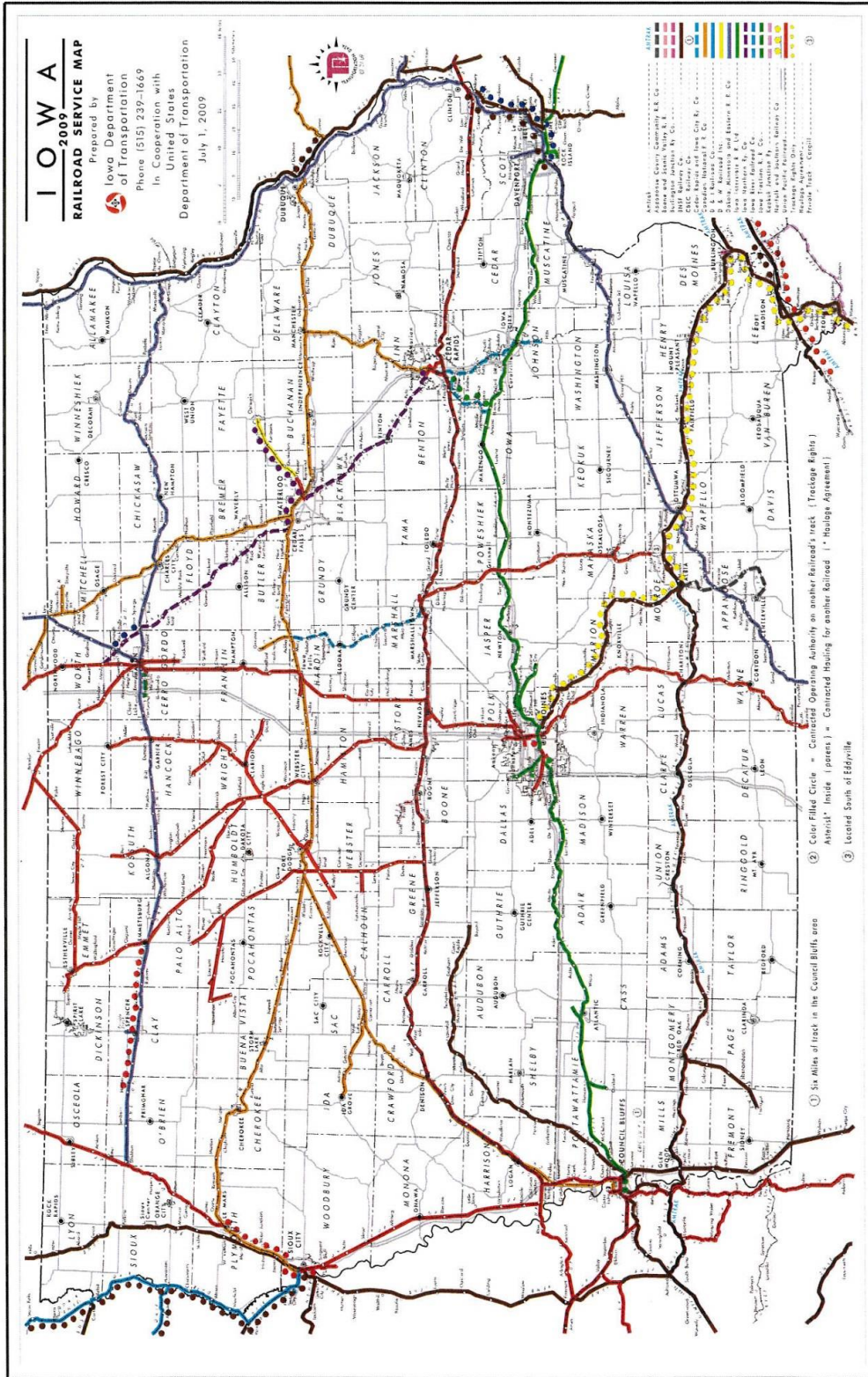
7/31/10
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District	Name	Updated	Title	Company	Group(s)	Address	City	Zip	Designation
10/31/2014									
Lucas	Alexander, Craig	03/12/13	Chief	Russell Fire Department	FFP	115 S Maple	Russell	50238	
Lucas	Grismore, Mary	06/16/09	Public Health Nurse	Lucas County Public Health	HP	123 S Grand	Chariton	50049	
Lucas	Hoch, Jayma	06/16/09	Clinical Service Assistant	Lucas County Health Center	HSP	1200 N 7th ST	Chariton	50049	
Lucas	Laing, John	03/12/13	Compliance Manager	HyVee Distribution Center	OOF	1801 Osceola AVE	Chariton	50049	
Lucas	Laing, Steve	03/12/13	Supervisor	Lucas Board of Supervisors	EO	916 Braden	Chariton	50049	Vice Chair
Lucas	Latham, C.J	06/16/09	Reverend	Chariton Christian Church	OTH	1100 Ilion AVE P.O. Box 429	Chariton	50049	
Lucas	McCurdy, Mark	06/16/09	Disaster Planner	Lucas County Health	FFP/HP/H SP	102 Atwell	Russell	50278	Chair
Lucas	Smith, Barry	03/12/13	Fire Chief	Chariton Vol. Fire Department	FFP	1155 S Main	Chariton	50049	
Lucas	Lamb, Mike	03/12/13	Coordinator	ADLM	EMP	12307 HWY 5/PO Box 399	Moravia	52571	Secretary
Lucas	Willadson, Maxine	06/16/09	Registered Nurse	Lucas County Public Health	HP	123 South Grand	Chariton	50049	
Lucas	Wood, Kendall	03/12/13	Ambulance Manager	Lucas County Health Center	FAP	1700 N7th	Chariton	50049	



Appendix 25: 2012 Mitigation Strategy Progress

<p style="text-align: center;">Lucas County, Iowa Previous Mitigation Strategies (2012)</p> <p style="text-align: center;">A=Accomplished I=In Progress N= No Progress O=Ongoing</p>							
Strategy	Chariton	Derby	Lucas	Russell	Williamson	Unincorp County	Explanation/Notes
Generators for shelters/public facilities	A	N	N	N			Backup generators exist at Chariton Fire Dept, County Public Health Dept, Lucas County Health Center, Lucas Co Law Center & Chariton Sewer Station. Derby, Lucas & Russell had no funding. No progress due to lack of funding.
New Storm Shelter- Heating/cooling Shelter	N						
Continuity of Operations Plan for post-disaster	A					A	Plan is created by ADLM Emergency Management & reviewed annually. There are formal plans for each jurisdiction are updated every 5yrs and are adopted by each city.
Acquisition or relocation of buildings in floodplains			N	N		N	No funds were secured to accomplish this strategy.
Safe Rooms in schools, Mobile home parks, Hospital, campgrounds, fairgrounds, etc	N					N	No progress due to lack of funding. It was noted that there are locations to seek shelter in the basement of the concession stand at the baseball field in Chariton, Chariton's "Friendly Acres" Trailer Park does have a concrete shelter to house about 100pppl.
Public Education & Outreach of warnings & self-protection	O	O	O	O		O	National Weather Service has launched promotional information that airs regularly on public radio & TV. Severe Weather/Storm Spotter Training is held annually and open to the public.

	Chariton	Derby	Lucas	Russell	Williamson	Unincorp County	Explanation/Notes
Develop Emergency Response Team post-disaster	O	O	O	O			Each jurisdiction has identified the local fire department as the post-disaster response team. The challenge lies with low enrollment numbers in the rural communities.
Acquisition & Installation of Storm Warning System	A	N		N			Chariton has installed 2 additional early storm warning sirens at the north & south edges of the community. No funding was secured for Derby & Russell to proceed.
Secure funding to remove vacant /collapsed buildings		N	N				Private owner tore down a large building in Russell. No other progress was noted due to the expense of asbestos removal & disposal.
Weather Radios for citizens	O	O	O	O		O	Weather radios are available for purchase at local retail stores for a minimal cost. Weather alerts are also no issued on cell phones.
Establish Local Hazardous Materials Capabilities	O	O	O	O			All fire departments are required to be "HAZ-MAT Operations Certified".
Hazardous Materials Protection for Storm Shelters	N	N	N	N		N	No funds were secured to accomplish this strategy.
Review Floodplain Managements & Enforcement for Effectiveness	O		O			O	Iowa DNR is in the process of updating floodplain risks in this region. This digital imaging will offer very detailed information about the potential risks.
Participation in Community Rating System for flood protection	O		O				
Flood proofing by homeowners	O	O	O	O		O	This strategy would be completed by residents on an individual basis and an ongoing strategy.

	Chariton	Derby	Lucas	Russell	Williamson	Unincorp County	Explanation/Notes
Storm water Management ordinance	A/O						Chariton has recently improve storm water drainage in multiple locations in the city.
Flood Insurance by property owners	O		O			O	This strategy would be completed by residents on an individual basis and an ongoing strategy.
Surge Protection/Lightning Protection	O	O	O	O		O	This strategy would be completed by residents on an individual basis and an ongoing strategy.
Bury Powerlines						N	Funding limitations
Temporary Debris Disposal Plan	O	O	O	O		O	County has Debris Management Plan that applies to all jurisdictions.
Snow Fences/Barriers	A/O					A/O	County & State road depts. Install fences throughout the county in late fall. No natural vegetation barriers have been installed due to funding
Rehabilitate Older Bldgs --	I	N	N	N		N	Chariton has received a "Downtown Revitalization Grant" and is in the process of building improvements to businesses around the square. Williamson has a private owner that has refinished a building to house a "tea room".
Expand Hazard area for mapping & mine evaluation	I	I	I	I		I	Iowa DNR has created estimated locations of old mines. This provides jurisdictions with more information & mapping to identify potential risk areas.
Water Storage Saving Plan -- reduce usage	O	O	O	O		O	This strategy would be completed by residents on an individual basis and an ongoing strategy.
Evaluate/maintain/repair area dams						O	Iowa DNR preforms inspections
Burning Restrictions	A	N	N	N			No permits are issued for burning in the county. Burning is not allowed in the City of Chariton.

	Chariton	Derby	Lucas	Russell	Williamson	Unincorp County	Explanation/Notes
Encourage Smoke/ Fire/ Carbon Monoxide Detectors & sprinkler systems	O	O	O	O		O	Chariton & Russell Fire Departments have free smoke alarms available and can offer assistance to install at proper locations.
Maintain current Evacuation Plans for buildings, schools & cities	A	A	A	A		A	Plans are created by ADLM Emergency Management reviewed annually. Identified as #1 of ESF. School reviews & approves annually
Maintenance of Heating/ cooling systems	O	O	O	O		O	This strategy would be completed by residents on an individual basis and an ongoing strategy.
Fireplace Maintenance	O	O	O	O		O	At private home owner discretion. Need to identify a service provider in the area.
Hazardous Material Disposal Program	O	O	O	O		O	Marion Co Landfill is the designated site for Hazardous Materials disposal. All communities have annual drives to pick up.
Search & Rescue Training for First Responders	O	O	O	O			First responders are required to have 24hrs of training annually. This is an ongoing need
Mass Casualty Preparation	A	A	A	A		A	Plan is outlined in the local ESF plan and reviewed annually.
Immunization plans – scheduled & emergency situations	O	O	O	O		O	County Public Health Dept administers by appointment. Nurses also offer remote clinic locations as requested or needed. During flu season, local pharmacy also offers.
Waste Disposal Enforcement	O	O	O	O			Current waste disposal is provided to the region by Southern Iowa Disposal from Knoxville. Recycling Center is also available in every jurisdiction. Cities of Chariton & Russell require trash pickup at each residents.
Pest Management by cities through regulations of	O	O	O	O			This can be deemed a public health issue and is individually evaluated by case.

	Chariton	Derby	Lucas	Russell	Williamson	Unincorp County	Explanation/Notes
property maintnce.							
Radon/Lead Mitigation	O	O	O	O		O	Locally free radon testing kits are available at ADLM Environmental Health or County Public Health Dept.
Hazard Occurrence Data Collection & reporting	O	O	O	O		O	Currently jurisdictions are responsible for recording and reporting local events to the Emergency Management Coordinator.
Collection & Protection of Vital Records by private residents	O	O	O	O		O	This strategy would be completed by residents on an individual basis and an ongoing strategy.
Digging hotline/ pipeline safety regulations of pipelines education	O	O	O	O		O	Educational material has been published through local radio, TV & mailings.
Tree Management/ Trimming by homeowners, utilities & county	O	O	O	O		O	Chariton offers curbside removal after storms.
Critical Infrastructure Protection from Terrorism	A/O	O	O	O		O	Active Shooter training has occurred at the school. More sessions are planned in future at various public locations.
Assessment Risk for Terrorism	O	O	O	O		O	Assessments are completed by local law enforcement and Iowa Homeland Security. School now has a staff member trained to handle active shooter situations. Also in the process of updating the safety plan.
Manufactured Home Tie-Downs regulations	A	N	N	N		N	Participants believe that insurance requires mobile homes to be tied down, but only Chariton city has an ordinance requiring.

	<i>Chariton</i>	<i>Derby</i>	<i>Lucas</i>	<i>Russell</i>	<i>Williamson</i>	<i>Unincorp County</i>	<i>Explanation/Notes</i>
Building Code Enforcement	A						Chariton has recently employed a full time Code Compliance Officer capable of enforcing building codes.
NFIP Participation	O		O				Chariton NFIP #190195 Lucas NFIP #190196
Participation in Community Rating System for Flooding	N		N				

Appendix 26: 2016 Mitigation Strategy Scoring

2016 Mitigation Prioritization

Lucas County Hazard Mitigation

Lucas County HMP Prioritizing Mitigation Strategies (Higher Total Points = Higher Priority)									
Number of Hazards Addressed (1pt each)	Mitigation Strategy	Cost (voluntary +1pt, minimal -1pt, Moderate -1pt, High -2pt)	Priority (High +2pts, Medium, +1pt, Low Opt)	Timeline (ongoing +1pt, short term Opt, medium term -1pt, or long term -2pts)	Require Political support? (Yes Opt/No +1pt)	Protect life and/or prevent injuries? (Yes +1pt/No Opt)	Will it reduce or eliminate damage to structures or infrastructure? (Yes +1pt/No Opt)	Total Points	
4	Generators for shelters/public facilities	Mod -1	Med 1	Med -1	Yes 0	Yes 1	No 0	4	
5	New Storm Shelter-Heating/cooling Shelter	Mod -1	Med 1	Med -1	No 1	Yes 1	No 0	6	
9	Continuity of Operations Plan for post-disaster	Min 0	High 2	Ongoing 1	Yes 0	Yes 1	No 0	13	
2	Acquisition or relocation of buildings in floodplains	High -2	Low 0	Long -2	Yes 0	Yes 1	Yes 1	0	
3	Safe Rooms in schools, Mobile home parks, campgrounds, etc	High -2	High 2	Long -2	Yes 0	Yes 1	No 0	2	
13	Public Education & Outreach of warnings & self-protection	Min 0	Med 1	Ongoing 1	No 1	Yes 1	No 0	17	
10	Develop Emergency Response Team post-disaster	Vol 1	Med 1	Ongoing 1	No 1	No 0	No 0	14	
3	Acquisition & Installation of Storm Warning System	Mod -1	High 2	Med -1	Yes 0	Yes 1	No 0	4	

2016 Mitigation Prioritization

Lucas County Hazard Mitigation

Number of Hazards Addressed (1pt each)	Mitigation Strategy	Cost (voluntary 1pt, minimal Opt, Moderate -1pt, High -2pt)	Priority (High 2pts, Medium, 1pt Low Opt)	Timeline (ongoing 1pt, short term Opt, medium term -1pt, or long term -2pts)	Require Political support? (Yes Opt/No 1pt)	Protect life and/or prevent injuries? (Yes 1pt/No Opt)	Will it reduce or eliminate damage to structures or infrastructure? (Yes 1pt/No Opt)	Total Points
1	Secure Funding for vacant /collapsed buildings to remove or repair	High -2	Med 1	Med -1	Yes 0	No 0	Yes 1	0
5	Weather Radios for citizens	Vol 1	Low 0	Ongoing 1	No 1	Yes 1	No 0	9
1	Establish Local Hazardous Materials Capabilities	Mod -1	Med 1	Med -1	Yes 0	Yes 1	No 0	1
2	Hazardous Materials Protection for Storm Shelters	Min 0	Low 0	Med -1	No 1	No 0	Yes 1	3
1	Review Floodplain Managements & Enforcement for Effectiveness	Min 0	Med 1	Ongoing 1	Yes 0	No 0	Yes 1	4
3	Flood proofing by homeowners	Vol 1	Low 0	Ongoing 1	No 1	No 0	Yes 1	7
2	Storm water Management ordinance	Min 0	Low 0	Short 0	Yes 0	No 0	Yes 1	3
1	Flood Insurance by property owners	Vol 1	Low 0	Ongoing 1	No 1	No 0	Yes 1	5
1	Surge Protection/ Lightning Protection	Vol 1	Low 0	Ongoing 1	No 1	No 0	No 0	4
3	Bury Powerlines	High -2	Low 0	Long -2	Yes 0	No 0	Yes 1	0
4	Temporary Debris Disposal Plan	Min 0	Low 0	Short 0	No 1	No 0	No 0	5

2016 Mitigation Prioritization

Lucas County Hazard Mitigation

Number of Hazards Addressed (1pt each)	Mitigation Strategy	Cost (voluntary 1pt, minimal 0pt, Moderate -1pt, High -2pt)	Priority (High 2pts, Medium, 1pt Low 0pt)	Timeline (ongoing 1pt, short term Opt, medium term -1pt, or long term -2pts)	Require Political support? (Yes 0pt/No 1pt)	Protect life and/or prevent injuries? (Yes 1pt/No 0pt)	Will it reduce or eliminate damage to structures or infrastructure? (Yes 1pt/No 0pt)	Total Points
1	Snow Fences/ Barriers	Mod -1	Low 0	Ongoing 1	No 1	No 0	No 0	2
3	Rehabilitate Older Bldgs	High -2	Med 1	Long -2	Yes 0	No 0	Yes 1	1
2	Expand Hazard area for mapping & mine evaluation	Mod -1	Low 0	Long -2	Yes 0	No 0	No 0	-1
1	Water Storage Saving Plan – reduce usage	Vol 1	Low 0	Ongoing 1	Yes 0	No 0	No 0	3
1	Evaluate/ maintain/ repair area dams	High -2	Low 0	Ongoing 1	Yes 0	Yes 1	Yes 1	2
2	Burning Restrictions	Min 0	Low 0	Ongoing 1	Yes 0	No 0	No 0	3
1	Encourage Smoke/ Fire/ Carbon Monoxide Detectors & sprinkler systems	Vol 1	Med 1	Ongoing 1	No 1	Yes 1	Yes 1	7
6	Maintain current Evacuation Plans for buildings, schools & cities	Min 0	Med 1	Ongoing 1	Yes 0	Yes 1	No 0	9
2	Maintenance of Heating/ cooling systems	Vol 1	Med 1	Ongoing 1	No 1	No 0	No 0	6
1	Fireplace Maintenance	Vol 1	Med 1	Ongoing 1	No 1	No 0	No 0	5
1	Hazardous Material Disposal Program	Mod -1	Med 1	Short 0	Yes 0	No 0	No 0	1
8	Search & Rescue Training for First Responders	Mod -1	Med 1	Ongoing 1	No 1	No 0	No 0	10

2016 Mitigation Prioritization

Lucas County Hazard Mitigation

Number of Hazards Addressed (1pt each)	Mitigation Strategy	Cost (voluntary 1pt, minimal 0pt, Moderate -1pt, High -2pt)	Priority (High 2pts, Medium, 1pt, Low 0pt)	Timeline (ongoing 1pt, short term 0pt, medium term -1pt, or long term -2pts)	Require Political support? (Yes 0pt/No 1pt)	Protect life and/or prevent injuries? (Yes 1pt/No 0pt)	Will it reduce or eliminate damage to structures or infrastructure? (Yes 1pt/No 0pt)	Total Points
5	Maintain a current plan for Mass Casualty Preparation & Up-to-date training	Mod -1	Med 1	Ongoing 1	No 1	No 0	No 0	7
1	Immunization plans -- scheduled & emergency situations	Min 0	Med 1	Ongoing 1	No 1	No 0	No 0	4
1	Waste Disposal Enforcement	Min 0	Med 1	Ongoing 1	No 1	No 0	No 0	4
1	Pest Management by cities through regulations of property maintnce.	Min 0	Low 0	Short 0	Yes 0	No 0	Yes 1	2
1	Radon/Lead Mitigation	Mod -1	Low 0	Ongoing 1	No 1	No 0	No 0	2
2	Hazard Occurrence Data Collection & reporting	Min 0	Low 0	Ongoing 1	No 1	No 0	No 0	4
2	Collection & Protection of Vital Records by private residents	Vol 1	Low 0	Ongoing 1	No 1	No 0	No 0	5
1	Digging hotline/ pipeline safety regulations of pipelines education	Min 0	Med 1	Ongoing 1	No 1	Yes 1	No 0	5
2	Tree Management/ Trimming by homeowners, utilities & county	Min 0	Med 1	Ongoing 1	No 1	No 0	No 0	5

2016 Mitigation Prioritization

Lucas County Hazard Mitigation

Number of Hazards Addressed (1pt each)	Mitigation Strategy	Cost (voluntary 1pt, minimal Opt, Moderate -1pt, High -2pt)	Priority (High 2pts, Medium, 1pt, Low Opt)	Timeline (ongoing 1pt, short term Opt, medium term -1pt, or long term -2pts)	Require Political support? (Yes Opt/No 1pt)	Protect life and/or prevent injuries? (Yes 1pt/No Opt)	Will it reduce or eliminate damage to structures or infrastructure? (Yes 1pt/No Opt)	Total Points
1	Critical Infrastructure Protection from Terrorism	Mod -1	Med 1	Ongoing 1	Yes 0	Yes 1	Yes 1	4
1	Assessment Risk for Terrorism	Mod -1	Low 0	Med -1	Yes 0	Yes 1	Yes 1	1
2	Manufactured Home Tie-Downs regulation/ordinance	Min 0	Med 1	Short 0	Yes 0	Yes 1	Yes 1	5
2	Building Code Enforcement	Mod -1	Med 1	Short 0	Yes 0	No 0	Yes 1	3
2	NFIP Participation	Min 0	Med 1	Ongoing 1	Yes 0	No 0	Yes 1	5
3	Participation in Community Rating System for Flooding	Min 0	Med 1	Ongoing 1	Yes 0	No 0	Yes 1	6

Appendix 27: Glossary

Note: most definitions contained here are derived from Dictionary.com and other internet searches; some are based on FEMA or Iowa Department of Homeland Security and Emergency Management information. Where exact language is used, the source is cited following the definition.

100-year flood plain – area in which the chance of a flood occurring in any given year is 1% independent of any other year; this is statistically about once every 100 years, this does not mean that if there is not a flood this year that next year the chance goes up to 2%

500-year flood plain – the area in which the chance is .2% chance of a flood occurring in any given year independent of any other year; this is statistically about once every 500 years this does not mean that if there is not a flood this year that next year the chance goes up to .4%

Acceptable risk hazards – hazards that have been determined by the Lucas County Planning Committee to be low priority for mitigation strategies and projects to the point of no actions or steps are worth taking currently

Acute shortage (energy) – severe shortage in energy resources or supplies

ADLM – is the local emergency management service that is a collaborative effort of Appanoose, Davis, Lucas, and Lucas Counties in Iowa.

Aerosol – a liquid or gas under compression to be dispensed as a spray or foam

Agricultural drought – drought which refers to soil moisture deficiencies

Anhydrous ammonia – a hazardous substance that is used for industrial and commercial purposes and as a fertilizer lacking water which separates it from ammonia hydroxide

Anticholinergics – a class of medications that blocks nerve sensations and treat a variety of conditions including asthma, muscle spasms, and gastrointestinal cramps among others

Appurtenant – legal term describing something that goes along with or belongs to something else

Aquifer – an underground layer of porous rock or soils such as sand or gravel from which water can be drawn from

Asphyxiation – suffocation, choking, smothering

Asthma – respiratory disorder characterized by wheezing, coughing, labored breathing

Atmospheric carbon – carbon monoxide; gaseous carbon in the air, some of which is naturally occurring while some is the result of fossil fuel and wood combustion

Bio-Detection Systems (BDS) – a way to detect pollutants or organic compounds in the air or other substances

Bioterrorism – the use of biological agents against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom

Blizzard conditions – heavy or prolonged snowstorm characterized by reduced visibility and strong winds

Bottled Fuels – this Census designation is being used in this plan to include the Census designation as well as Fuel Oil and Kerosene; the Census designation “bottled fuels” refers largely to LP gas

Block Group – the smallest census designated area other than for small incorporated areas; many cities contain multiple block groups, which are smaller delineations of blocks which comprise census tracts, some small cities may occupy a small part of a block group however

California Encephalitis – a strain of encephalitis first discovered in California characterized by dizziness, lethargy, headache, fever, seizures, and brain swelling that is transmitted by infected mosquitoes

Cascading Event Matrix – a tool provided by FEMA for ranking hazards in relation to one another including the impacts of one hazard on others or causal relationship between multiple hazards

Cell, storm – a storm cell is the smallest unit of a storm system characterized as an air mass formed by a convective loop

Clandestine – secret or concealed, also related to under-cover law enforcement operations

Coercion – use of force through intimidation or use of power to gain a certain behavior or outcome

Continental climate – a climate region that has cold enough temperatures in the winter to sustain snow and moderate precipitation mainly in the warmer months

Convective (loop or winds) – a meteorological term indicating the transfer of heat in the atmosphere such as by updrafts

Cumulonimbus – clouds that are characterized by large, dense “towers” that are associated with producing thunderstorms, also called Thunderheads or Thunderclouds

Deforestation – removal of a stand of trees

Delimit – marking or setting the outer limits or boundaries of something

Delineate – outline, mark, or define apart from something else, also see Delimit

Demographics – statistical data about a population including age, total population, income, housing status; information found in the US Census

Desertification – the process of an area converting to desert through depletion of vegetation, usually through over-exploitation by animals and / or humans and drought

Disease vector – in epidemiology a vector is a medium or species that carries or transmits diseases, a common disease vector may be mosquitoes

Doppler radar – radar that tracks the speed and direction of something measured

Downburst winds – strong winds that flow downward from cumulonimbus clouds usually associated with intense thunderstorms

Downdrafts – strong downward winds

El Nino – warm ocean currents that develop after December off of the coast of Peru and Ecuador that are sometimes associated with catastrophic storms

Emerald Ash Borer – an exotic invasive species that has been killing ash trees in Michigan, Illinois, Pennsylvania, Ohio, Indiana, and Maryland

Endangered (species) – a species that is determined to be in eminent threat of extinction throughout all or a significant portion of its habitat

Endemic – natural or characteristic, belonging to a particular location

Epidemics – rapidly spreading or extensively found in a population

Epidemiology – branch of medicine dealing with how diseases spread

Erosion – the process of soil or rock being worn away through abrasion, corrosion, or other means

Essential Facility – Elements that are important to ensure a full recovery of a community or state following a hazard event. These would include: government functions, major employers, banks, schools, and certain commercial establishments, such as grocery stores, hardware stores, and gas stations (FEMA).

Evapotranspiration – the process of transferring moisture from the earth to the atmosphere through evaporation and plant transpiration

Event – the occurrence of a storm or hazard

Fauna – animal life

Flood hazard area – The area shown to be inundated by a flood of a given magnitude on a map; The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on NFIP maps. The SFHA is the area where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies (FEMA).

flood plain – area along a stream or river where flooding is a natural occurrence: flood plains can change over time based on changing conditions upstream such as urban development, dam or levee constructions, and other human actions

Flood zones – Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHA are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood. SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30. Moderate flood hazard areas, labeled Zone B or Zone X (shaded) are also shown on the FIRM, and are the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled Zone C or Zone X (unshaded) (FEMA).

Floodway – A "Regulatory Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations. For streams and other watercourses where FEMA has provided Base Flood Elevations (BFEs), but no floodway has been designated, the community must review floodplain development on a case-by-case basis to ensure that increases in water surface elevations do not occur, or identify the need to adopt a floodway if adequate information is available (FEMA).

Floodway fringe – the area surrounding a floodway

Flora – plant life

Foot and Mouth Disease – a severe and contagious disease found in cows, sheep, hogs, and other hoofed animals “characterized by vesicular eruptions in the mouth and about the hoofs, teats, and udder” (Dictionary.com)

Frost/freeze advisory – National Oceanic and Atmospheric Administration convention of indicating when a frost or hard freeze is possible for an area

Frostbite – injury caused by extreme cold or frost

Fujita Scale – Rates Tornadoes with numeric values from F0 to F5 based on Tornado wind speed and damage sustained. An F0 indicates minimal damage such as broken tree limbs or signs, while and F5 indicated severe damage sustained (FEMA).

Functionally obsolete (bridges) – bridges that due to changing technology, lack of improvement, or deteriorating conditions are obsolete, this includes width of bridges

Funnel cloud – a rapidly rotating funnel-shaped cloud extending downward from the base of a cumulonimbus cloud, which, if it touches the surface of the earth, is a Tornado or waterspout (Dictionary.com).

Gradient winds - horizontal wind velocity tangent to the contour line of a constant pressure surface (or to the isobar of a geopotential surface) at or above 2,500 feet (762 meters) (Allwords.com).

Hacking – breaking into another’s computer illegally, also to skillfully write or alter a computer program

Half-life – the time it takes for one-half of the radioactive atoms of a substance to disintegrate

Hazardous substance – a substance that poses a threat to human, animal, or environmental health

Hazardous Materials – see Hazardous substance

HazMat – short-hand for Hazardous Materials, also used as HazMat Team to indicate the trained professionals that respond to release of hazardous substances

Heat index – a number in degrees Fahrenheit that tells how hot it really feels when relative humidity is added to the actual air temperature

High-risk hazards – hazards that are determined by the Lucas County Planning Committee to pose the most risk to the community and of priority for developing projects or policies to address

Hijack – to forcefully take

Historical Occurrence – the number of times that a hazard has occurred in the community in the past

Horizontal peak gravity acceleration – a measure of how hard the earth shakes in a given area

Housing stock – the collective set of housing units in a given area, often a city or neighborhood

Housing unit – a single collection of rooms occupied by a family or household (conventional or unconventional) such as an apartment, a house, a mobile home, or a condo unit

Hydrocarbon – organic compounds composed of both hydrogen and carbon such as benzene or methane

Hydrological drought – drought which refers to declining surface water and groundwater supplies

Hypothermia – below normal body temperature

Ice jam – an obstruction of a waterway by pieces of ice

Impoundment – a body of water created by an obstruction such as a dam

Influenza – the common flu and variations of the flu

Infrastructure – Refers to the public services of a community that have a direct impact on the quality of life. Infrastructure includes communication technology such as phone lines or Internet access, vital services such as public water supplies and sewer treatment facilities, and includes an area's transportation system such as airports, heliports; highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots; and waterways, canals, locks, seaports, ferries, harbors, dry-docks, piers and regional dams (FEMA).

Intrusion detection system – any one of various electronic means to detect or thwart hacking attempts not unlike antivirus programs

Invasive species – any species of insects, animals, plants and pathogens, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem (invasive.org)

Ionizing – adding an electrical charge to atoms; lightning ionizes the air

IDALS – Iowa Department of Agriculture and Land Stewardship

IDNR – Iowa Department of Natural Resources

Jet stream – fast flowing, narrow current of air located 6 to 9 miles above the earth's surface

Karst subsidence – the effect of water dissolving of particular soils that lead to surface depressions or Sinkholes

Kniffen Silt Loam – deep, poorly drained soils generally found in loess with varying slopes between 2 to 9%; a National Resource Conservation Service soil category

La Nina – A cooling of the ocean surface off the western coast of South America, occurring periodically every 4 to 12 years and affecting Pacific and other weather patterns (Dictionary.com)

Land cover – the composition of vegetation or human built environment that occupies horizontal space

Land uses – classifications of how land is used in a given space including farmland, forests, water bodies, or urban areas; also a system of classifications used in zoning ordinances

Linguistically isolated” meaning that all members of the household age 14 and above have some difficulty with the English language - def applied to household

Loam – soils composed of a mixture of sand, clay, silt, and organic matter (Dictionary.com)

Logarithmically – mathematical indication that for each increment beyond a set point the number or magnitude increases or decreased significantly

Low-risk hazards – hazards that are determined by the Lucas County Planning Committee to pose a low risk to the community and of low priority for developing projects or policies to address

Lyme Disease – an inflammatory disease caused by tick bites by infected ticks that leads to joint swelling, rash, fever, and sometimes more severe symptoms

Magnitude – size or extent

Malaria – part of a set of tropical diseases characterized by fever, sweating, and chills transmitted to humans by mosquitoes

Maximum Threat – the spatial extent of the community that might be impacted

Median – statistical convention of indicating that half of the data is higher and half of the data is lower than this number; the median number does not necessarily mean the average though it can be the same

Meteorologic drought – drought which refers to precipitation deficiency

Methamphetamine – a central nervous system stimulant used to clinically treat certain conditions but largely known as an illegal drug produced from a variety of chemical inputs that can cause numerous health problems or even death from any given use, including the first

Microbursts – a sudden, violent downdraft of air over a small area. Microbursts are difficult to detect and predict with standard weather instruments and are especially hazardous to airplanes during landing or takeoff (Dictionary.com)

Micro-meteorological – meteorological conditions affecting a small area

Microorganisms – living organisms that require a microscope to view including bacteria and protozoan

Mine subsidence – mine collapses or cave-ins leading to depressions or Sinkholes on the surface

Mitigation – any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event. Mitigation, also known as prevention (when done before a disaster), encourages long-term reduction of hazard vulnerability. The goal of mitigation is to decrease the need for response as opposed to simply increasing the response capability (FEMA).

Morbidity – the rate of incidence of a disease; proportion of disease in a particular geographic location (Dictionary.com)

Munitions – weapons and military material

NFIP – National Flood Insurance Program; Federal program created by Congress in 1968 that makes flood insurance available in communities that enact minimum floodplain management regulations in 44 CFR §60.3 (FEMA).

National Registry of Historic Places – listing of historic places including buildings and sites that meet the National Park Service’s requirements for protection; historic places are proposed by the local community or private owners

Nitrogen oxides – form of nitrogen found in vehicle exhaust

Non-convective winds – winds that do not transfer heat

Notifiable disease – diseases that are required to be reported to public health authorities due to its danger to human or animal health

NWS - National Weather Service

Octanol – a substance composed of fatty alcohol and carbon atoms found in some essential oils and used in perfumes and flavor constituents

Outbreak – a sudden occurrence or manifestation of something; disease outbreaks are when a disease suddenly happens and spreads rapidly

Pandemic (disease) – a disease that is found through a large population, a widespread disease

Percolate – fluid moving through a porous substance such as water soaking into the soil, also indicating activity or movement

Perpetrators – person responsible for undertaking an action, generally a criminal action

Petroleum – flammable, oily, thick, dark-colored fluid from which various fuel substances are produced including gasoline and kerosene

Plume – a space in soil, water, or air containing pollutants spreading from a defined location

Precipitation – rain or snow

Probability (hazard occurrence) – Likelihood of the hazard event, sometimes without regard to hazard history

Proximity – location in relation to something else

Radioactive fallout – radioactive particles themselves or the settling of radioactive particles to the surface of the earth and other land covers

Reforestation – replanting of trees such as in an area that has been denuded

Rhetoric – use of language to influence others

Rotating blackout – an intentional power outage in order to meet electrical demand when supplies are insufficient

Section – a geographic subdivision under the Public Land Survey; a one-square mile subdivision of a township which is composed of 36 sections, a section can be further divided into “quarters” and “quarter-quarters”

Seismic zone – a designated area where Earthquakes and other seismic activity may take place

Severity of Impact – assessment of the severity in terms of fatalities, injuries, property losses, and economic losses

SHMT – State Hazard Mitigation Team

Sniping – shooting a firearm from a hidden location

Socio-economic – pertaining to the interaction between economic and social conditions

Speed of Onset – potential amount of warning time available before the hazard occurs

Strong frontal system – a volatile boundary between two masses of air which may produce strong storms

Subsidence – sinking or lowering to a different level; also known as Sinkholes

Superfund Sites – a location designated by the Federal Government for toxic waste clean-up

Surface-level ozone – ozone found near the surface of the earth rather than in the upper atmosphere, also known as smog

Tectonic – pertaining to the structure of the earth

Threatened (species) – a species that is determined to be in threat of extinction throughout all or a significant portion of its habitat unless action is taken

Topography – detailed description of a specific place including the shape of the land, where the highs and lows are, and how hills are shaped

Tributary – a creek or stream that feeds into a larger creek or stream or a river

USDA – U.S. Department Agriculture

Updraft – upward current of warm, moist air which can form cumulonimbus clouds

Urbanization – the conversion of agricultural or wild lands to human developed, urban environment

Vaccination – a shot or other delivery method of incapacitated disease to boost immunity to the disease

Vandalism – deliberate or mischievous destruction or alterations of another’s property

Vulnerability – measure of the percentage of people and property that would be affected by the hazard event

Watch vs. warning – The National Weather Service uses a watch to indicate that conditions are right for a given storm to develop while warning indicates that a given storm is in the area; these classifications are applied to Tornados, winter storms, thunderstorms, and other weather events

West Nile Virus – a virus that is found mostly in birds but can be transmitted to humans by mosquitoes that manifests as flu-like symptoms, the virus can lead to meningitis or encephalitis; there is currently no known treatment

Wind chill – the apparent temperature experienced by the human body taking into account wind speed and actual air temperature.

Appendix 28: Goals, Objectives & Strategies

1. Protect critical facilities, infrastructure, services and other community assets from the impacts of hazards.

Objective 1.1 Seek mitigation projects that provide the highest degree of hazard protection at the least cost.

Strategy 1.A: Continuity of Operations Plan – Post Disaster
 Strategy 1.B: Public Education & Outreach of Warnings – self protection
 Strategy 1.C: Community Emergency Response Team
 Strategy 1.D: Local Hazardous Materials Capabilities
 Strategy 1.E: Hazardous Materials Protection for Storm Shelters
 Strategy 1.F: Maintain Current Evacuation Plans
 Strategy 1.G: Search & Rescue Training for First Responders
 Strategy 1.H: Digging Hotline/Pipeline Safety Regulations
 Strategy 1.I: Temporary Debris Disposal Plan
 Strategy 1.J: Expanded Hazard Area Mapping & Mine Location
 Strategy 1.K: Mass Casualty Preparation
 Strategy 1.L: Replace or Install New Storm Warning System
 Strategy 1.M: Weather Radios for Citizens
 Strategy 1.N: Surge Protection/Lightning Protection
 Strategy 1.O: Burying Power Lines
 Strategy 1.P: Participation in Community Rating System for Flooding
 Strategy 1.Q: Flood Proofing of Properties
 Strategy 1.R: Storm Water Management
 Strategy 1.S: Generators for Storm Shelters
 Strategy 1.T: New Storm Shelter/ Cooling & Heating Shelter Location
 Strategy 1.U: Snow Fences/Barriers – Natural & Artificial
 Strategy 1.V: Maintenance of Heating & Cooling Systems
 Strategy 1.W: Tree Management/Trimming
 Strategy 1.X: Collection & Protection of Vital Records
 Strategy 1.Y: Acquisition or Relocation of Buildings in Floodplain
 Strategy 1.Z: Hazardous Material Disposal Program
 Strategy 1.AA: Safe Room in School, Mobile Home Parks, Campgrounds, Fairgrounds, etc.
 Strategy 1.BB: Secure Funding for removal of Vacant/ Collapsed Buildings
 Strategy 1.CC: Review Floodplain Management for Effectiveness
 Strategy 1.DD: Flood Insurance by Homeowners
 Strategy 1.EE: Rehabilitate Older Buildings
 Strategy 1.FF: Water Storage Saving Plan – Reduce Usage
 Strategy 1.GG: Evaluate/Maintain/Repair Area Dams
 Strategy 1.HH: Encourage Smoke/Fire/ Carbon Monoxide Detectors & sprinkler systems
 Strategy 1.II: Immunization plans – Emergency & Scheduled
 Strategy 1.JJ: Pest Management – through Property Regulations
 Strategy 1.KK: Radon/Lead Mitigation
 Strategy 1.LL: Critical Infrastructure Protection from Terrorism
 Strategy 1.MM: Assessment Risk for Terrorism
 Strategy 1.NN: Manufactured Home Tie-Down Regulation/Ordinance
 Strategy 1.OO: Building Code Enforcement
 Strategy 1.PP: NFIP Participation
 Strategy 1.QQ: Establish Burning Restrictions
 Strategy 1.RR: Fireplace Maintenance

Strategy 1.SS: Waste Disposal Enforcement
 Strategy 1.TT: Hazard Occurrence Data Collection & Reporting System

Objective 1.2 Strengthen partnerships and collaboration of jurisdictions, as well as, invite corporate partners, education systems, agencies and faith based representatives to participate in emergency planning and recovery.

Strategy 1.A: Continuity of Operations Plan – Post Disaster
 Strategy 1.B: Public Education & Outreach of Warnings – self protection
 Strategy 1.C: Community Emergency Response Team
 Strategy 1.D: Hazardous Materials Protection for Storm Shelters
 Strategy 1.E: Maintain Current Evacuation Plans
 Strategy 1.F: Mass Casualty Preparation
 Strategy 1.G: Weather Radios for Citizens
 Strategy 1.H: Surge Protection/Lightning Protection
 Strategy 1.I: Generators for Storm Shelters
 Strategy 1.J: Safe Room in School, Mobile Home Parks, Campgrounds, Fairgrounds, etc.

Objective 1.3 Utilize public funds/grant opportunities to protect critical facilities, public services & transportation entities.

Strategy 1.A: Continuity of Operations Plan – Post Disaster
 Strategy 1.B: Local Hazardous Materials Capabilities
 Strategy 1.C: Search & Rescue Training for First Responders
 Strategy 1.D: Replace or Install New Storm Warning System
 Strategy 1.E: Weather Radios for Citizens
 Strategy 1.F: Surge Protection/Lightning Protection
 Strategy 1.G: Burying Power Lines
 Strategy 1.H: Storm Water Management
 Strategy 1.I: Generators for Storm Shelters
 Strategy 1.J: New Storm Shelter/ Cooling & Heating Shelter Location
 Strategy 1.K: Snow Fences/Barriers – Natural & Artificial
 Strategy 1.L: Acquisition or Relocation of Buildings in Floodplain
 Strategy 1.M: Safe Room in School, Mobile Home Parks, Campgrounds, Fairgrounds, etc.
 Strategy 1.N: Secure Funding for removal of Vacant/ Collapsed Buildings
 Strategy 1.O: Rehabilitate Older Buildings
 Strategy 1.P: Evaluate/Maintain/Repair Area Dams
 Strategy 1.Q: Encourage Smoke/Fire/ Carbon Monoxide Detectors & sprinkler systems
 Strategy 1.R: Radon/Lead Mitigation
 Strategy 1.S: Critical Infrastructure Protection from Terrorism

2. Protect the health, safety & quality of life for Monroe County residents by minimizing the vulnerability of people and property in Monroe County

Objective 2.1 Ensure that property owners can maintain & improve their properties.

Strategy 1.A: Weather Radios for Citizens
 Strategy 1.B: Surge Protection/Lightning Protection
 Strategy 1.C: Flood Proofing of Properties
 Strategy 1.D: Maintenance of Heating & Cooling Systems
 Strategy 1.E: Tree Management/Trimming

Strategy 1.F: Flood Insurance by Homeowners
 Strategy 1.G: Rehabilitate Older Buildings
 Strategy 1.H: Encourage Smoke/Fire/ Carbon Monoxide Detectors & sprinkler systems
 Strategy 1.I: Pest Management – through Property Regulations
 Strategy 1.J: Radon/Lead Mitigation
 Strategy 1.K: Manufactured Home Tie-Down Regulation/Ordinance
 Strategy 1.L: Building Code Enforcement
 Strategy 1.M: Establish Burning Restrictions
 Strategy 1.N: Fireplace Maintenance
 Strategy 1.O: Waste Disposal Enforcement
 Strategy 1.P: Hazardous Material Disposal Program

Objective 2.2 Ensure that disaster recovery can proceed promptly following a disaster.

Strategy 1.A: Continuity of Operations Plan – Post Disaster
 Strategy 1.B: Public Education & Outreach of Warnings – self protection
 Strategy 1.C: Community Emergency Response Team
 Strategy 1.D: Local Hazardous Materials Capabilities
 Strategy 1.E: Hazardous Materials Protection for Storm Shelters
 Strategy 1.F: Maintain Current Evacuation Plans
 Strategy 1.G: Search & Rescue Training for First Responders
 Strategy 1.H: Mass Casualty Preparation
 Strategy 1.I: Temporary Debris Disposal Plan
 Strategy 1.J: Generators for Storm Shelters
 Strategy 1.K: Collection & Protection of Vital Records
 Strategy 1.L: New Storm Shelter/ Cooling & Heating Shelter Location
 Strategy 1.M: Water Storage Saving Plan – Reduce Usage
 Strategy 1.N: Immunization plans – Emergency & Scheduled
 Strategy 1.O: Waste Disposal Enforcement
 Strategy 1.P: Hazardous Material Disposal Program

Objective 2.3 Provide back-up energy supplies in all vital assets identified in this plan.

Strategy 1.A: Continuity of Operations Plan – Post Disaster
 Strategy 1.B: Search & Rescue Training for First Responders
 Strategy 1.C: Community Emergency Response Team
 Strategy 1.D: Local Hazardous Materials Capabilities
 Strategy 1.E: Surge Protection/Lightning Protection
 Strategy 1.F: Generators for Storm Shelters
 Strategy 1.G: New Storm Shelter/ Cooling & Heating Shelter Location
 Strategy 1.H: Tree Management/Trimming
 Strategy 1.I: Water Storage Saving Plan – Reduce Usage

Objective 2.4 Promote improving zoning codes, building codes, nuisance abatement, and health codes, especially in relation to areas with older buildings.

Strategy 1.A: Digging Hotline/Pipeline Safety Regulations
 Strategy 1.B: Flood Proofing of Properties
 Strategy 1.C: Storm Water Management
 Strategy 1.D: Tree Management/Trimming
 Strategy 1.E: Acquisition or Relocation of Buildings in Floodplain
 Strategy 1.F: Secure Funding for removal of Vacant/ Collapsed Buildings
 Strategy 1.G: Rehabilitate Older Buildings
 Strategy 1.H: Water Storage Saving Plan – Reduce Usage
 Strategy 1.I: Pest Management – through Property Regulations
 Strategy 1.J: Radon/Lead Mitigation

Strategy 1.K: Manufactured Home Tie-Down Regulation/Ordinance
 Strategy 1.L: Building Code Enforcement
 Strategy 1.M: Establish Burning Restrictions
 Strategy 1.N: Waste Disposal Enforcement
 Strategy 1.O: Hazardous Material Disposal Program

Objective 2.5 Improve protection of residents & structures from the effects of flooding
 Strategy 1.A: Participation in Community Rating System for Flooding
 Strategy 1.B: Flood Proofing of Properties
 Strategy 1.C: Storm Water Management
 Strategy 1.D: Acquisition or Relocation of Buildings in Floodplain
 Strategy 1.E: Review Floodplain Management for Effectiveness
 Strategy 1.F: Maintain Current Evacuation Plans
 Strategy 1.G: Search & Rescue Training for First Responders
 Strategy 1.H: Flood Insurance by Homeowners
 Strategy 1.I: Temporary Debris Disposal Plan
 Strategy 1.J: Evaluate/Maintain/Repair Area Dams
 Strategy 1.K: NFIP Participation
 Strategy 1.L: Weather Radios for Citizens

3. Reduce losses due to natural and man-made hazards

Objective 3.1 Educate members of the county about hazards, how to be prepared, & shelter locations.

Strategy 1.A: Continuity of Operations Plan – Post Disaster
 Strategy 1.B: Public Education & Outreach of Warnings – self protection
 Strategy 1.C: Community Emergency Response Team
 Strategy 1.D: Search & Rescue Training for First Responders
 Strategy 1.E: Hazardous Materials Protection for Storm Shelters
 Strategy 1.F: Digging Hotline/Pipeline Safety Regulations
 Strategy 1.G: Search & Rescue Training for First Responders
 Strategy 1.H: Replace or Install New Storm Warning System
 Strategy 1.I: Weather Radios for Citizens
 Strategy 1.J: Surge Protection/Lightning Protection
 Strategy 1.K: Snow Fences/Barriers – Natural & Artificial
 Strategy 1.L: Collection & Protection of Vital Records
 Strategy 1.M: Safe Room in School, Mobile Home Parks, Campgrounds, Fairgrounds, etc.
 Strategy 1.N: Encourage Smoke/Fire/ Carbon Monoxide Detectors & sprinkler systems
 Strategy 1.O: Radon/Lead Mitigation
 Strategy 1.P: Establish Burning Restrictions
 Strategy 1.Q: Hazard Occurrence Data Collection & Reporting System

Objective 3.2 Review & upgrade warning systems and communications for sufficient coverage.

Strategy 1.A: Continuity of Operations Plan – Post Disaster
 Strategy 1.B: Public Education & Outreach of Warnings – self protection
 Strategy 1.C: Community Emergency Response Team
 Strategy 1.D: Replace or Install New Storm Warning System
 Strategy 1.E: Weather Radios for Citizens

Objective 3.3 Provide certified shelters/safe rooms

Strategy 1.A: Hazardous Materials Protection for Storm Shelters

Strategy 1.B: Search & Rescue Training for First Responders
 Strategy 1.C: Generators for Storm Shelters
 Strategy 1.D: New Storm Shelter/ Cooling & Heating Shelter Location
 Strategy 1.E: Safe Room in School, Mobile Home Parks, Campgrounds, Fairgrounds, etc.

Objective 3.4 Provide adequate training, equipment and exercises to train responding emergency personnel.

Strategy 1.A: Continuity of Operations Plan – Post Disaster
 Strategy 1.B: Search & Rescue Training for First Responders
 Strategy 1.C: Community Emergency Response Team
 Strategy 1.D: Local Hazardous Materials Capabilities
 Strategy 1.E: Mass Casualty Preparation
 Strategy 1.F: Immunization plans – Emergency & Scheduled
 Strategy 1.G: Critical Infrastructure Protection from Terrorism
 Strategy 1.H: Hazard Occurrence Data Collection & Reporting System

Objective 3.5 Maintain current & create new planning and exercises related to any terrorism event.

Strategy 1.A: Continuity of Operations Plan – Post Disaster
 Strategy 1.B: Search & Rescue Training for First Responders
 Strategy 1.C: Community Emergency Response Team
 Strategy 1.D: Mass Casualty Preparation
 Strategy 1.E: Critical Infrastructure Protection from Terrorism
 Strategy 1.F: Assessment Risk for Terrorism

Objective 3.6 Identify and map the greatest risk potential of hazards in order to determine locations where improvements could be made.

Strategy 1.A: Digging Hotline/Pipeline Safety Regulations
 Strategy 1.B: Expanded Hazard Area Mapping & Mine Location
 Strategy 1.C: Participation in Community Rating System for Flooding
 Strategy 1.D: Acquisition or Relocation of Buildings in Floodplain
 Strategy 1.E: Secure Funding for removal of Vacant/ Collapsed Buildings
 Strategy 1.F: Review Floodplain Management for Effectiveness
 Strategy 1.G: Rehabilitate Older Buildings
 Strategy 1.H: Evaluate/Maintain/Repair Area Dams
 Strategy 1.I: Pest Management – through Property Regulations

Appendix 29: Contact Information

Lucas County Board of Supervisors
Lucas County Courthouse
916 Braden Avenue
Chariton, Iowa 50049
641-774-2018 - phone
website: Lucasco.org

ADLM – Emergency Management
12307 Highway 5
Moravia, Iowa 52571
641-734-3223 - phone