CLINTON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Draft 5/8/2018

Mo-Kan Regional Council, 224 N. 7th Street, St. Joseph, MO 64501

Clinton County Hazard Mitigation Planning Committee

Jurisdictional Representatives

Name	Title	Department	Jurisdiction/Agency/Organiz
Wade Wilken, Jr. Blair Shock Tammy Clough	Presiding Commissioner Emergency Management Director Health Department	County Commission Health Department Health Department	Clinton County
Tim Wymes Rick Bashor	Director of Economic Development Police Chief	Economic Development Police Station	Cameron
Cindy Bingham	Community Volunteer	Administration	Grayson
Chip Holman	Mayor	Administration	Gower
Robert Loopper	Fire Chief	Fire Department/EMS	Holt
Bob Burns	City Administrator	Administration	Lathrop
Greg Harris	City Manager	Administration	Plattsburg
Mike Shyrock	Councilman	City Council	Trimble
Chad Swindler	Councilman	City Council	Turney
Matt Robinson	Superintendent	Administration	Cameron School District
Dr. Sandy Stegall	Superintendent	Administration	Clinton School District
Paul Mensching	Superintendent	Administration	E. Buchanan School District
Chris Fine	Superintendent	Administration	Lathrop School District

Stakeholder Representatives

Name	Title	Department	Agency/Organization
Beth Farwell	Planning and Zoning	Planning and Zoning	Clinton County
Don Moore	Chair	Local Emergency Planning Committee	Clinton County
Gary McCrea	Commissioner	Commission	Clinton County
Ira Fogg	Officer	Sheriff's Office	Clinton County
Larry Fish	Sheriff	Sheriff's Office	Clinton County
Larry King	Commissioner		Clinton County
Pamela Tuia	RN		Cameron Regional Medical Center
Dean Langner	Mayor	Administration	Lathrop
Kay Foster	Citizen		Lathrop
Laura McFadden	Director		Lathrop Chamber of Commerce
Bradley V.	Fire Fighter	Fire Department	Plattsburg Fire District
Sandra Utz	Director		Plattsburg Chamber of
Ronald Gorham	Citizen		Plattsburg
Russ Hamilton	Pastor		Cameron Christian Church
Jason Utz	Maintenance	Maintenance	MoDOT
Travis Garton	Trooper		MO State Highway Patrol
Bob Dye	Citizen		Citizen
Michael Booth	Regional Coordinator		SEMA

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The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. Clinton County and participating jurisdictions and school/special districts developed this multi-jurisdictional local hazard mitigation plan update to reduce future losses from hazard events to the County and its communities and school/special districts. The plan is an update of a plan that was approved in September, 2013. The plan and the update were prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 to result in eligibility for the Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance Grant Programs.

The County Multi-Hazard Mitigation Plan is a multi-jurisdictional plan that covers the following jurisdictions that participated in the planning process:

- Clinton County
- City of Cameron
- City of Gower
- Village of Grayson
- City of Lathrop
- City of Plattsburg
- City of Trimble
- Village of Turney
- Cameron R-I School District
- Clinton County R-III School District
- East Buchanan School District
- Lathrop R-II School District

Clinton County and the entities listed above developed a Multi-Jurisdictional Hazard Mitigation Plan that was approved by FEMA in September, 2013 (hereafter referred to as the *2013 Hazard Mitigation Plan*). This current planning effort serves to update that previously approved plan.

The plan update process followed a methodology prescribed by FEMA, which began with the formation of a Mitigation Planning Committee (MPC) comprised of representatives from Clinton County and participating jurisdictions. The MPC updated the risk assessment that identified and profiled hazards that pose a risk to Clinton County and analyzed jurisdictional vulnerability to these hazards. The MPC also examined the capabilities in place to mitigate the hazard damages, with emphasis on changes that have occurred since the previously approved plan was adopted. The MPC determined that the planning area is vulnerable to several hazards that are identified, profiled, and analyzed in this plan. Winter storms, severe thunderstorms/hail/lightning/high winds, and tornadoes are among the hazards that historically have had a significant impact. The MPC elected to include man-made hazards in 2018 update.

Based upon the risk assessment, the MPC updated goals for reducing risk from hazards. The goals are listed below:

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens.

- Objective 1.1: Protect the lives and property of Clinton County residents.
- Objective 1.2: Provide sufficient warning of impending disasters.
- Objective 1.3: Identify the citizens most vulnerable to disasters and plan accordingly.

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

- Objective 2.1: Decrease the impact of natural hazards.
- Objective 2.2: Decrease the cost of the next disaster.
- Objective 2.3: Increase Clinton County's economic resistance to disasters.

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

- Objective 3.1: Increase disaster mitigation management capability in local governments.
- Objective 3.2: Strengthen critical infrastructure.

Goal 4: Ensure Access to Information About Hazard Preparation and Recovery.

- Objective 4.1: Increase knowledge among citizens about disaster safety.

To advance the identified goals, the MPC developed recommended mitigation actions, which are detailed in Chapter 4 of this plan. The MPC developed an implementation plan for each action, which identifies priority level, background information, ideas for implementation, responsible agency, timeline, cost estimate, potential funding sources, and more.

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

This plan has been reviewed by and adopted with resolutions or other documentation of adoption by all participating jurisdictions and schools/special districts. The documentation of each adoption is included in Appendix D, and a model resolution is included on the following page.

The following jurisdictions participated in the development of this plan and have adopted the multi-jurisdictional plan.

- Clinton County
- City of Cameron
- City of Gower
- Village of Grayson
- City of Lathrop
- City of Plattsburg
- City of Trimble
- Village of Turney
- Cameron R-I School District
- Clinton County R-III School District
- East Buchanan School District
- Lathrop R-II School District

Model Resolution

(*LOCAL GOVERNING BODY/SCHOOL DISTRICT*), Missouri RESOLUTION NO. _____

A RESOLUTION OF THE (*LOCAL GOVERNING BODY /SCHOOL DISTRICT*) ADOPTING THE (*PLAN NAME*)

WHEREAS the (*local governing body/school district*) recognizes the threat that natural hazards pose to people and property within the (local governing body/school district); and

WHEREAS the (*local governing body/school district*) has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the (*plan name*), hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the *(local governing body/school district*) from the impacts of future hazards and disasters; and

WHEREAS the (*local governing body*) recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the (*local governing body/school district*) will endeavor to integrate the *Plan* into the comprehensive planning process; and

WHEREAS adoption by the (*local governing body/school district*) demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY THE (*LOCAL GOVERNMENT/SCHOOL DISTRICT*), in the State of Missouri, THAT:

In accordance with (*local rule for adopting resolutions*), the (*local governing body/school district*) adopts the final *FEMA-approved Plan*.

ADOPTED by a vote of__in favor and____against, and____abstaining, this_day of _____,_____.

By (Sig): _____
Print name: _____

ATTEST:
By (Sig.): _____
Print name: _____

APPROVED AS TO FORM:
By (Sig.): _____
Print name: _____

1 INTRODUCTION AND PLANNING PROCESS

1.1 PURPOSE

Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Mitigation activities may be implemented prior to, during or after an incident. However, it has been demonstrated that hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs (http://www.fema.gov/what-mitigation).

Federal Emergency Management Agency (FEMA) has implemented the various hazard mitigation planning provisions through the Code of Federal Regulations (CFR) at 44 CFR Part 201. The CFR provisions set forth the mitigation plan requirement for local and tribal governments as a condition of receiving FEMA hazard mitigation assistance. Under 44 CFR §201.6, local governments, schools or other publicly funded districts must have adopted a FEMA-approved local hazard mitigation plan in order to apply for hazard mitigation project grants. Section 322 of the Robert T. Stafford Relief and Emergency Assistance Act (P.L. 93-288), as amended by the Disaster Mitigation Act of 2000 (DMA) (P.L. 106-390), provides for States, Tribes and local governments to undertake a risk-based approach to reducing risks to natural hazards through mitigation planning.

The plan also meets the minimum planning requirements for all FEMA mitigation programs, such as Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA), Pre-Disaster Mitigation (PDM) and where appropriate, other FEMA mitigation related programs such as the National Earthquake Hazards Reduction Program (NEHRP), the National Flood Insurance Program (NFIP) and the Community Rating System (CRS). Entities that do not adopt the plan will not be eligible for mitigation grants.

The Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule were published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act or DMA). The DMA established the requirements for local hazard mitigation plans are in the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). The communities and school districts were informed that adopting the plan is a prerequisite for mitigation grant eligibility. Entities that do not adopt the plan will not be eligible for mitigation grants.

1.2 BACKGROUND AND SCOPE

As required by 44 CFR §201.6(d)(3), local jurisdictions must review and revise their plan to reflect changes in development, progress in local mitigation efforts and changes in priorities and resubmit it for approval every five (5) years in order to continue to be eligible for mitigation project grant funding. The 2018 DeKalb County Multi-Jurisdictional Hazard Mitigation Plan is a revision of the previous five-year update adopted in September 2013 which was the first update of the original plan.

Jurisdictions that participated in the last plan and are continuing participation in the 2018 include:

- Clinton County
- City of Cameron
- City of Gower
- Village of Grayson
- City of Holt
- City of Lathrop
- City of Plattsburg
- City of Trimble
- Village of Turney
- Cameron R-I School District
- Clinton County R-III School District
- East Buchanan School District
- Lathrop R-II School District

Several jurisdictions have boundaries in two counties. The jurisdictions of Cameron, Stewartsville, and Osborn are located in DeKalb and Clinton counties. Cameron is participating in Clinton County's plan while Stewartsville and Osborn are participating in DeKalb County's plan. Holt is located in Platte and Clinton counties but is participating in Clinton County's plan.

Information in the plan will be used to help guide and coordinate mitigation activities and decisions for local land use policies in the future.

1.3 PLAN ORGANIZATION

The 2018 HMP is organized into five chapters, which are:

- Chapter 1: Introduction and Planning Process
- Chapter 2: Planning Area Profile and Capabilities
- Chapter 3: Risk Assessment
- Chapter 4: Mitigation Strategy
- Chapter 5: Plan Implementation and Maintenance
- Appendices

The plan format has been standardized across the state in order to create hazard mitigation plans that are more consistent with each other, making it easier to locate information, as well as

making plans more consistent from update to update. Chapter 5, Plan Maintenance, was added to expand the amount of information on maintaining the plan between updates. In the 2013 update, plan maintenance information was located in Section 4, Mitigation Strategy. Routine review and maintenance of mitigation actions and goals is important to make sure actions are being implemented on schedule and for the plan's goals to guide mitigation efforts. By increasing the focus on plan maintenance through the addition of a separate chapter, this aspect will receive the attention it deserves.

The table below **(Table 1.1)** shows each chapter and summarizes the changes made in the update.

Table 1.1. Changes Made in Plan Update

2013 HMP	2018 HMP
Section 1: Community Profiles	Chapter 1: Introduction and Planning Process
Section 2: Hazard Identification	Chapter 2: Planning Area Profile and Capabilities
Section 3: Vulnerability and Capability Assessment	Chapter 3: Risk Assessment
Section 4: Mitigation Strategy	Chapter 4: Mitigation Strategy
	Chapter 5: Plan Maintenance Process (new chapter)

1.4 PLANNING PROCESS

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

Mo-Kan Regional Council contracted to facilitate the plan's updating process. Mo-Kan staff met with the Clinton County Presiding Commissioner and Emergency Management Director during the informational meeting to develop a list of area stakeholders and local jurisdiction representatives for the Mitigation Planning Committee (MPC). The updating process included the kick-off meeting and three subsequent MPC meetings, as well as monthly Local Emergency Planning Committee (LEPC) meetings. Mo-Kan staff produced the draft and final plan update in a FEMA approved document, and coordinated with the Missouri State Emergency Management Agency (SEMA) and FEMA plan reviews.

The main topics at the MPC meetings are discussed in Section 1.4.2. Mo-Kan solicited public involvement in the planning process. Press releases were disseminated for the MPC meetings that were held on September 19, 2017, October 17, 2017, November 21, 2017 and January 6,

2018. Appendix A provides the results from the survey that was distributed to the public for input into the risk analysis and planning process. Appendix B provides documentation of the planning process including public involvement solicitations and meeting notices.

The draft of the plan was posted on the Clinton County website for public review and comment. A press release was sent to *Clinton County Leader* and *Cameron Newsleader*, notifying the public that the plan was available for comment. Input from city and county officials was solicited through distribution of drafts of the plan to their jurisdictions.

Table 1.2 shows the representatives from local jurisdictions and stakeholders that attended meetings and participated on the MPC.

Table 1.2. Jurisdictional Representatives Clinton County Mitigation Planning Committee

Name	Title	Department	Jurisdiction/Agency/Organiz
Wade Wilken, Jr. Blair Shock	Presiding Commissioner Emergency Management Director	County Commission Health Department	Clinton County
Tim Wymes Rick Bashor	Director of Economic Development Police Chief	Economic Development Police Station	Cameron
Cindy Bingham	Community Volunteer	Community Volunteer	Grayson
Chip Holman	Mayor	Administration	Gower
Robert Looper	Fire Chief	Fire Department/EMS	Holt
Bob Burns	City Administrator	Administration	Lathrop
Greg Harris	City Manager	Administration	Plattsburg
Mike Shyrock	Councilman	City Council	Trimble
Chad Swindler	Councilman	City Council	Turney
Matt Robinson	Superintendent	Administration	Cameron School District
Dr. Sandy Stegall	Superintendent	Administration	Clinton School District
Paul Mensching	Superintendent	Administration	E. Buchanan School District
Chris Fine	Superintendent	Administration	Lathrop School District

1.4.1 Multi-Jurisdictional Participation

44 CFR Requirement §201.6(a)(3): Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan.

Each jurisdiction is required to participate in the planning process and officially adopt the plan, in order to be eligible for mitigation funding grants. The MPC established a minimum criteria that each jurisdiction must meet in order to be considered a “participant.” Plan participation requirements were defined as:

- Designation of a representative from each participating jurisdiction to serve on the MPC;
- Participation in two MPC meetings by either direct participation or authorized representation or host a work session with the specific jurisdiction;
- Each participating jurisdiction must provide to the MPC sufficient information to support plan development by completion and return of data collection questionnaires and validating/correcting critical facility inventories;

- Eliminated actions from the previously approved plan that were not implemented because they were impractical, inappropriate, not cost-effective, or were otherwise not feasible;
- Review and comment on plan drafts;
- Actively solicit input from the public, local officials, and other interested parties about the planning process and provide an opportunity for them to comment on the plan;
- Provide documentation to show time donated to the planning effort; and
- All participants should formally adopt the mitigation plan prior to submittal to FEMA for final approval.

The participation requirements were easily met by Clinton County, which has full-time staff that were present at each meeting. Communities with full-time staff were able to attend meetings, in general, but the communities without full-time staff had difficulty. The MPC agreed that if a jurisdiction was unable to attend the meetings that participation requirements could be met by communicating with Mo-Kan to receive meeting materials and submitting the necessary paperwork. See Table 1.3 for jurisdictional participation in the planning process. Several jurisdictions have not met the participation requirements at this time.

Table 1.3. Jurisdictional Participation in Planning Process

Jurisdiction	Kickoff Meeting	Meeting #2	Meeting #3	Meeting #4	Data Collection Questionnaire Response	Update/Develop Mitigation Actions	Sufficient Contact with Mo-Kan
Clinton County	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cameron	Yes	Yes	Yes	No	Yes	Yes	Yes
Grayson	No	No	No	No	Yes	Yes	Yes
Gower	No	No	Yes	No	Yes	Yes	Yes
Holt	Yes	Yes	Yes	Yes	No	No	Yes
Lathrop	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plattsburg	Yes	Yes	Yes	No	Yes	Yes	Yes
Trimble	No	Yes	Yes	No	Yes	Yes	Yes
Turney	No	No	No	No	Yes	Yes	Yes
Cameron School District	Yes	Yes	Yes	No	Yes	No	Yes
Clinton School District	Yes	No	No	No	No	No	No
East Buchanan School District	No	No	No	No	Yes	No	No
Lathrop School District	No	No	No	No	Yes	Yes	Yes

1.4.2 The Planning Steps

FEMA's Local Mitigation Planning Handbook (March 2013), Local Mitigation Plan Review Guide (October 1, 2013), and Integrating Hazard Mitigation into Local Planning: Case Studies and Tools for Community Officials (March 1, 2013) were used as the sources for the HMP

update. The update followed the 10-step planning process adapted from FEMA's Community Rating System (CRS) and Flood Mitigation Assistance programs. The10-step process allows the Plan to meet funding eligibility requirements of the Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, Community Rating System, and Flood Mitigation Assistance Program. Table 1.4 shows how the CRS process aligns with the Nine Task Process outlined in the 2013 Local Mitigation Planning Handbook.

Following Table 1.4 is a summary of how Mo-Kan staff used the process below to develop the update to the Plan.

Table 1.4. County Mitigation Plan Update Process

Community Rating System (CRS) Planning Steps (Activity 510)	Local Mitigation Planning Handbook Tasks (44 CFR Part 201)
Step 1. Organize	Task 1: Determine the Planning Area and Resources
	Task 2: Build the Planning Team 44 CFR 201.6(c)(1)
Step 2. Involve the public	Task 3: Create an Outreach Strategy 44 CFR 201.6(b)(1)
Step 3. Coordinate	Task 4: Review Community Capabilities 44 CFR 201.6(b)(2) & (3)
Step 4. Assess the hazard	Task 5: Conduct a Risk Assessment 44 CFR 201.6(c)(2)(i) 44 CFR 201.6(c)(2)(ii) & (iii)
Step 5. Assess the problem	
Step 6. Set goals	Task 6: Develop a Mitigation Strategy 44 CFR 201.6(c)(3)(i); 44 CFR 201.6(c)(3)(ii); and 44 CFR 201.6(c)(3)(iii)
Step 7. Review possible activities	
Step 8. Draft an action plan	
Step 9. Adopt the plan	Task 8: Review and Adopt the Plan
Step 10. Implement, evaluate, revise	Task 7: Keep the Plan Current
	Task 9: Create a Safe and Resilient Community 44 CFR 201.6(c)(4)

Step 1: Organize the Planning Team (Handbook Tasks 1 & 2)

In May 2017, Mo-Kan entered into cooperative agreements with SEMA and Clinton County to prepare this multi-jurisdictional plan for local jurisdictions in Clinton County. Discussions on the development of the Clinton County Multi-Jurisdictional Hazard Mitigation Plan began on July 18, 2017 with a meeting attended by Mo-Kan staff, the Clinton County Presiding Commissioner and Emergency Management Director. This meeting was conducted to discuss the timeline for developing the hazard mitigation plan, the planning process, identification of stakeholders and community organizations to include in the planning process and a date for the Kick-Off meeting to initiate participation of jurisdictions and public entities in the planning process. The attendees identified prospective representatives and stakeholders and a contact list was prepared for mailing an invitation letter to the Kick-Off Meeting. The list of invitees included local elected officials, municipal government staff, county government staff, emergency services personnel, school administrators, members from health and social services organizations, utility providers, and volunteer organizations. Neighboring communities and counties were welcome to participate.

The MPC met on four occasions from September 2017 through January 2018 to collaborate on

the plan's update. Participants assisted in data collection; reviewed and revised goals, objectives and mitigation strategies; and provided reviews and comments on the plan throughout the update process. Communication with MPC members occurred throughout the planning process through face-to-face meetings, phone interviews, and email correspondence in addition to committee meetings. Public notices, press releases, agendas and sign-in sheets for those meetings are in Appendix B.

Table 1.5 shows the meeting schedule and items discussed for MPC meetings.

Table 1.5. Schedule of MPC Meetings

Meeting	Topic	Date
Informational Meeting	Met with the Presiding County Commission and Emergency Management Director to discuss the composition of the Mitigation Planning Committee. Discussed risk assessment methodology and the timeline for updating the plan.	July 18, 2017
Kick-off Meeting	Discussion on the background and importance of HMP, timeline and participation requirements, review of 2013 plan and began working on community data questionnaire forms.	September 19, 2017
Planning Meeting #2	Review of goals and actions, discussion of past and potential mitigation projects and began working on hazard analysis and cascading disasters.	October 17, 2017
Planning Meeting #3	Discussion achievements and creating new actions.	November 21, 2017
Planning Meeting #4	Discussion on the adoption process and revisiting the goals and objectives.	January 6, 2018

Step 2: Plan for Public Involvement (Handbook Task 3)

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

The MPC held their Kick-Off meeting on, September 19, 2017. Some of the MPC members had participated in the 2013 update but the updating process was new for the majority. There was discussion on soliciting public input and the importance of public outreach. Several MPC members volunteered to distribute information at public events and facilities. It was determined to hold a series of public meetings and to present HMP update information at city council meetings, Local Emergency Planning Committee (LEPC) meetings and other type of meetings. Mo-Kan staff and local jurisdictions disseminated public notices and press releases to the media, urging public attendance and input. A survey was distributed to the public for their input.

The Community Rating System (CRS) was discussed to determine if jurisdictions were interested in participation. Clinton County has minimal issues with flooding so there was not

extensive interest. MPC members were usually present at the aforementioned meetings. The committee was open to public input at these meetings and incorporated this information into the plan when thought appropriate.

The MPC created a survey to get the public's feedback about what hazards they were the most concerned with and what mitigation actions they would like to see included in the update. The survey was posted on the county's website and to the Local Emergency Planning Committee (LEPC) meeting attendees. The survey results are located in Appendix B.

In addition, information regarding the hazard mitigation plan, as well as Ready-in-Three campaign materials were distributed at the following locations: Clinton County Courthouse, Clinton County Senior Center, and during the Cameron Regional Hospital's Health Fair. Other meetings that were open to the public included:

Local Emergency Planning Committee (LEPC) meetings – held monthly.
The plan update was a standing agenda item discussed at meetings. Many attendees were first responders and provided information about past disasters and suggestions on how to mitigate the impact of future disasters.

ACCD (Andrew, Clinton, Caldwell and DeKalb Counties) 911 meeting - July 10, 2017
Attendees discussed communication capabilities and how to be ready to handle disasters.

Trimble City Council meeting – December 4, 2017
The plan update was discussed at the city council meeting and the public was informed of how they can become involved.

City of Cameron meeting – January 25, 2018
City staff and Mo-Kan staff met to discuss mitigation actions.

City of Gower – March 29, 2018
City staff and Mo-Kan staff met to discuss mitigation actions.

City of Turney – April 16, 2018
Chairman and Mo-Kan staff discussed mitigation actions via phone.

Step 3: Coordinate with Other Departments and Agencies and Incorporate Existing Information (Handbook Task 3)

44 CFR Requirement 201.6(b): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process. (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

At the informational meeting, held on July 18, 2017, the Clinton County Presiding Commissioner and Emergency Management Director were asked to compile a list of

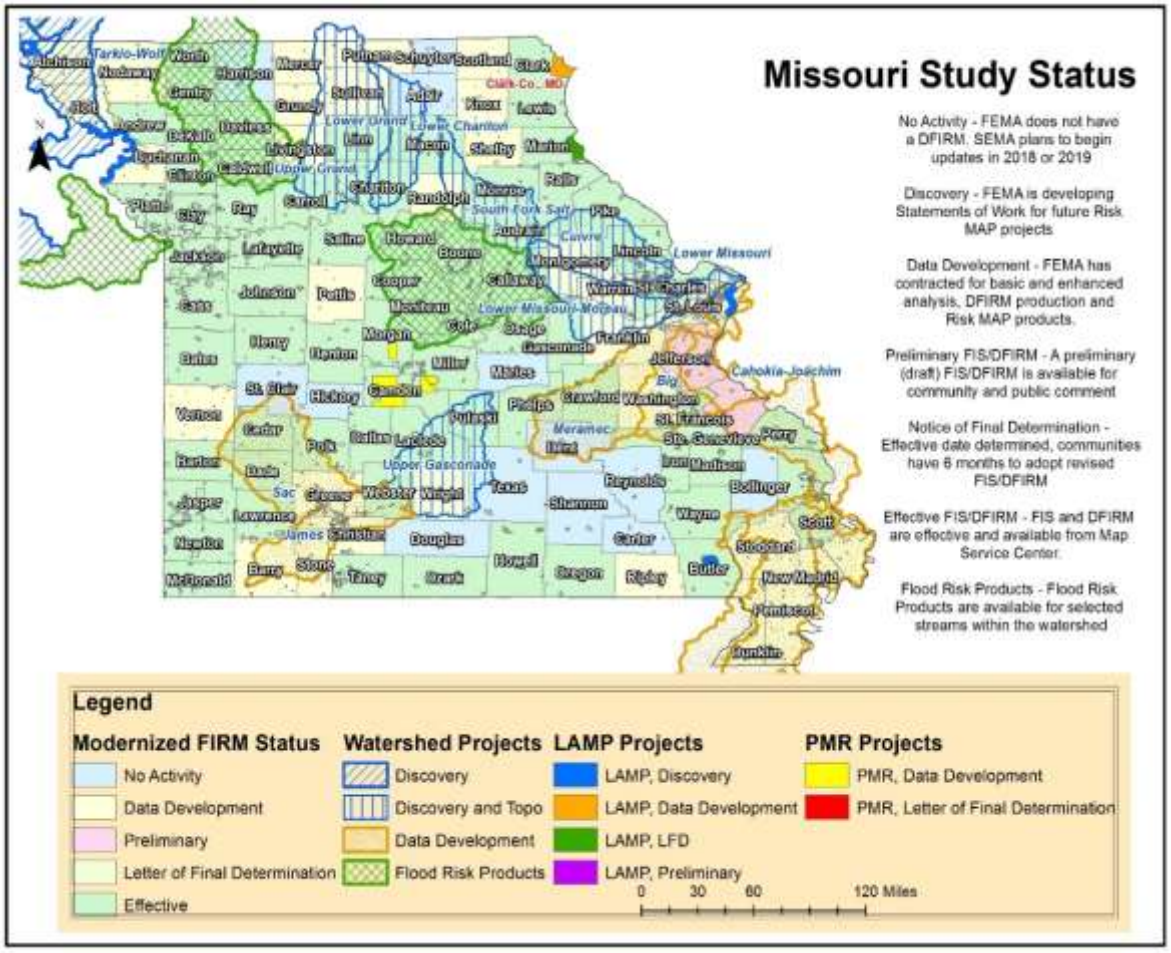
organizations to invite to participate in updating the plan, whose goals and interests interfaced with hazard mitigation. Invitations were sent to all jurisdictions located in Clinton County, school districts, emergency management and responders personnel, industry representatives, etc. A list of organizations and agencies receiving invitations are located in Appendix B. Invitation respondents were the MPC, whose input guided the plan update.

Coordination with FEMA Risk MAP Project

Risk Mapping, Assessment, and Planning (Risk MAP) is the Federal Emergency Management Agency (FEMA) Program that provides communities with flood information and tools they can use to enhance their mitigation plans and take action to better protect their citizens. Through collaboration with State, Tribal, and local entities, Risk MAP delivers quality data that increases public awareness and leads to action that reduces risk to life and property.

Clinton County has a Risk Map watershed project; flood risk product. Figure 1.1, Missouri Study Status Map illustrates the current status of Missouri counties in regard to RiskMap projects, including Clinton County.

Figure 1.1. Map of RiskMAP projects



Integration of Other Data, Reports, Studies, and Plans

Additional input was solicited from other agencies and organizations that were not able to attend planning committees. Data was collected and reviewed from multiple sources, which are referenced throughout the document. These sources include, but are not limited to, the US Census, Andrew and Buchanan Counties HMPs (adjacent counties), Flood Insurance Studies (FIS), Flood Insurance Rate Maps (FIRMS), State Department of Natural Resources (DNR) dam information, National Inventory of Dams (NID), dam inspection reports, local comprehensive plans and land use plans, US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics.

Step 4: Assess the Hazard: Identify and Profile Hazards (Handbook Task 5)

At the first MPC meeting, held on September 19, 2017, hazards from the 2013 plan were briefly identified and profiled. The MPC agreed that historically, tornados and severe weather had been the primary areas of concern. At the second MPC meeting, held on October 17, 2017, the hazards were discussed in more detail and a survey was workshopped that would be important for getting the public's feedback on which hazards they were most concerned about.

A list of previous disaster declarations was available to jurisdictions to assist in their risk assessment, but this list was not reviewed at a MPC meeting. The data collection questionnaire forms provided valuable information regarding each jurisdiction's experience with disasters. This information was used by the individual jurisdictions in evaluating their risk assessment and by Mo-Kan staff in generating the data for risk assessments for Chapter 3. The MPC reviewed each jurisdiction's data collection questionnaire at the fourth MPC meeting.

The 2013 Clinton County HMP and 2010 State Plan provided a basis for the 2017 Clinton County HMP. Andrew and Buchanan County's updated HMPs were referred to, since it followed the new outline and are adjacent counties.

Step 5: Assess the Problem: Identify Assets and Estimate Losses

Jurisdictions identified their respective assets on their Data Collection Questionnaire form, as well as during work sessions. These assets were compared against various GIS layers and HAZUS to access their vulnerability to disasters.

The city clerks, mayors and/or city council members of their respective jurisdictions collaborated to complete the data collection questionnaires. Clinton County has full-time staff, but other communities had only one or no full-time staff. Providing information on the data collection questionnaires often fell to one person. The superintendents and/or principals completed the data collection questionnaires for their school districts. Most of the data on the school questionnaire forms was readily available, in a different format, for school emergency plans. The data retrieved from the questionnaires can be found in Chapter 3. This data includes information on regulatory, personnel, fiscal and technical capabilities, and existing mitigation initiatives.

Inventory estimates for each jurisdiction's building stock in the county were derived through the use of HAZUS MH 3.2. The methodology for estimating losses varies by hazard. Loss estimates are included for various hazard profiles in the Risk Assessment chapter.

Step 6: Set Goals (Handbook Task 6)

It was at the second MPC meeting that the goals from the previous plan were reviewed. They decided to wait until the fourth meeting, held on October 17, 2017, to finalize the goals for the 2018 plan. This decision was based on allowing the jurisdictions more time to examine what progress had been made and to determine if there are new needs. The 2013 plan goals were:

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens.

- Objective 1.1: Protect the lives and property of Clinton County residents.
- Objective 1.2: Provide sufficient warning of impending disasters.
- Objective 1.3: Identify the citizens most vulnerable to disasters and plan accordingly.

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

- Objective 2.1: Decrease the impact of natural hazards.
- Objective 2.2: Decrease the cost of the next disaster.
- Objective 2.3: Increase Clinton County's economic resistance to disasters.

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

- Objective 3.1: Increase disaster mitigation management capability in local governments.
- Objective 3.2: Strengthen critical infrastructure.

Goal 4: Ensure Access to Information About Hazard Preparation and Recovery.

- Objective 4.1: Increase knowledge among citizens about disaster safety.

At the fourth meeting, the MPC decided to keep the goals and objectives the same as the 2013 plan.

Clinton County's 2018 HMP goals are:

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens.

- Objective 1.1: Protect the lives and property of Clinton County residents.
- Objective 1.2: Provide sufficient warning of impending disasters.
- Objective 1.3: Identify the citizens most vulnerable to disasters and plan accordingly.

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

- Objective 2.1: Decrease the impact of natural hazards.
- Objective 2.2: Decrease the cost of the next disaster.
- Objective 2.3: Increase Clinton County's economic resistance to disasters.

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

- Objective 3.1: Increase disaster mitigation management capability in local governments.
- Objective 3.2: Strengthen critical infrastructure.

Goal 4: Ensure Access to Information About Hazard Preparation and Recovery.

- Objective 4.1: Increase knowledge among citizens about disaster safety

Step 7: Review Possible Mitigation Actions and Activities

At the second MPC meeting, held on October 17, 2017, the mitigation strategy from the previous plan was reviewed and a new strategy was discussed. Representatives from the jurisdictions also reviewed the previous actions and reported on progress made on previously proposed actions. A packet for each jurisdiction was provided that included evaluation and STAPLEE forms, information on how to complete the forms and the actions to be evaluated. How to evaluate the past actions was discussed during the meeting but due to the sheer number of actions needing to be evaluated, jurisdiction representatives evaluated actions outside of the scheduled MPC meetings.

Participants were to consider the potential cost of each action in relation to the anticipated future cost savings. Members were encouraged to continue forwarding only those actions that substantively addressed long-term risks identified in the risk assessment. There was little difference in the risk assessment of natural hazards from the 2013 plan. However, the members elected to add man-made disasters to the 2018 plan. Man-made disasters are situations that the jurisdictions want to prepare for.

The STAPLEE method was used to prioritize actions that would continue forward. The modified STAPLEE method determined if an action is socially acceptable, technically feasible, administratively possible, politically acceptable, legal, economically beneficial and environmentally sound. The STAPLEE method also considered if lives will be saved or if disaster damages would decrease through implementation. However, several MPC members said that certain actions scored higher than they felt their level of importance was. The representatives used their discretion on including those low scoring actions with high importance since a STAPLEE method is a guideline to assist in ranking and not the only factor in determining importance.

At the third MPC meeting, held on November 21, 2017, new actions were discussed. MPC members were encouraged to continue actions that addressed long-term risks identified in the risk assessment. Copies of the FEMA publication *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (January 2013)* were made available for jurisdictions to reference.

Step 8: Draft an Action Plan

At the third MPC meeting, held October 16, 2017 new actions were discussed. The individual jurisdictions submitted their new actions after discussion with their respective city council or school board. It was at the individual jurisdiction's discretion on whether to include actions with low STAPLEE scores.

Step 9: Adopt the Plan (Handbook Task 8)

Jurisdictions were provided a copy of the plan to make available to the public. The public and the jurisdictions were asked for feedback. The plan went before the Clinton County Commissioners and the other jurisdictions for adoption in May. Adoption resolutions can be found in Appendix D.

Step 10: Implement, Evaluate, and Revise the Plan (Handbook Tasks 7 & 9)

At each MPC meeting, plan maintenance was discussed. At the fourth MPC meeting, held on January 6, 2018 the discussion was more in depth, including strategies for plan implementation, monitoring and plan review dates. Clinton County, and other jurisdictions established general dates to review the plan so they can monitor and evaluate their progress on obtaining the plan's goals and completing the actions. During a review of the plan, the public will be notified and invited to participate. Details of plan maintenance and review are in Chapter 5.

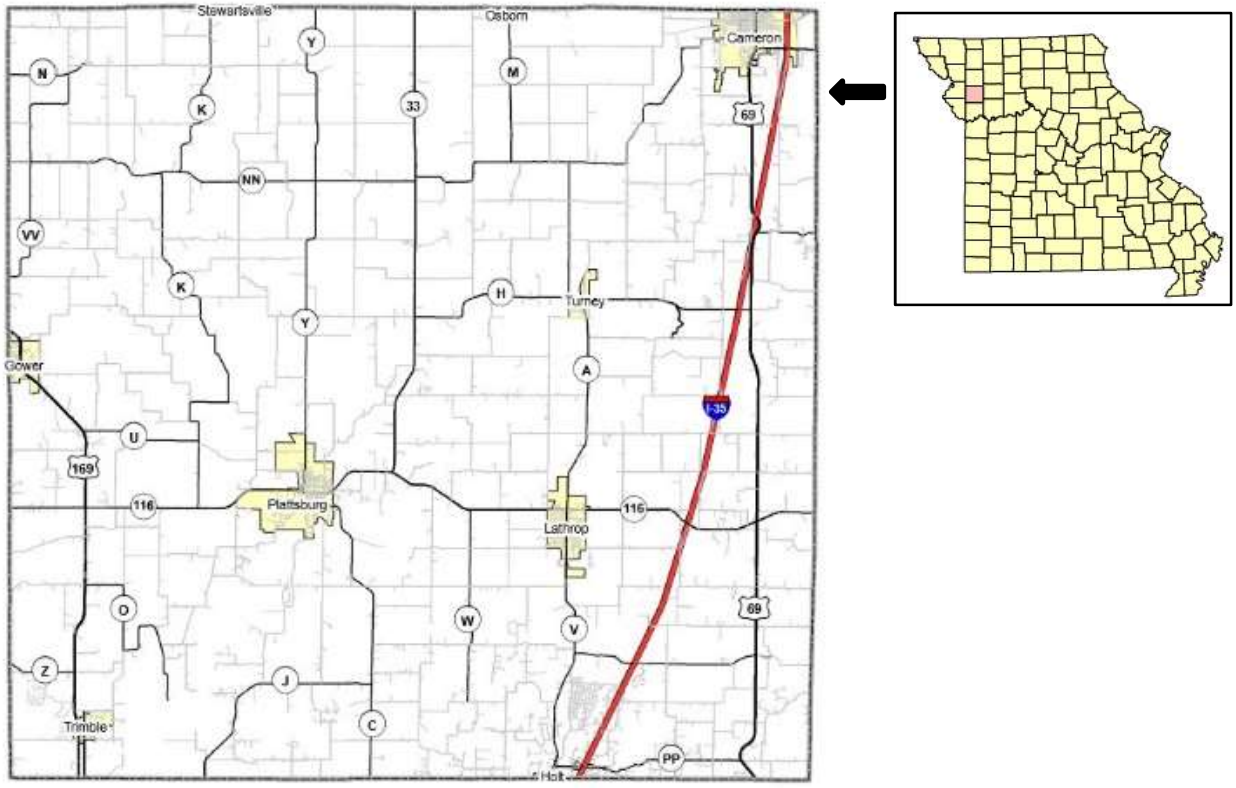
2 PLANNING AREA PROFILE AND CAPABILITIES

2.1 Clinton County Planning Area Profile

Clinton County is bordered by the counties of Buchanan, Caldwell, Clay, DeKalb, Platte and Ray. The county seat of Plattsburg is located near the geographic center of the county. As shown in Figure 2.1 on the following page, the communities of Cameron, Gower, Holt, Stewartsville, and Osborn are located in two counties. The communities participating in the Clinton County Hazard Mitigation Plan are Cameron, Gower, Grayson, Holt, Lathrop, Plattsburg, Trimble and Turney. Grayson and Turney are classified as villages and data was not always available.

According to the U.S. Bureau of the Census July 1, 2016 Annual Population Estimates, the population of Clinton County is 20,610. This is 133 more people than the 2000 U.S. Census population of 20,743. The change is .64 percent. Missouri and the United States experienced growth rates of 1.58 percent and 1.42 percent, respectively, during the same timeframe. According to the 2016 American Community Survey, Clinton County's median household income (MHI) increased 27.6 percent from $41,629 in 2000 to $57,486. During the same timeframe Missouri and the United States experienced an increase in median income of 30.73 percent and 31.73 percent, respectively. From 2000 to 2016, the median house value in the county rose from $86,400 to $138,400, an increase of 60.19 percent. This increase lagged behind the state and national median house value increases of 57.06 percent and 65.21 percent, respectively (Source: http://www factfinder.census.gov).

Figure 2.1 **Map of Clinton County**



2.1.2 Geography, Geology and Topography

In accordance with the United States Census Bureau the county is about 423 square miles; and about 419 square miles is land, and four square miles is water. The county is predominately rural with centrally located Plattsburg serving as the county seat. Cameron, located in both Clinton and DeKalb county is the largest population center, with 9,788 residents. Agriculture is the primary land use.

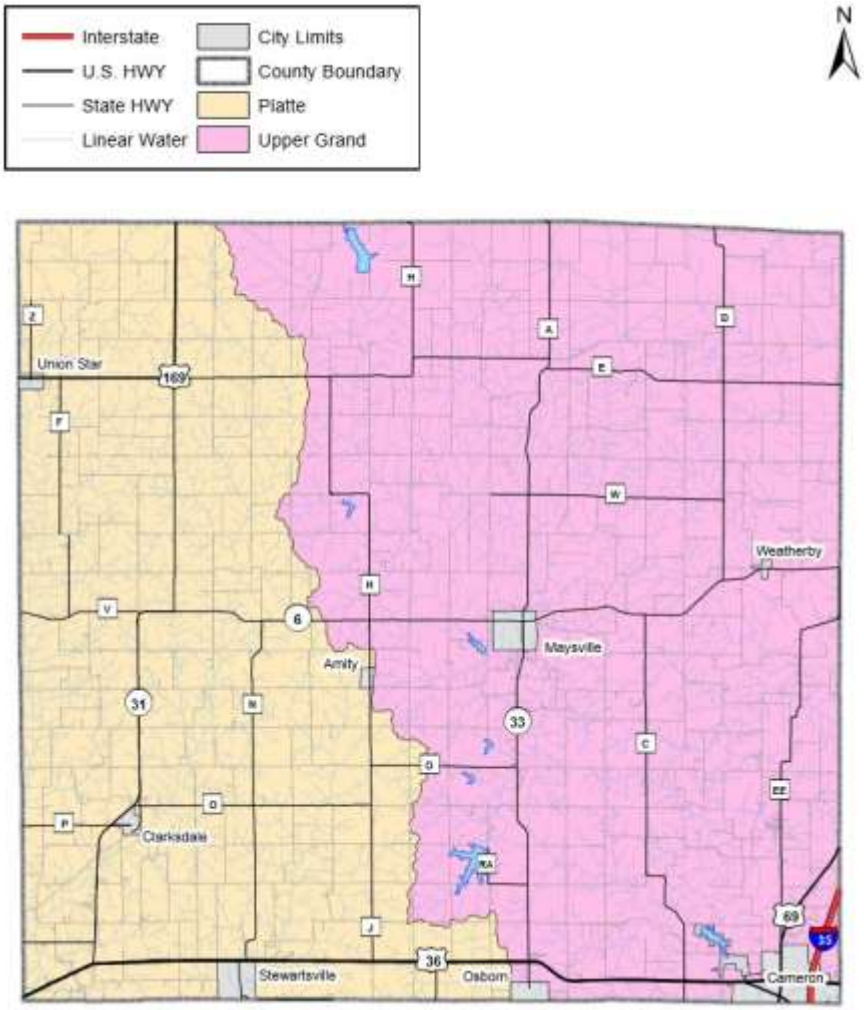
The topography form of Clinton County is moderately dissected plains, and includes Pennsylvanian-Age Bedrock and thin limestone. Since the area is susceptible to heavy rainfall and clay is found in its topography, storm water runoff can create erosion problems.

Clinton County does not have any major rivers. The streams are the Little Platte, Castile Creek and Shoal Creek. Smithville Lake was constructed by the U.S. Army Corps of Engineers in 1979. The dam is located to the south of Clinton County in Clay County, but the body of the lake extends well into Clinton County. Altogether, Smithville Lake covers 7,190 acres and has a storage area of 102,200 acre feet. The lake drains 213 acres. The topography and soil content of Clinton County are not conducive to the formation of large wetlands. However, numerous small wetlands exist in varying degrees of quality.

There are three eight-digit hydrological unit (HUC) watersheds in Clinton County. The Platte Watershed includes the communities of Stewartsville, Gower, Turney, Plattsburg and Lathrop. The

Upper Grand Watershed includes the communities of Cameron, Lathrop; Holt is located in the Lower Missouri Crooked Watershed. Figure 2.2 shows the three watersheds in county (Source: MoDNR).

Figure 2.2 Clinton County HUC-8 Watersheds



(Source: Missouri Department of Natural Resources)

2.1.3 Climate

The climate of northwest Missouri is continental in nature with cold winters, hot summers and is subject to extreme changes in temperature, humidity, cloudiness and wind speeds. The mean average temperature is 52.3° show that July is the warmest month and has an average daily high of 88.9°. January is the coldest month with the average daily low temperature of 19.7°. The average rain fall is 45 inches per year and average snow fall is 12 inches per year (Source: https://www.ncdc.noaa.gov/temp-and-precip/ and http://www.bestplaces.net/climate/county/missouri/dekalb).

2.1.4 Population/Demographics

Table 2.1 provides the populations for each city, village, and the unincorporated county for 2000 and 2016 American Community Survey population estimates, as provided by the United States Census Bureau, with the number and percentage change.

The county population will not be completely accurate since portions of some of the incorporated areas overlap into the adjacent counties, such as the case with the cities of Cameron, Gower, Osborn and Stewartsville. Cameron, the largest incorporated area and the majority of its population reside in Clinton County.

Table 2.1. Clinton County Population 2000-2016 by Community

Jurisdiction	Total Population 2000	Total Population 2016	2000-2016 # Change	2000-2016 % Change
City of Cameron*	9,788	9,933	145	1.50%
City of Gower	1,399	1,526	127	9.07%
City of Holt	405	498	93	22.96%
City Lathrop	2,092	2,086	-6	-0.29%
City of Plattsburg	2,354	2,319	-35	-1.50%
City of Trimble	451	646	195	43.24%
Village of Turney	155	148	-7	-4.52%
Unincorporated area	2,285	3,662	1,377	60.26%
Totals	18,979	20,743	1,764	8.88%

(Source: U.S. Bureau of the Census, 2016 American Community Survey, *population includes the portions of these cities in adjacent counties)

According to the 2016 American Community Survey, 5.5 percent of Clinton County's population is under 5 years old, which is below the matching statewide and national percentages of 6.2. Clinton County's percentage of over population of 65 years old is 17.1, which is higher than the statewide and national percentages of 15.3 and 14.5, respectively. The county has 7,951 households, with the persons per household, 2012-2016 being 2.55 in Clinton County. This is slightly larger than the statewide of 2.48 and slightly smaller than the national average 2.64.

The vulnerability analyses in the next chapter of this plan will include Social Vulnerability Index (SoVI ®) information from the Hazards and Vulnerability Research Institute at the University of South Carolina. The University developed an index to evaluate and rank the ability to respond to, cope with, recover from, and adapt to disasters. The index synthesizes 30 socioeconomic variables which research literature suggests contribute to reduction in a community's ability to prepare for, respond to, and recover from hazards. SoVI ® data sources include primarily those from the United States Census Bureau. Clinton County has a SoVI® score of -0.560000002 and in the national percentile of 40.9 percent.

Figure 2.3 shows how Clinton County compares to the state and nation in social vulnerability to environmental hazards. A higher percentage indicates a higher vulnerability. Scores in the top 20 percent of the United States are more vulnerable counties (red) and scores in the bottom 20 percent of the United States indicate the least vulnerable counties (blue). Clinton County scores in the medium range for vulnerability (Source: http://webra.cas.sc.edu/hvri/products/sovi.aspx)

Figure 2.3 **Social Vulnerability Index**

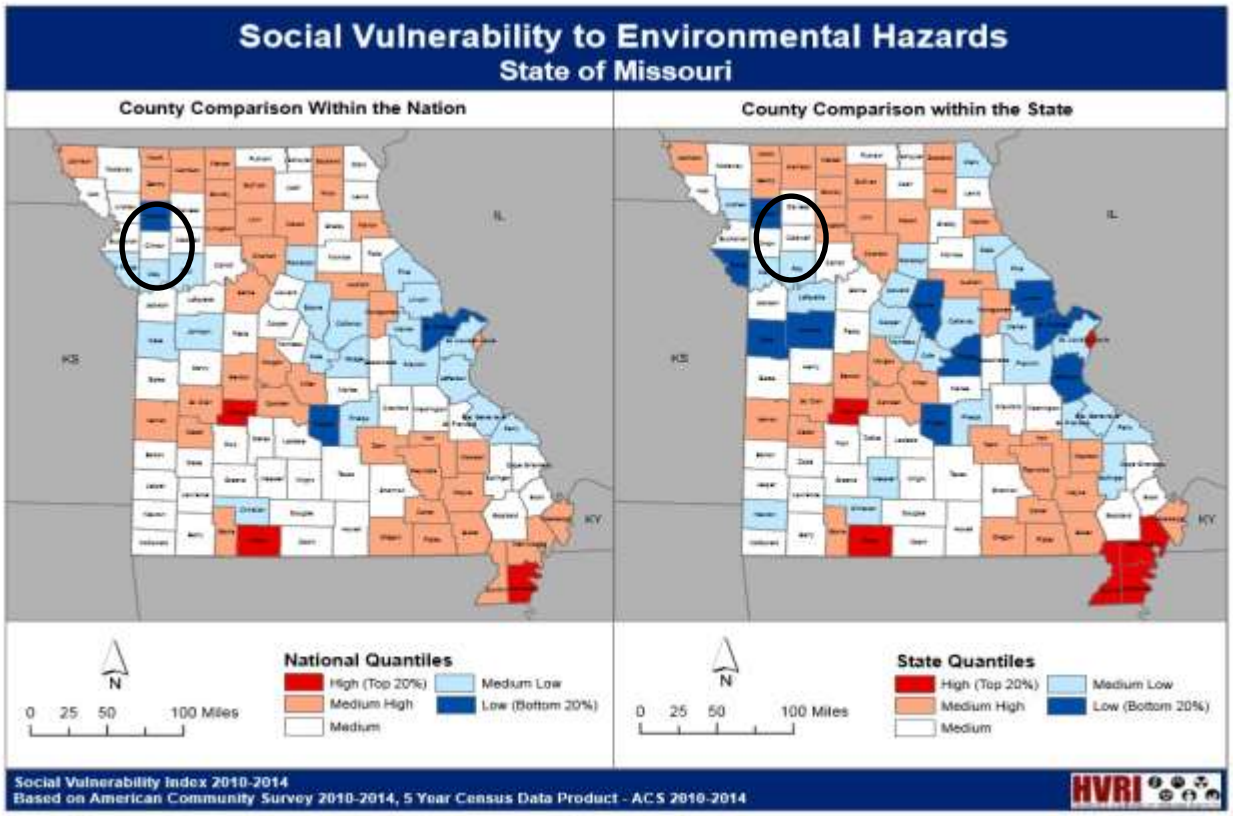


Table 2.2 provides additional demographic and economic indicators for the county.

Table 2.2. Unemployment, Poverty, Education, and Language Percentage Demographics, Clinton County, Missouri

Jurisdiction	Total in Labor Force	Percent of Civilian Population Unemployed	Percent of Families Below the Poverty Level	Percentage of Population (High School graduate)	Percentage of Population (Bachelor's degree or higher)	Percentage of population (spoken language other than English)
Clinton County	10,405	3.2%	9.5%	92.5%	18.6%	1.8%
City of Cameron	2,912	2.1%	19.2%	83.1%	11.8%	2.8%
City of Gower	794	3.1%	7.5%	94.8%	18.7%	0.3%
City of Holt	248	4.3%	13.9%	81.9%	9.2%	1.7%
City of Lathrop	1,171	5.2%	11.8%	92.0%	13.1%	1.8%
City of Osborn	302	5.2%	4.5%	88.3%	8.7%	0.2%
City of Plattsburg	1,151	4.0%	14.7%	87.4%	19.4%	5.5%
City of Trimble	327	6.0%	23.3%	89.3%	10%	2.9%
Village of Turney	50	0.0%	28.2%	91.1%	13.3%	0%

(Source: U.S. Census, 2016 American Community Survey, 5-year Estimates)

2.1.5 History

The first settler of what is called Clinton County today was John Livingston, who settled in the area in 1830. Originally Clinton County was a part of Clay County, which served as the home of the world famous outlaw Jesse James. Until the Platte Purchase, the area was considered a border county and was thought of as the "Gateway to the West." Clinton County was not established until the year 1833, when it was named after the seventh Governor of New York, Dewitt Clinton. Plattsburg was established as the county seat. Clinton County was primarily made up of Southern settlers, but had representation of both sides during the Civil War. This situation caused the county to be divided, and casualties were common throughout the county.

After trending downward for the first half of the twentieth century, Clinton County has enjoyed a population upswing since 1960. Clinton County is one of a few northwest Missouri counties demonstrating consistent growth, albeit not major. The growth is due to a number of factors, but the most obvious reason is one of geography. The Kansas City metropolitan area, located adjacent to Clinton County to the southwest, is witnessing suburban sprawl. Crossed by Interstate 35, Clinton County is a natural site for increased suburbanization, as citizens of the Kansas City area leave the city for more rural setting.

2.1.6 Occupations

Table 2.3 displays occupation statistics for the incorporated cities and the county as a whole.

Table 2.3. Occupation Statistics, Clinton County, Missouri

Jurisdiction	Management, Business, Science, and Arts Occupations	Service Occupations	Sales and Office Occupations	Natural Resources, Construction, and Maintenance Occupations	Production, Transportation, and Material Moving Occupations
Clinton County	27.88%	18.49%	22.76%	13.63%	17.24%
City of Cameron	30.95%	24.77%	22.15%	6.8%	15.33%
City of Gower	24.27%	21.09%	20.82%	15.78%	18.04%
City of Holt	27.16%	16.38%	16.38%	12.07%	28.01%
City of Lathrop	18.13%	26.46%	23.68%	14.06%	17.67%
City of Osborn	23.22%	21.43%	33.57%	5.35%	16.43%
City of Plattsburg	33.61%	22.19%	16.90%	15.04%	12.26%
City of Trimble	21.28%	19.26%	16.22%	15.20%	28.04%
Village of Turney	22%	38%	12%	2%	26%

(Source: U.S. Census, 2016 American Community Survey, 5-year Estimates)

2.1.7 Agriculture

According to the USDA 2012 Census on Agriculture, Clinton County has 758 farms with a total acreage of 191,602 acres. The average size of farms and acres of the neighboring counties of Andrew, Buchanan, and DeKalb is 210,043 acres and 805 farms. The average size per farm is 253 acres, which is slightly lower than the state average of 285 acres. The market value of agricultural products sold is $ 56,419,000, with $ 38,632,000 coming from crops, nursery, and green house products and $17,787,000 coming from livestock, poultry and their products. Beef cattle production was a significant farming activity, with 25,568 head of cattle on 320 farms and 17,986 head of cows and calves sold on 299 farms. Other significant farming activities included production of 2,268,812 bushels of corn from 112 farms, and 30,407 tons of forage from 357 farms. In addition, 61 percent percent of principle operators reported their primary occupation being something other than farming. The 2011-2015 Community Survey 5-Year Estimates show that 268 were employed in agriculture, fishing, and forestry operations, which is 2.8 percent of the Clinton County workforce.

2.1.8 FEMA Hazard Mitigation Assistance Grants in Planning Area

Clinton County has not received any recent hazard mitigation assistant grants, other than the statewide grant for funds to update the hazard mitigation plan. Through the updating process several jurisdictions expressed interest in applying for grants for outdoor warning sirens.

2.2 Jurisdictional Profiles and Mitigation Capabilities

This section will include individual profiles for each participating jurisdiction. It will also include a discussion of previous mitigation initiatives in the planning area. There will be a summary table indicating specific capabilities of each jurisdiction that relate to their ability to implement mitigation opportunities. The unincorporated county is profiled first, followed by the incorporated communities, and the public school districts.

2.2.1 Unincorporated Clinton County

Clinton County is governed with a three-person board of commissioners. County officeholders are listed below.

- Board of Commissioners – Wade Wilken, Jr. Gary McCrea and Larry King
- County Assessor – Cindy Carter
- County Recorder – Molly Livingston
- County Sheriff – Larry Fish
- County Treasurer – Leann Gump
- Emergency Management – Blair Shock
- Health Department – Blair Shock
- Coroner – Lee Hanks
- Road and Bridge – John Noble
- County Zoning Administrator – Beth Farwell

Mitigation Initiatives/Capabilities

The Emergency Management Director (EMD) is a part-time position filled by the director of the Clinton County Health Department. The EMD conducts emergency preparedness outreach and social media emergency messaging. There are monthly Local Emergency Planning Committee (LEPC) meetings in which all jurisdictions, school districts, special districts and first responders have the opportunity to participate in. There are 911 ACCD meetings that include the counties of Andrew, Caldwell, Clinton, and DeKalb. Table 2.4 lists the county's mitigation capabilities.

Table 2.4. Unincorporated Clinton County Mitigation Capabilities

Capabilities	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Operations Plan (EOP) Yes	Yes, EOP since 1988, revisit annually
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	No
County Mitigation Plan	Yes, 2013
Local Mitigation Plan (PDM)	No
County Mitigation Plan (PDM)	No
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	Yes
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	No
School Mitigation Plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes, part of the EOP
Policies/Ordinance	
Zoning Ordinance	Yes
Building Code	No, not allowed for 3rd class counties
Floodplain Ordinance	Yes, no construction in floodplains

Subdivision Ordinance	Yes
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes
Storm Water Ordinance	No
Drainage Ordinance	No
Site Plan Review Requirements	On-site wastewater
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes, wastewater
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	Yes
National Weather Service (NWS) Storm Ready	In progress
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	Multiple
Capabilities	**Status Including Date of Document or Policy**
Economic Development Program	Yes
Land Use Program	Yes
Public Education/Awareness	Yes
Property Acquisition	Yes
Planning/Zoning Boards	Yes
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes, emergency management and law enforcement
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	Yes
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	Yes
Evacuation Route Map	Yes
Critical Facilities Inventory	Yes
Vulnerable Population Inventory	Yes
Land Use Map	No
Staff/Department	
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Director	Yes, part time
NFIP Floodplain Administrator	Yes, zoning administrator, full time

Bomb and/or Arson Squad	No
Emergency Response Team	Yes
Hazardous Materials Expert	Yes
Local Emergency Planning Committee	Yes
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	Yes
Economic Development Department	No
Housing Department	No
Planning Consultant	No
Regional Planning Agencies	Yes
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	Yes
Salvation Army	Yes
Veterans Groups	Yes
Environmental Organization	Yes
Homeowner Associations	Yes
Neighborhood Associations	Yes
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.	Yes
Local Funding Availability	
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	Yes

Capabilities	Status Including Date of Document or Policy
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	No
Impact fees for new development	No
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	Yes

(Source: Data Collection Questionnaire, 2018)

2.2.2 City of Cameron

Cameron has a population of 9,933 and is governed by a mayor and five-member city council. The community currently has a paid police department and volunteer fire department. There are five outdoor warning sirens that are activated by the city's police dispatch center. There is 911 and text cast notification. Table 2.5 lists Cameron's mitigation capabilities.

Table 2.5. City of Cameron Mitigation Capabilities

Capability	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	Yes
Builder's Plan	Yes
Capital Improvement Plan	Yes
Local Emergency Plan	Yes
County Emergency Plan	Yes
Local Recovery Plan	Yes

County Recovery Plan	Yes
Local Mitigation Plan	Yes
County Mitigation Plan	Yes
Local Mitigation Plan (PDM)	Yes
County Mitigation Plan (PDM)	Yes, 2013
Economic Development Plan	Yes
Transportation Plan	No
Land-use Plan	Yes
Flood Mitigation Assistance (FMA) Plan	Yes
Watershed Plan	No
Firewise or other fire mitigation plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes
Policies/Ordinance	**Status Including Date of Document or Policy**
Zoning Ordinance	Yes
Building Code	Yes, ICC 2015
Floodplain Ordinance	Yes
Subdivision Ordinance	Yes
Tree Trimming Ordinance	Yes
Nuisance Ordinance	Yes
Storm Water Ordinance	Yes
Drainage Ordinance	Yes
Capability	**Status Including Date of Document or Policy**
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	No
Landscape Ordinance	Yes
Program	**Status Including Date of Document or Policy**
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	Yes
National Weather Service (NWS) Storm Ready	Yes
Building Code Effectiveness Grading (BCEGs)	Yes, #5
ISO Fire Rating	Yes
Economic Development Program	Yes
Land Use Program	Yes
Public Education/Awareness	Yes
Property Acquisition	Yes
Planning/Zoning Boards	Yes
Stream Maintenance Program	Yes
Tree Trimming Program	Yes
Engineering Studies for Streams (Local/County/Regional)	Yes
Mutual Aid Agreements	Yes
Studies/Reports/Maps	**Status Including Date of Document or Policy**
Hazard Analysis/Risk Assessment (Local)	N/A
Hazard Analysis/Risk Assessment (County)	N/A
Flood Insurance Maps	N/A
FEMA Flood Insurance Study (Detailed)	N/A
Evacuation Route Map	N/A
Critical Facilities Inventory	Yes
Vulnerable Population Inventory	N/A
Land Use Map	Yes
Staff/Department	**Status Including Date of Document or Policy**
Building Code Official	Yes
Building Inspector	Yes
Mapping Specialist (GIS)	Yes
Engineer	Yes
Development Planner	Yes

Public Works Official	Yes
Emergency Management Coordinator	Yes
NFIP Floodplain Administrator	Yes
Bomb and/or Arson Squad	Yes, KCMO
Emergency Response Team	Yes, St. Joseph
Hazardous Materials Expert	Yes
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes
Sanitation Department	Yes, privately owned
Transportation Department	Yes
Economic Development Department	Yes
Housing Department	No
Planning Consultant	Yes
Regional Planning Agencies	Yes
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	Yes, St. Joseph
Salvation Army	No
Capability	
Veterans Groups	Yes
Environmental Organization	No
Homeowner Associations	Yes
Neighborhood Associations	Yes
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.	Yes
Local Funding Availability	**Status Including Date of Document or Policy**
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

(Source: Data Collection Questionnaire, 2018)

2.2.3 Village of Grayson

The Village of Grayson is governed by a chairman and four board members. There is no census data available for the community, as it is unincorporated. The community does not have any mitigation capabilities.

2.2.4 City of Gower

Gower has a population of 1,526 and is governed by a mayor and city council. There is city policeman and a fire department, who are responsible for activating the two outdoor warning sirens. There is a convalescent home in the community. The churches are active in assisting vulnerable citizens. Table 2.6 lists Gower's mitigation capabilities.

Table 2.6. City of Gower Mitigation Capabilities

Capability	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No

Local Emergency Plan	Yes, Aug 2018
County Emergency Plan	Yes
Local Recovery Plan	No
Local Mitigation Plan	Yes, March 2018
County Mitigation Plan	Yes
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	Yes
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes
Policies/Ordinance	**Status Including Date of Document or Policy**
Zoning Ordinance	Yes
Building Code	No
Floodplain Ordinance	No
Subdivision Ordinance	Yes
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes
Storm Water Ordinance	No
Drainage Ordinance	No
Capability	**Status Including Date of Document or Policy**
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	**Status Including Date of Document or Policy**
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	Yes, 4
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	Yes
Property Acquisition	No
Planning/Zoning Boards	Yes
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
Studies/Reports/Maps	**Status Including Date of Document or Policy**
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	No
Flood Insurance Maps	No
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	No
Vulnerable Population Inventory	No
Land Use Map	No
Staff/Department	
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No

Development Planner	No
Public Works Official	Yes
Emergency Management Coordinator	Yes
NFIP Floodplain Administrator	No
Bomb and/or Arson Squad	No
Emergency Response Team	Yes
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	No
Sanitation Department	Yes, outsourced
Transportation Department	No
Economic Development Department	No
Housing Department	No
Planning Consultant	No
Regional Planning Agencies	Yes
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Capability	
Veterans Groups	Yes
Environmental Organization	No
Homeowner Associations	Yes
Neighborhood Associations	Yes
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.	Yes
Local Funding Availability	**Status Including Date of Document or Policy**
Ability to apply for Community Development Block Grants	No
Ability to fund projects through Capital Improvements funding	No
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

(Source: Data Collection Questionnaire, 2018)

2.2.5 Village of Holt

Holt has a population of 498 and is governed by alderman. The community has a fire department. Table 2.7 lists Holt's mitigation capabilities.

Table 2.7. Village of Holt Mitigation Capabilities

Capability	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	Yes
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	No
County Mitigation Plan	No
Economic Development Plan	No
Transportation Plan	No

Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	No
School Mitigation Plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No
Policies/Ordinance	**Status Including Date of Document or Policy**
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	Unsure
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	No
Drainage Ordinance	No
Capability	**Status Including Date of Document or Policy**
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Iowa Wetlands and Riparian Areas Conservation Plan	No
Debris Management Plan	No
Program	**Status Including Date of Document or Policy**
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	Unsure
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	Unsure
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
Studies/Reports/Maps	**Status Including Date of Document or Policy**
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	No
Flood Insurance Maps	No
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	Yes
Vulnerable Population Inventory	No
Land Use Map	Yes
Staff/Department	
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Coordinator	No

NFIP Floodplain Administrator	No
Bomb and/or Arson Squad	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Planning Consultant	No
Regional Planning Agencies	Yes
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	Yes
Salvation Army	No
Capability	
Veterans Groups	No
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.	No
Local Funding Availability	**Status Including Date of Document or Policy**
Ability to apply for Community Development Block Grants	No
Ability to fund projects through Capital Improvements funding	Unsure
Authority to levy taxes for a specific purpose	Unsure
Fees for water, sewer, gas, or electric services	Unsure
Impact fees for new development	No
Ability to incur debt through general obligation bonds	Unsure
Ability to incur debt through special tax bonds	Unsure
Ability to incur debt through private activities	Unsure
Ability to withhold spending in hazard prone areas	No

(Source: Data Collection Questionnaire, 2018)

2.2.6 City of Lathrop

Lathrop has a population of 2,086 and is governed by a mayor and board of alderman. The fire district covers Lathrop and Turney. There are three outdoor warning sirens. The community added the third siren in 2018 and has submitted a notice of intent for a fourth siren. There is a designated public tornado shelter at the community center but it is not to FEMA's standards. There is generator at the community center and there are plans to add a generator to the police station. Lathrop is completing the second phase of water upgrades. Table 2.8 lists Lathrop's mitigation capabilities.

Table 2.8. City of Lathrop Mitigation Capabilities

Capability	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	Yes, June 20, 2006
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	No
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	No
County Mitigation Plan	Yes, Sept. 9, 2013
Local Mitigation Plan (PDM)	No

County Mitigation Plan (PDM)	No
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	No
School Mitigation Plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No
Policies/Ordinance	**Status Including Date of Document or Policy**
Zoning Ordinance	Yes, Ord. 525, June 4, 1965
Building Code	VERSION: 4, 2016 IRC 7/16/2013
Floodplain Ordinance	Yes, Ord. 526, 7/18/1985
Subdivision Ordinance	Yes, June 2, 1965
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes, Ord. 887, June 11, 1995
Storm Water Ordinance	No
Drainage Ordinance	No
Capability	**Status Including Date of Document or Policy**
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	**Status Including Date of Document or Policy**
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	RATING; 5 in city limits and 7outside of city limits
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	Yes
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes, with county, fire departments and other communities
Studies/Reports/Maps	**Status Including Date of Document or Policy**
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	In progress
Flood Insurance Maps	No
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	Yes
Vulnerable Population Inventory	No
Land Use Map	Yes
Staff/Department	
Building Code Official	Yes, part-time
Building Inspector	Yes, part-time
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	Yes, full-time
Emergency Management Coordinator	Yes, county

NFIP Floodplain Administrator	Yes
Bomb and/or Arson Squad	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Planning Consultant	No
Regional Planning Agencies	Yes
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	Yes, county
Salvation Army	No
Capability	
Veterans Groups	Yes
Environmental Organization	No
Homeowner Associations	Yes
Neighborhood Associations	No
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes
Local Funding Availability	**Status Including Date of Document or Policy**
Ability to apply for Community Development Block Grants	No
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	No
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	No
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

Source: Data Collection Questionnaire

2.2.7 City of Plattsburg

Plattsburg has a population of 2,319 and serves as the county seat. There are three outdoor warning sirens which are active by the Clinton County Sheriff's office dispatch or the Plattsburg Police Department. The community does not have designated public shelters. There are seven full-time and one part-time staff. Table 2.9 lists Plattsburg's mitigation capabilities.

Table 2.9. City of Plattsburg Mitigation Capabilities

Capability	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	Yes, August 2015
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	Yes, April 2013
County Emergency Plan	No
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	No
County Mitigation Plan	Yes, 2013
Economic Development Plan	Yes, August 2015
Transportation Plan	No
Land-use Plan	Yes, August 2015

Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No
Policies/Ordinance	**Status Including Date of Document or Policy**
Zoning Ordinance	Yes
Building Code	Yes, 2015 IRC
Floodplain Ordinance	No
Subdivision Ordinance	Yes
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes
Storm Water Ordinance	No
Drainage Ordinance	No
Capability	**Status Including Date of Document or Policy**
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	**Status Including Date of Document or Policy**
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	Yes
ISO Fire Rating	Yes, 6
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	Yes
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
Studies/Reports/Maps	**Status Including Date of Document or Policy**
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	No
Flood Insurance Maps	No
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	Yes
Vulnerable Population Inventory	No
Land Use Map	Yes
Staff/Department	
Building Code Official	Yes, part-time
Building Inspector	Yes, part-time
Mapping Specialist (GIS)	Yes, part-time
Engineer	No
Development Planner	No
Public Works Official	Yes, full-time
Emergency Management Coordinator	No
NFIP Floodplain Administrator	Yes, part-time
Bomb and/or Arson Squad	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes

County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Planning Consultant	No
Regional Planning Agencies	Yes
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Capability	
Veterans Groups	Yes
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.	Yes
Local Funding Availability	**Status Including Date of Document or Policy**
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	No
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	Yes

(Source: Data Collection Questionnaire, 2018)

2.2.8 City of Trimble

Trimble has a population of 646 and is governed by a mayor and four council members. There are no outdoor warning sirens or publicly designated shelters in the community. There is a fire department.

Table 2.10. City of Trimble Mitigation Capabilities

Capability	**Status Including Date of Document or Policy**
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	No
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	No
County Mitigation Plan	Yes
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No
Policies/Ordinance	**Status Including Date of Document or Policy**
Zoning Ordinance	Yes
Building Code	Yes

Floodplain Ordinance	No
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes
Storm Water Ordinance	No
Drainage Ordinance	No
Capability	**Status Including Date of Document or Policy**
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	**Status Including Date of Document or Policy**
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	No
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	Yes
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
Studies/Reports/Maps	**Status Including Date of Document or Policy**
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	No
Flood Insurance Maps	No
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	No
Vulnerable Population Inventory	No
Land Use Map	Yes
Staff/Department	
Building Code Official	Yes, part-time
Building Inspector	Yes, part-time
Mapping Specialist (GIS)	No
Engineer	Yes, part-time
Development Planner	No
Public Works Official	Yes, part-time
Emergency Management Coordinator	No
NFIP Floodplain Administrator	No
Bomb and/or Arson Squad	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	No
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Planning Consultant	No
Regional Planning Agencies	Yes
Historic Preservation	No

Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Capability	
Veterans Groups	No
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.	No
Local Funding Availability	**Status Including Date of Document or Policy**
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	No
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	Yes

Source: Data Collection Questionnaire

2.2.9 Village of Turney

Turney has a population of 148 and has a board of five councilmen. There are no tornado sirens in the community and the depot basement is used as a public shelter. However, it is not FEMA's standards. There are two part-time city employees, a clerk and street maintenance worker.

Table 2.11. Village of Turney Mitigation Capabilities

Capability	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	No
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	No
County Mitigation Plan	No
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No
Policies/Ordinance	**Status Including Date of Document or Policy**
Zoning Ordinance	Yes
Building Code	No
Floodplain Ordinance	No
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes
Storm Water Ordinance	No
Drainage Ordinance	No
Capability	**Status Including Date of Document or Policy**

Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	**Status Including Date of Document or Policy**
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	No
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
Studies/Reports/Maps	**Status Including Date of Document or Policy**
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	No
Flood Insurance Maps	No
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	No
Vulnerable Population Inventory	No
Land Use Map	No
Staff/Department	**Status Including Date of Document or Policy**
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Coordinator	No
NFIP Floodplain Administrator	No
Bomb and/or Arson Squad	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	No
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Planning Consultant	No
Regional Planning Agencies	Yes
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Capability	
Veterans Groups	No
Environmental Organization	No
Homeowner Associations	No

Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.	No
Local Funding Availability	**Status Including Date of Document or Policy**
Ability to apply for Community Development Block Grants	Unknown
Ability to fund projects through Capital Improvements funding	No
Authority to levy taxes for a specific purpose	No
Fees for water, sewer, gas, or electric services	No
Impact fees for new development	No
Ability to incur dept through general obligation bonds	No
Ability to incur debt through special tax bonds	No
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

Table 2.12 is a summary table of mitigation capabilities in Clinton County.

Table 2.12. Mitigation Capabilities Summary Table

Capabilities	Clinton County	City of Cameron	City of Gower	City of Holt	City of Lathrop	City of Plattsburg	City of Trimble	Village of Turney
Planning Capabilities								
Comprehensive Plan	No	Yes	No	No	Yes	Yes	No	No
Builder's Plan	No	Yes	No	No	No	No	No	No
Capital Improvement Plan	No	Yes	No	No	No	No	No	No
Local Emergency Plan	No	Yes	Yes	No	No	Yes	No	No
County Emergency Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local Recovery Plan	No	Yes	No	No	No	No	No	No
County Recovery Plan	No	Yes	No	No	No	No	No	No
Local Mitigation Plan	No	Yes	Yes	No	No	No	No	No
County Mitigation Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Debris Management Plan	No	Yes	No	No	No	No	No	No
Economic Development Plan	No	Yes	No	No	No	No	No	No
Transportation Plan	No	No	No	No	No	No	No	No
Land-use Plan	Yes	Yes	No	No	No	Yes	No	No
Flood Mitigation Assistance (FMA) Plan	Yes	Yes	No	No	No	No	No	No
Watershed Plan	No	No	No	No	No	No	No	No
Firewise or other fire mitigation plan	No	No	No	No	No	No	No	No
Critical Facilities Plan (Mitigation/Response/ Recovery)	Yes	Yes	Yes	No	No	No	No	No
Policies/Ordinance								
Zoning Ordinance	Yes	Yes	Yes	No	Yes	Yes	No	Yes
Building Code	No	Yes	No	No	Yes	Yes	No	No
Floodplain Ordinance	Yes	No	No	Unsure	Yes	No	No	No

Capabilities	Clinton County	City of Cameron	City of Gower	City of Holt	City of Lathrop	City of Plattsburg	City of Trimble	Village of Turney
Subdivision Ordinance	Yes	Yes	Yes	No	Yes	Yes	No	No
Tree Trimming Ordinance	No	No	No	No	No	No	No	No
Nuisance Ordinance	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Storm Water Ordinance	No	Yes	No	No	No	No	No	No
Drainage Ordinance	No	No	No	No	No	No	No	No
Site Plan Review Requirements	Yes, for wastewater	Yes	No	No	Yes	Yes	Yes	No
Historic Preservation Ordinance	No	No	No	No	No	No	No	No
Landscape Ordinance	No	Yes	No	No	No	No	No	No
Program								
Zoning/Land Use Restrictions	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Codes Building Site/Design	Yes	Yes	Yes	No	Yes	Yes	Yes	No
National Flood Insurance Program (NFIP) Participant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NFIP Community Rating System (CRS) Participating Community	No	No	No	No	No	No	No	No
Hazard Awareness Program	Yes	Yes	No	No	No	No	No	No
National Weather Service (NWS) Storm Ready	In progress	Yes	No	No	No	No	No	No
Building Code Effectiveness Grading (BCEGs)	No	Yes	No	No	No	No	No	No
ISO Fire Rating	Multiple	Yes	4	Unsure	5 and 7	6	No	No

Capabilities	Clinton County	City of Cameron	City of Gower	City of Holt	City of Lathrop	City of Plattsburg	City of Trimble	Village of Turney
Economic Development Program	Yes	Yes	No	No	No	No	No	No
Land Use Program	Yes	Yes	No	No	No	No	No	No
Public Education/Awareness	Yes	Yes	No	No	No	No	No	No
Property Acquisition	Yes	Yes	No	No	No	No	No	No
Planning/Zoning Boards	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Stream Maintenance Program	No	No	No	No	No	No	No	No
Tree Trimming Program	No	Yes	No	No	No	No	No	No
Engineering Studies for Streams (Local/County/Regional)	No	Yes	No	No	No	No	No	No
Mutual Aid Agreements	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Studies/Reports/Maps								
Hazard Analysis/Risk Assessment (Local)	No	No	No	No	No	No	No	No
Hazard Analysis/Risk Assessment (County)	Yes	No	No	No	In progress	No	No	No
Flood Insurance Maps	Yes	No	No	No	No	No	No	No
FEMA Flood Insurance Study (Detailed)	Yes	No	No	No	No	No	No	No
Evacuation Route Map	Yes	No	No	No	No	No	No	No
Critical Facilities Inventory	Yes	Yes	No	No	Yes	Yes	No	No
Vulnerable Population Inventory	No	No	No	No	No	No	No	No

Capabilities	Clinton County	City of Cameron	City of Gower	City of Holt	City of Lathrop	City of Plattsburg	City of Trimble	Village of Turney
Land Use Map	No	Yes	No	No	Yes	Yes	Yes	No
Staff/Department								
Building Code Official	No	Yes	No	No	Yes	Yes	Yes	No
Building Inspector	No	Yes	No	No	Yes	Yes	Yes	No
Mapping Specialist (GIS)	No	Yes	No	No	No	Yes	No	No
Engineer	No	Yes	No	No	No	No	No	No
Development Planner	No	Yes	No	No	No	No	No	No
Public Works Official	No	Yes	Yes	No	Yes	Yes	Yes	No
Emergency Management Coordinator	Yes	Yes	No	No	County	No	No	No
NFIP Floodplain Administrator	Yes	Yes	No	No	Yes	No	No	No
Bomb and/or Arson Squad	No	Yes	No	No	No	No	No	No
Emergency Response Team	Yes	Yes	Yes	No	No	No	No	No
Hazardous Materials Expert	Yes	Yes	No	No	No	No	No	No
Local Emergency Planning Committee	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County Emergency Management Commission	No	No	No	No	No	No	No	No
Sanitation Department	No	Yes	No	No	No	No	No	No
Transportation Department	Yes	Yes	No	No	No	No	No	No
Economic Development Department	No	No	No	No	No	No	No	No

Capabilities	Clinton County	City of Cameron	City of Gower	City of Holt	City of Lathrop	City of Plattsburg	City of Trimble	Village of Turney
Housing Department	No	No	No	No	No	No	No	No
Planning Consultant	No	No	No	No	No	No	No	No
Regional Planning Agencies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Historic Preservation	No	No	No	No	No	No	No	No
Non-Governmental Organizations (NGOs)								
American Red Cross	Yes	Yes	No	No	Yes	No	No	No
Salvation Army	Yes	No	No	No	No	No	No	No
Veterans Groups	Yes	Yes	Yes	No	Yes	Yes	No	No
Environmental Organization	Yes	No	No	No	No	No	No	No
Homeowner Associations	Yes	Yes	Yes	No	Yes	No	No	No
Neighborhood Associations	Yes	Yes	Yes	No	No	No	No	No
Chamber of Commerce	Yes	Yes	Yes	No	Yes	Yes	No	No
Community Organizations (Lions, Kiwanis, etc.	Yes	Yes	Yes	No	Yes	Yes	No	No
Financial Resources								
Apply for Community Development Block Grants	Yes	Yes	No	Unknown	No	Yes	Yes	Unknown
Fund projects through Capital Improvements funding	Yes	Yes	No	No	Yes	Yes	Yes	No
Authority to levy taxes for specific purposes	Yes	Yes	Yes	No	Yes	Yes	No	No
Fees for water, sewer, gas, or electric services	No	Yes	Yes	No	Yes	Yes	Yes	No
Impact fees for new development	No	Yes	Yes	No	No	No	Yes	No

Capabilities	Clinton County	City of Cameron	City of Gower	City of Holt	City of Lathrop	City of Plattsburg	City of Trimble	Village of Turney
Incur debt through general obligation bonds	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Incur debt through special tax bonds	Yes	Yes	Yes	No	No	Yes	Yes	No
Incur debt through private activities	No	No	No	No	No	No	No	No
Withhold spending in hazard prone areas	Yes	No	No	No	No	Yes	Yes	No

(Source: Data Collection Questionnaires, 2018)

2.2.10 Special District

Special districts, such as the fire districts, participated with their respective jurisdictions and will not be listed separately in this plan.

2.2.11 Public School District Profiles and Mitigation Capabilities

As shown in the map below, the school districts of Cameron R-I, Clinton R-III, East Buchanan C-1 and Lathrop R-II are primarily located in Clinton County. East Buchanan added on to their high school in Gower, and Cameron built a middle school that is close to meeting FEMA standards. The four school districts do not expect any significant enrollment changes or major construction projects in the next five years. Table 2.13 - 2.16 show the enrollment of the school districts.

Figure 2.4 **Map of School Districts**

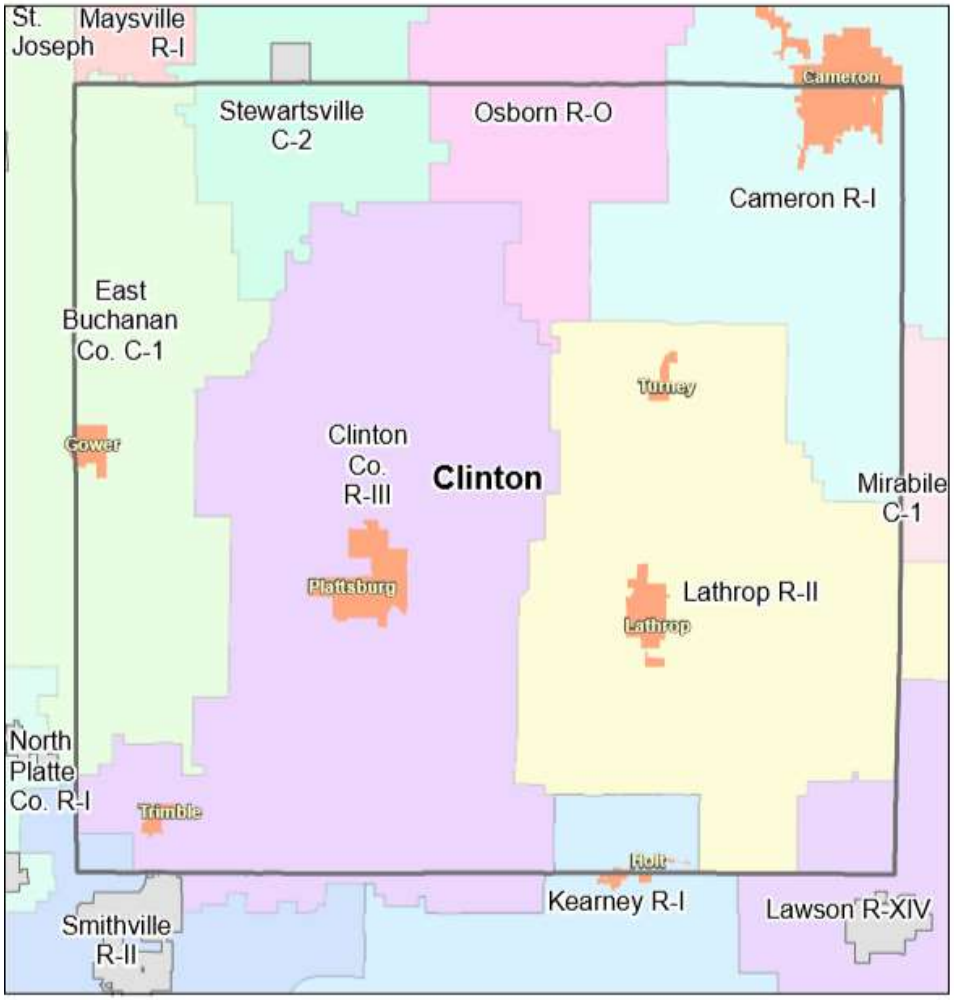


Table 2.13. Cameron R-I School District Buildings and Enrollment Data, 2017

District Name	Building Name	Building Enrolment
Cameron R-I	Cameron High	557
Cameron R-I	Cameron Veterans Middle	400
Cameron R-I	Parkview Elementary	419

(Source:http://mcds.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx)

Table 2.14. Clinton R-III Buildings and Enrollment Data, 2017

District Name	Building Name	Building Enrolment
Clinton R-III	Plattsburg High	219
Clinton R-III	Clinton Co. R-III Middle	134
Clinton R-III	Ellis Elementary	291

(Source: http://mcds.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx)

Table 2.15. East Buchanan Co. C-1 School District Buildings and Enrollment Data, 2017

District Name	Building Name	Building Enrolment
East Buchanan Co. C-1	East Buchanan High	227
East Buchanan Co. C-1	East Buchanan Elementary	319

(Source: http://mcds.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx)

Table 2.16. Lathrop R-II School District Buildings and Enrollment Data, 2017

District Name	Building Name	Building Enrolment
Lathrop R-II	Lathrop High	307
Lathrop R-II	Lathrop Middle	215
Lathrop R-II	Lathrop Elementary	415

(Source: http://mcds.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx)

Table 2.17. Summary of Mitigation Capabilities-School Districts

Capability	Cameron R-I School District	Clinton Co. R-III School District *	East Buchanan School District	Lathrop R-II S School District
Planning Elements				
Master Plan/ Date	No	Unknown	No	Yes, August 1, 2017
Capital Improvement Plan/Date	Yes	Unknown	No	Yes, January 10, 2018
School Emergency Plan / Date	Yes	Unknown	Yes, May 2016	Yes, March 1, 2019
Weapons Policy/Date	Yes	Unknown	Yes, January 2003	Yes, 2017
Personnel Resources				
Full-Time Building Official (Principal)	Yes	Unknown	Yes	Yes
Emergency Manager	No	Unknown	No	No
Grant Writer	No	Unknown	No	No
Public Information Officer	No	Unknown	Yes	No
Financial Resources				
Capital Improvements Project Funding	Yes	Unknown	Yes	Yes
Local Funds	Yes	Unknown	Yes	Yes
General Obligation Bonds	Yes	Unknown	Yes	Yes
Special Tax Bonds	No	Unknown	Yes	Yes
Private Activities/Donations	No	Unknown	Yes	Yes
State And Federal Funds/Grants	Yes	Unknown	Yes	Yes

***Clinton R-III has not submitted the data questionnaire form at this time.**

Capability	Cameron R-III School District	Clinton Co. R-III School District *	East Buchanan School District	Lathrop R-II School District
Fire Evacuation Training	Yes	Yes	Yes	Yes
Tornado Sheltering Exercises	Yes	Yes	Yes	Yes
Public Address/Emergency Alert System	Yes	Yes	Yes	Yes
NOAA Weather Radios	Yes	Yes	Yes	Yes
Lock-Down Security Training	Yes	Yes	Yes	Yes
Mitigation Programs	Unknown	Unknown	Yes	No
Tornado Shelter/Safe room	No	Unknown	In Gower	No
Campus Police	Yes	Unknown	No	No

(Source: Data Collection Questionnaires, 2018)

* **Clinton R-III has not submitted the data questionnaire form at this time.**

3 RISK ASSESSMENT

44 CFR Requirement §201.6(c)(2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

The goal of the risk assessment is to estimate the potential loss in the planning area, including loss of life, personal injury, property damage, and economic loss, from a hazard event. The risk assessment process allows communities and school/special districts in the planning area to better understand their potential risk to the identified hazards. It will provide a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

Although this plan is an update from 2013, there has been minimal change of risk in the planning area.

This chapter is divided into four main parts:

- **Section 3.1 Hazard Identification** identifies the hazards that threaten the planning area and provides a factual basis for elimination of hazards from further consideration;
- **Section 3.2 Assets at Risk** provides the planning area's total exposure to natural hazards, considering critical facilities and other community assets at risk;
- **Section 3.3 Future Land Use and Development** discusses areas of planned future development
- **Section 3.4 Hazard Profiles and Vulnerability Analysis** provides more detailed information about the hazards impacting the planning area. For each hazard, there are three sections: 1) Hazard Profile provides a general description and discusses the threat to the planning area, the geographic location at risk, potential severity/magnitude/extent, previous occurrences of hazard events, probability of future occurrence, risk summary by jurisdiction, impact of future development on the risk; 2) Vulnerability Assessment further defines and quantifies populations, buildings, critical facilities, and other community/school or special district assets at risk to natural hazards; and 3) Problem Statement briefly summarizes the problem and develops possible solutions.

3.1 Hazard Identification

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

The plan profiles all natural hazards that can affect Clinton County. The natural hazards that can affect the county have been identified in the 2013 Clinton County Hazard Mitigation Plan and the 2013 Missouri State Plan. Natural hazards are naturally occurring climatological, hydrological or geologic events that have a negative effect on people and the built environment. Technological hazards refer to hazards that stem from technological or industrial conditions that can include hazardous materials events, national security hazards, power failure, telecommunications failure, etc. Only natural hazards are included.

3.1.1 Review of Existing Mitigation Plans

The Mitigation Planning Committee (MPC) reviewed hazards identified in the original plan to determine if any conditions had changed. The Missouri Hazard Mitigation Plan was considered in determining local hazards. Clinton County was determined not to be at risk for some natural hazards, due to location, climate or soil structure. These hazards which are not included in the hazard mitigation plan are tsunamis, volcanoes, avalanches, hurricanes, coastal storms, coastal erosion, expansive soils and landslides. Hazards which are included in the mitigation plan, in alphabetical order, are: dam failure, drought, earthquakes, flooding, levee failure, heat waves, land subsidence, severe winter weather, thunderstorms which includes wind and hail storms, tornados and fires.

Several MPC members expressed interest in including public health outbreaks and communication failure in the plan. However, these hazards were not included in the plan due to time constraints. The MPC agreed to revisit the possibility during the next update and to collect information which would be helpful for the hazard profiles and risk assessment.

3.1.2 Review Disaster Declaration History

Federal disaster declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. If the disaster is so severe that both the local and state governments' capacities are exceeded, a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

FEMA also issues emergency declarations, which are more limited in scope and do not include the long-term federal recovery programs of major disaster declarations. Determinations for declaration type are based on scale and type of damages and institutions or industrial sectors affected.

Table 3.1 lists the federal FEMA disaster declarations that have occurred in Clinton County from 1990 to present.

Table 3.1. FEMA Disaster Declarations that included Clinton County, Missouri, 1990-Present

Disaster Number	Description	Declaration Date Incident Period	Individual Assistance (IA) Public Assistance (PA)
4238	Severe Storms, Tornadoes, Straight-line winds, Flooding	8/7/2015 5/15/2015-7/27/2015	PA
1961	Missouri Severe Winter Storm and Snowstorm	3/23/2011 1/31/2011-2/5/2011	PA
1934	Missouri Severe Storms, Flooding, and Tornadoes	8/17/2010 6/12/2010-7/31/2010	PA
1736	Missouri Severe Winter Storms	12/15/2007 12/6/2007- 12/15/2007	PA
1708	Missouri Severe Storms and Flooding	06/11/2007 05/05/2007-5/18/2007	IA and PA
1524	Missouri Severe Storms, Tornadoes, and Flooding	06/11/2004 05/18/2004-05/31/2004	IA PA
1403	Missouri Ice Storm	02/06/2002 01/29/2002-02/13/2002	IA PA
995	Missouri Flooding, Severe Storm	07/09/1993 06/10/1993-10/25/1993	IA PA

(Source: Federal Emergency Management Agencyhttp://www.fema.gov/disastershttp://www.fema.gov/disasters)

3.1.3 Research Additional Sources

Sources of data on locations and past impacts of hazards in the planning area include:

- Missouri Hazard Mitigation Plans (2010 and 2013)
- Previously approved planning area Hazard Mitigation Plan (date)
- Federal Emergency Management Agency (FEMA)
- Missouri Department of Natural Resources (MDNR)
- National Drought Mitigation Center Drought Reporter
- US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics
- National Agricultural Statistics Service (Agriculture production/losses)
- Data Collection Questionnaires completed by each jurisdiction
- State of Missouri GIS data

- Environmental Protection Agency
- Flood Insurance Administration
- Hazards US (HAZUS)
- Missouri Department of Transportation
- Missouri Division of Fire Marshal Safety
- Missouri Public Service Commission
- National Fire Incident Reporting System (NFIRS)
- National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (NCDC);
- Pipeline and Hazardous Materials Safety Administration
- County and local Comprehensive Plans to the extent available
- County Emergency Management
- County Flood Insurance Rate Map, FEMA
- Flood Insurance Study, FEMA
- SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin
- U.S. Army Corps of Engineers
- U.S. Department of Transportation
- United States Geological Survey (USGS)
- Various articles and publications available on the internet

The only centralized source of data for many of the weather-related hazards is the National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (NCDC). Although it is usually the best and most current source, there are limitations to the data which should be noted. The NCDC documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce. In addition, it is a partial record of other significant meteorological events, such as record maximum or minimum temperatures or precipitation that occurs in connection with another event. Some information appearing in the NCDC may be provided by or gathered from sources outside the National Weather Service (NWS), such as the media, law enforcement and/or other government agencies, private companies, individuals, etc. An effort is made to use the best available information but because of time and resource constraints, information from these sources may be unverified by the NWS. The NWS does not guarantee the accuracy or validity of the information.

The NCDC damage amounts are estimates received from a variety of sources, including those listed above in the Data Sources section. For damage amounts, the NWS makes a best guess using all available data at the time of the publication. Property and crop damage figures should be considered as a broad estimate. Damages reported are in dollar values as they existed at the time of the storm event. They do not represent current dollar values.

Due to changes in the data collection and processing procedures over time, there are unique periods of record available depending on the event type in the NWS database. The following timelines show the different time spans for each period of unique data collection and processing procedures.

1. Tornado: From 1950 through 1954, only tornado events were recorded.

2. Tornado, Thunderstorm Wind and Hail: From 1955 through 1992, only tornado, thunderstorm wind and hail events were keyed from the paper publications into digital data. From 1993 to 1995, only tornado, thunderstorm wind and hail events have been extracted from the Unformatted Text Files.

3. All Event Types (48 from Directive 10-1605): From 1996 to present, 48 event types are recorded as defined in NWS Directive 10-1605.

Injuries and deaths caused by a storm event are reported on an area-wide basis. With NCDC data, a death or injury listed in connection with that county search did not necessarily occur in that county.

3.1.4 Hazards Identified

The hazards that significantly impact the planning area are listed below and were chosen for further analysis in alphabetical order. Not all hazards impact every jurisdiction. For example, Osborn is not located in close proximity to a dam but Holt is in the inundation zone of two high hazard dams. The table below provides a summary of the jurisdictions impacted by each hazard. The symbol “x” indicates the jurisdiction is impacted by the hazard, and a "-" indicates the hazard is not applicable to that jurisdiction.

Table 3.2. Hazards Identified for Each Jurisdiction

	Dam Failure	Drought	Earthquake	Extreme Heat	Fires (Structural/ Urban/Wild)	Flooding (River and Flash)	Land Subsidence /Sinkholes	Levee Failure	Severe Winter Weather	Thunderstorm/ Lightning/Hail/ High Wind	Tornado
Clinton County	x	x	x	x	x	x	-	-	x	x	x
City of Cameron	x	x	x	x	x	x	-	-	x	x	x
City of Gower	-	x	x	x	x	x	-	-	x	x	x
City of Lathrop	x	x	x	x	x	x	-	-	x	x	x
City of Holt	x	x	x	x	x	x	-	-	x	x	x
City of Osborn	-	x	x	x	x	x	-	-	x	x	x
City of Plattsburg	x	x	x	x	x	x	-	-	x	x	x
City of Trimble	-	x	x	x	x	x	-	--	x	x	x
Village of Turney	-	x	x	x	x	x	-	-	x	x	x

3.1.5 Multi-Jurisdictional Risk Assessment

The risk assessment evaluates each participating jurisdiction's vulnerability to each hazard that can affect the planning area. Many of the hazards identified in the risk assessment have the same probability of occurrence throughout the planning area. The hazards that vary across the planning area in terms of risk include dam failure, flash flood, structural or wildland fire, riverine flood and flash flood. These differences are detailed in each hazard profile under geographic location and vulnerability.

Clinton County is fairly uniform in terms of climate, topography, and building construction characteristics. Cameron is the largest community within the planning area which has more assets at a greater density. Therefore, it has greater vulnerability to weather-related hazards. Conversely, rural areas have agricultural assets (crops/livestock) that are vulnerable to hail damages. These differences will be discussed in greater detail in the vulnerability sections of each hazard.

3.2 Assets at Risk

This section assesses the planning area population, structures, critical facilities and infrastructure, and other important assets that may be at risk to hazards. The inventory of assets for each jurisdiction were derived from parcel data from the Clinton County Assessor, the Clinton County structures dataset downloaded from Missouri Spatial Data Information Service (MSDIS), local jurisdiction data collection questionnaires, and HAZUS MH 3.2.

3.2.1 Total Exposure of Population and Structures

Unincorporated County and Incorporated Cities

In the following three tables, population data is based on 2010 Census Bureau data. Building counts and building exposure values are based on parcel data provided by the State of Missouri Geographic Information Systems (GIS) database which can be found at the following website, http://sema.dps.mo.gov/programs/mitigation_management.php. Contents exposure values were calculated by factoring a multiplier to the building exposure values based on usage type. The multipliers were derived from the HAZUS MH 2.1 and are defined below in Table 3.3. Land values have been purposely excluded from consideration because land remains following disasters, and subsequent market devaluations are frequently short term and difficult to quantify. Another reason for excluding land values is that state and federal disaster assistance programs generally do not address loss of land (other than crop insurance). It should be noted that the total valuation of buildings is based on county assessors' data which may not be current. In addition, government-owned properties are usually taxed differently or not at all, and so may not be an accurate representation of true value. Public school district assets and special districts assets are included in the total exposure tables assets by community and county.

Table 3.3 shows the total population, building count, estimated value of buildings, estimated value of contents and estimated total exposure to parcels for the unincorporated county and each incorporated city. For multi-county communities, the population and building data may include data on assets located outside the planning area. Table 3.4 that follows provides the building value

exposures for the county and each city in the planning area broken down by usage type. Finally, Table 3.5 provides the building count total for the county and each city in the planning area broken out by building usage types (residential, commercial, industrial, and agricultural).

Table 3.3. Maximum Population and Building Exposure by Jurisdiction

Jurisdiction	2016 Population	Building Count	Building Exposure ($)	Contents Exposure ($)	Total Exposure ($)
City of Cameron	9,933	2,687	$884,473,000	$538,539,000	$1,423,012,000
City of Gower	1,526	614	$174,605,000	$104,112,000	$278,717,000
City of Lathrop	2,086	847	$219,940,000	$123,964,500	$343,904,500
City of Plattsburg	2,319	1,030	$274,333,000	$184,223,000	$458,556,000
City of Trimble	646	278	$47,602,000	$28,152,000	$75,754,000
Village of Turney	148	80	$15,580,000	$8,385,000	$23,965,500
Unincorporated County	3,662	3,222	$666,317,000	$485,590,000	$1,151,907,000
Totals	20,743	8,930	$2,282,850,000	$1,472,965,500	$3,755,815,500

(Sources: Population, 2010 U.S. Census; Building Count and Building Exposure, Missouri GIS Database: http://sema.dps.mo.gov/programs/mitigation_management.php; Contents Exposure derived by applying multiplier to Building Exposure based on HAZUS MH 2.1 standard contents multipliers per usage type as follows: Residential (50%), Commercial (100%), Industrial (150%), Agricultural (100%). For purposes of these calculations, government, school, and utility were calculated at the commercial contents rate.)

Table 3.4. Building Values/Exposure by Usage Type

Jurisdiction	Residential	Commercial	Industrial	Agricultural	Religious, Government, and Education	Total
City of Cameron	$701,666,000	$136,950,000	$9,798,000	$2,432,000	$33,627,000	$884,473,000
City of Gower	$144,294,000	$16,210,000	$3,308,000	$448,000	$10,345,000	$174,605,000
City Lathrop	$195,259,000	$12,784,000	$1,847,000	$1,448,000	$8,602,000	$219,940,000
City of Plattsburg	$200,969,000	$29,946,000	$20,749,000	$1,059,000	$21,610,000	$274,333,000
City of Trimble	$41,398,000	$3,611,000	$2,498,000	$95,000	$0	$47,602,000
Village of Turney	$14,629,000	$494,000	$240,000	$104,000	$113,000	$15,580,000
Unincorporated	$639,814,000	$136,950,000	$9,798,000	$11,819,000	$2,217,000	$666,317,000
Totals	$1,938,029,000	$196,298,000	$54,927,000	$17,405,000	$76,191,000	$2,282,850,000

(Source: Missouri GIS Database, http://sema.dps.mo.gov/programs/mitigation_management.php)

Table 3.5. Building Counts by Usage Type

Jurisdiction	Residential Counts	Commercial Counts	Industrial Counts	Agricultural Counts	Religion, Government, and Education Counts	Total
City of Cameron	2,387	208	38	11	43	2,687
City of Gower	568	33	3	2	8	614
City Lathrop	747	34	7	6	13	847
City of Plattsburg	925	63	16	7	19	1,030
City of Trimble	263	11	4	0	0	278
Village of Turney	73	3	2	1	1	80
Unincorporated	3,222	55	46	71	1	3,394
Totals	8,225	407	116	98	84	8,930

(Source: Missouri GIS Database, http://sema.dps.mo.gov/programs/mitigation_management.php; Public School Districts and Special Districts)

Even though schools and special districts' total assets are included in the tables above, additional discussion is needed, based on the data that is available from the districts' completion of the Data Collection Questionnaire and district maintained websites. The number of enrolled students at the participating public school districts is provided in Table 3.6 below. Additional information includes the number of buildings, building values (building exposure) and contents value (contents exposure). These numbers will represent the total enrollment and building count for the public school districts regardless of the county in which they are located.

Table 3.6. Population and Estimated Building Exposure by Public School Districts

Public School District	Enrolment	Buildings	Building Exposure ($)	Contents Exposure ($)	Total Exposure ($)
Cameron R-I	1,746	11	$48,251,719	$7,883,244	$56,134,963
Clinton Co. R-III	649	5	$45,792,868	$25,166,547	$70,959,415
East Buchanan R-I	699	unknown	unknown	unknown	$30,463,532
Lathrop R-II	978	5	$36,914,347	423,318,006	$59,232,353

(Source: http://mcds.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx and Data Questionnaire Forms)

3.2.2 Critical and Essential Facilities and Infrastructure

This section will include information from the Data Collection Questionnaire and other sources concerning the vulnerability of participating jurisdictions' critical, essential, high potential loss, and transportation/lifeline facilities to identified hazards. Definitions of each of these types of facilities are provided below.

- Critical Facility: Those facilities essential in providing utility or direction either during the response to an emergency or during the recovery operation.
- Essential Facility: Those facilities that if damaged, would have devastating impacts on disaster response and/or recovery.
- High Potential Loss Facilities: Those facilities that would have a high loss or impact on the community.
- Transportation and lifeline facilities: Those facilities and infrastructure critical to transportation, communications, and necessary utilities.

Table 3.7 includes a summary of the inventory of critical and essential facilities and infrastructure in the planning area. The list was compiled from the Data Collection Questionnaires and from www.missourieconomy.org.

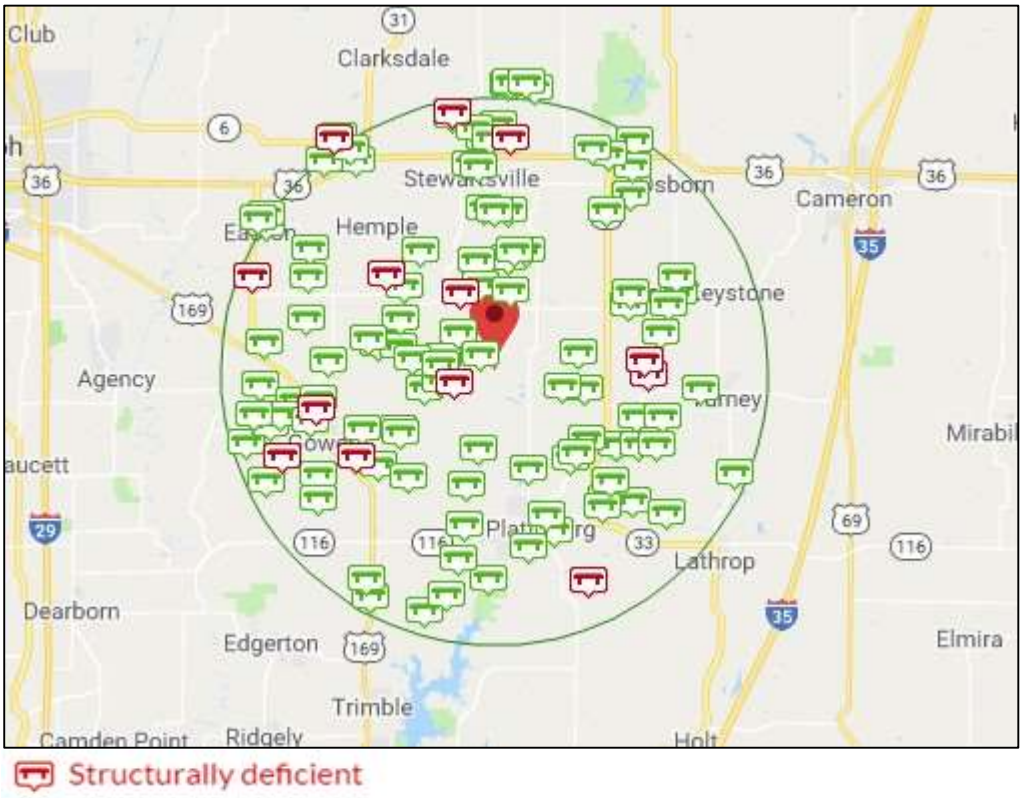
Table 3.7. Inventory of Critical/Essential Facilities and Infrastructure by Jurisdiction

Jurisdiction	Airport Facility	Bus Facility	Childcare Facility	Communications Tower	Electric Power Facility	Emergency Operations	Fire Service	Government	Housing	Shelters	Hospital/Health Care	Military	Natural Gas Facility	Nursing Homes	Police Station	Potable Water Facility	Rail	Sanitary Pump Stations	School Facilities	Stormwater Pump Stations	Tier II Chemical Facility	Wastewater Facility	Total
City of Cameron	1	1	1	0	0	2	1	1	0	0	3	0	0	3	1	0	0	0	4	0	0	0	18
City of Gower	0	1	2	0	0	2	1	1	1	0	1	0	0	1	1	0	0	0	3	0	0	0	14
City Lathrop	0	0	0	0	0	0	1	2	2	1	0	0	0	0	1	1	0	5	3	0	0	1	17
City of Holt	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
City of Osborn	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	5
City of Plattsburg	0	1	3	0	0	2	1	3	0	1	1	0	0	2	2	0	0	0	3	0	0	0	19
City of Trimble	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	3	0	0	0	0	7
Village of Turney	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
Unincorporated County	2	0	2	12	5	1	0	3	0	0	0	0	2	0	0	2	0	0	0	0	5	2	36
Totals	3	4	8	12	5	7	8	14	4	3	6	0	2	6	6	3	0	8	14	0	5	3	121

Figure 3.8 shows the locations of bridges in Clinton County that are included in the National Bridge Inventory data set. According to the Federal Highway Administration there are 152 bridges in the county, in which 76 are classified as good, 66 are fair,10 poor and 11 are structurally deficient. According to the National Bridge Inventory. The structurally deficient bridges are shown in red.

The term scour critical refers to one of the database elements in the National Bridge Inventory. This element is quantified using a “scour index”, which is a number indicating the vulnerability of a bridge to scour during a flood. Bridges with a scour index between 1 and 3 are considered “scour critical”, or a bridge with a foundation determined to be unstable for the observed or evaluated scour condition. There is one scour critical county bridge identified in Clinton County.

Figure 3.20. Structurally Deficient Bridges



(Source: http://t4america.org/maps-tools/bridges/)

3.2.3 Other Assets

Assessing the vulnerability of the planning area to disaster also requires data on the natural, historic, cultural, and economic assets of the area. This information is important for many reasons.

- These types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- Knowing about these resources in advance allows for consideration immediately following a hazard event, which is when the potential for damages is higher.

- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- The presence of natural resources can reduce the impacts of future natural hazards, such as wetlands and riparian habitats which help absorb floodwaters.
- Losses to economic assets like these (e.g., major employers or primary economic sectors) could have severe impacts on a community and its ability to recover from disaster.

Specific natural, historic, cultural, and economic assets in the planning area are included below.

Threatened and Endangered Species: Table 3.8 shows federally threatened and endangered species in the county.

Table 3.8. Threatened and Endangered Species in Clinton County

Common Name	Scientific Name	Status
Indiana bat	Myotis sodalist	Endangered
Nothern long-eared bat	Myotis septentrionalis	Threatened

(Source: U.S. Fish and Wildlife Service, http://www.fws.gov/midwest/Endangered/lists/missouri-cty.html; see also http://ecos.fws.gov/ipac/)

Natural Resources: The Missouri Department of Conservation (MDC) provides a database of lands the MDC owns, leases, or manages for public use. Table 3.9 lists the names and locations of parks and conservation areas (CA) in the planning area.

Table 3.9. Parks in Clinton County

Area Name	Address	City
Hartell (Ronald and Maude) CA	280 Street	Turney, MO
Lathrop Bridge Access	Highway 116 east 2 miles.	Plattsburg, MO
McGee Family CA	Route C south	Plattsburg, MO
USACE (Judge Birch Access)	Route C south	Plattsburg, MO

(Source: http://mdc4.mdc.mo.gov/applications/moatlas/AreaList.aspx?txtUserID=guest&txtAreaNm=s)

Park Name	Address	City
Watkins Mill State Park	26600 Park Road North	Lawson, MO 64062
Wallace State Park	10621 NE Hwy. 121	Cameron. MO 64429

(Source: Google Maps and Community Data Questionnaire forms)

Historic Resources: The National Register of Historic Places is the official list of registered cultural resources worthy of preservation. It was authorized under the National Historic Preservation Act of 1966 as part of a national program. The purpose of the program is to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. The National Register is administered by the National Park Service under the Secretary of the Interior. Properties listed in the National Register include districts, sites, buildings, structures and objects that are significant in American history, architecture, archeology, engineering, and culture. Table 3.10 lists properties that are on the National Register of Historic Places.

Table 3.10. Clinton County Properties on the National Register of Historic Places

Property	Address	City	Date Listed
Stoutimore, David and Sallie Ann House	501 S. Birch Ave	Plattsburg	July 23, 2013

(Source: http://dnr.mo.gov/shpo/mnrlist.htm)

Economic Resources: Table 3.11 shows major non-government employers in the county.

Table 3.11. Major Non-Government Employers in Clinton County

Employer Name	Main Locations	Product or Service	Employees
Correctional Center	Cameron	Prison	550
Cameron Regional Medical Center	Cameron	Healthcare	250
Cameron Veterans Home	Cameron	Healthcare	250
Cameron R-I School District	Cameron	Education	150
Case New Holland	Cameron	Manufacturing	150

(Source: Data Collection Questionnaires and Chamber of Commerce)

Agriculture: Agriculture has traditionally been an important part of the county's economy. According to the 2012 Census of Agriculture, crop and livestock sales are in excess of $56,419,000. 1,165 people are employed as farmers or farm hands in Clinton County. There are 758 principal operators in the county, with 292 engaging in farming as their primary occupation.

3.3 Land Use and Development

3.3.1 Development Since Previous Plan Update

Clinton County has experienced almost nine percent growth since 2000. The largest population center is Cameron. The unincorporated population increase is largely concentrated in the unincorporated areas of the county. Table 3.12 shows the population growth statistics for all cities in Clinton County as well as the county as a whole.

Table 3.12. Clinton County Population Growth, 2000-2016

Jurisdiction	Total Population 2000	Total Population 2016	2000-2016 # Change	2000-2016 %Change
City of Cameron	9,788	9,933	145	1.50%
City of Gower	1,399	1,526	127	9.07%
City Lathrop	2,092	2,086	-6	-0.29%
City of Holt	405	498	93	22.96%
City of Plattsburg	2,354	2,319	-35	-1.50%
City of Trimble	451	646	195	43.24%
Village of Turney	155	148	-7	-4.52%
Unincorporated area	2,285	3,662	1,377	60.26%
Totals	18,979	20,743	1,764	8.88%

(Source: U.S. Bureau of the Census, Decennial Census; ACS 2016)

Table 3.13 provides the change in numbers of housing units in the planning area from 2000 to 2016. Population growth or decline is generally accompanied by increases or decreases in the number of housing units, but as the table below shows, this is not always the case.

Table 3.13. Change in Housing Units, 2000-2016

Jurisdiction	Housing Units 2010	Housing Units 2016	2000-2016 # Change	2000-2016 % Change
City of Cameron	2,540	2,900	360	14.17%
City of Gower	549	632	83	15.12%
City of Holt	165	216	51	30.91%
City Lathrop	827	970	143	17.29%
City of Osborn	195	259	64	32.82%
City of Plattsburg	1,002	1,097	95	9.48%
City of Trimble	199	295	96	48.24%
Village of Turney	74	74	0	0%
Totals	7,877	8,888	1,011	12.83%

(Source: U.S. Bureau of the Census, Decennial Census; ACS 2016, Population Statistics are for entire incorporated areas as reported by the U.S. Census Bureau)

The changes in development for each participating jurisdiction since the previous plan update is discussed below. Within each hazard section under the heading "Previous and Future Development" these changes in development that have impacted the community's vulnerability to specific hazards, will be discussed.

Clinton County

Clinton County has experienced no significant changes that would alter the county's risk to the natural hazards that were identified in 2013 plan.

City of Cameron

Cameron has experienced a two percent population increase since 2000. Commercial and residential growth has occurred at the east side of town, near the I-35 and Highway 36 interchange, prompting the local government to look into acquiring more outdoor warning sirens to provide coverage to the area. There are plans for a 380-acre business park on the southeast side of town. The community's risk to natural hazards remains the same as in the 2013 plan.

City of Gower

Gower has experienced a nine percent population increase since 2000. The community's risk to natural hazards remains the same as in the 2013 plan.

Village of Grayson

The village does not have census information available. The community's risk to natural hazards remains the same as in the 2013 plan.

City of Holt

Holt has experienced a 23 percent population increase since 2000. The community's risk to natural hazards remains the same as in the 2013 plan but it's possible that building exposure has increased due to the community's location in a flood plain and near dam inundation zones.

City of Lathrop
Lathrop's population has remained relatively constant since 2000. The community's risk to natural hazards remains the same as in the 2013 plan.

City of Plattsburg
Plattsburg's population has remained relatively constant since 2000. The community's risk to natural hazards remains the same as in the 2013 plan.

City of Trimble
Trimble has experienced a 43 percent population increase since 2000. The community's location near Smithville Lake, a recreation area, and vicinity to the Kansas City area likely contributed to the population increase. Two new commercial properties have been constructed since the 2013 plan. The community's risk to natural hazards remains the same as in the 2013 plan.

Village of Turney
Turney has experienced a five percent population decrease since 2000. The community's risk to natural hazards remains the same as in the 2013 plan.

3.3.2 Future Land Use and Development

The remaining discussion in this section provides future growth and development information, where available, relative to each participating jurisdiction.

City of Cameron
The community has a comprehensive plan and land use plan. Future development is expected in Cameron's southeast area with the business park and east with another truck stop expansion being planned. This growth will leave some areas with an increased number of people outside of the range of tornado sirens.

Village of Grayson
The community does not have a comprehensive plan or land use plan. No significant future development is anticipated.

City of Gower
The community does not have a comprehensive plan but has a land use plan. No significant future development is anticipated.

City of Holt
The community does not have a comprehensive plan or land use plan. No significant future development is anticipated.

City Lathrop
The community has a comprehensive plan but not a land use plan. The second phase of water upgrades that will include a new tower and the wastewater treatment and collection system. Two new tornado sirens and a police station generator are planned to be acquired within the next five years. No significant future development is anticipated.

City of Plattsburg
The community has a comprehensive plan and land use plan. No significant future development is anticipated.

City of Trimble
The community does not have a comprehensive plan or land use plan. No significant future development

is anticipated.

Village of Turney
The community does not have a comprehensive plan or land use plan. No significant future development is anticipated.

School District's Future Development

Cameron School District
No significant future development is anticipated.

Clinton School District
No significant future development is anticipated.

East Buchanan School District
No significant future development is anticipated.

Lathrop School District
No significant future development is anticipated.

3.4 Hazard Profiles, Vulnerability, and Problem Statements

Each hazard will be analyzed individually in a hazard profile. The profile will consist of a general hazard description, location, severity/magnitude/extent, previous events, future probability, a discussion of risk variations between jurisdictions, and how anticipated development could impact risk. At the end of each hazard profile will be a vulnerability assessment, followed by a summary problem statement.

Hazard Profiles

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

Each hazard identified in Section 3.1.4 will be profiled individually in this section in alphabetical order. The level of information presented in the profiles will vary by hazard based on the information available. With each update of this plan, new information will be incorporated to provide better evaluation and prioritization of the hazards that affect the planning area. Detailed profiles for each of the identified hazards include information categorized as follows:

Hazard Description: This section consists of a general description of the hazard and the types of impacts it may have on a community or school/special district.

Geographic Location: This section describes the geographic location of the hazard in the planning area. Where available, use maps to indicate the specific locations of the planning area that are vulnerable to the subject hazard. For some hazards, the entire planning area is at risk.

Severity/Magnitude/Extent: This includes information about the severity, magnitude, and extent of a hazard. For some hazards, this is accomplished with description of a value on an established scientific scale or measurement system, such as an EF2 tornado on the Enhanced Fujita Scale. Severity, magnitude, and extent can also include the speed of onset and the duration of hazard events. Describing the severity/magnitude/extent of a hazard is not the same as describing its potential impacts on a community. Severity/magnitude/extent defines the characteristics of the hazard regardless of the people and property it affects.

Previous Occurrences: This section includes available information on historic incidents and their impacts. Historic event records form a basis for probability calculations

Probability of Future Occurrence: The frequency of recorded past events is used to estimate the likelihood of future occurrences. Probability was determined by dividing the number of recorded events by the number of years and multiplying by 100. This gives the percent chance of the event happening in any given year. For events occurring more than once annually, the probability will be reported 100% in any given year, with a statement of the average number of events annually.

The probability of future occurrence should also consider changing future conditions, including the effects of long-term changes in weather patterns and climate on the identified hazards. This is discussed when applicable.

Vulnerability Assessments

Requirement §201.6(c)(2)(ii): The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

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

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

Requirement §201.6(c)(2)(ii)(C): The plan should describe vulnerability in terms of providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Requirement §201.6(c)(2)(ii): (As of October 1, 2008) The risk assessment must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged in floods.

Following the hazard profile for each hazard will be the vulnerability assessment. The vulnerability assessment further defines and quantifies populations, buildings, critical facilities, and other community assets at risk to damages from natural hazards. The vulnerability assessments will be based on the best available county-level data, which is in the Missouri Hazard Mitigation Plan (2013), referred to as the 2013 State Plan. The county-level assessments in the 2013 State Plan were based on the following sources:

- Statewide GIS data sets compiled by state and federal agencies; and
- FEMA's HAZUS-MH loss estimation software.

The vulnerability assessments in Clinton County plan will also be based on:

- Written descriptions of assets and risks provided by participating jurisdictions;
- Existing plans and reports;
- Personal interviews with planning committee members and other stakeholders; and
- Other sources as cited.

Within the Vulnerability Assessment, the following sub-headings will be addressed:

Vulnerability Overview

Potential Losses to Existing Development: This sections includes the types and numbers, of buildings, critical facilities, etc.

Previous and Future Development: This section will include information on how changes in development have impacted the community's vulnerability to this hazard. Describe how any changes

in development that occurred in known hazard prone areas since the previous plan have increased or decreased the community's vulnerability. Describe any anticipated future development in the county, and how that would impact hazard risk in the planning area.

Hazard Summary by Jurisdiction: For hazard risks that vary by jurisdiction, this section will provide an overview of the variation and the factual basis for that variation.

Problem Statements

Each hazard analysis will conclude with a brief summary of the problems created by the hazard in the planning area, and possible ways to resolve those problems. Jurisdiction-specific information will be included in those cases where the risk varies across the planning area.

3.4.1 Dam Failure

Hazard Profile

Hazard Description

A dam is defined as a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. Dams are typically constructed of earth, rock, concrete, or mine tailings. Dam failure is the uncontrolled release of impounded water resulting in downstream flooding, affecting both life and property. Dam failure can be caused by any of the following:

1. Overtopping - inadequate spillway design, debris blockage of spillways or settlement of the dam crest.
2. Piping: internal erosion caused by embankment leakage, foundation leakage and deterioration of pertinent structures appended to the dam.
3. Erosion: inadequate spillway capacity causing overtopping of the dam, flow erosion, and inadequate slope protection.
4. Structural Failure: caused by an earthquake, slope instability or faulty construction.

Dams regulated by the state are non-federally regulated dams that are over 35 feet in height. Missouri Department of Natural Resources (MDNR) Water Resources Center maintains the Dam and Reservoir Safety Program in Missouri. They ensure these dams are safely constructed, operated, and maintained pursuant to Chapter 236 of Revised Statutes of Missouri. The MDNR has data on the regulated and non-regulated dams in the state and uses the dam hazard classification system shown in Table 3.14.

Table 3.14. MDNR Dam Hazard Classification Definitions

Hazard Class	Definition
Class I	The area downstream from the dam that would be affected by inundation contains ten (10) or more permanent dwellings or any public building. Inspection of these dams must occur every two years.
Class II	The area downstream from the dam that would be affected by inundation contains one (1) to nine (9) permanent dwelling, or one (1) or more campgrounds with permanent water, sewer and electrical services or one (1) or more industrial buildings. Inspection of these dams must occur once every three years.
Class III	The area downstream from the dam that would be affected by inundation does not contain any of the structures identified for Class I or Class II dams. Inspection of these dams must occur once every five years.

(Source: https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan_2013.pdf)

Federally regulated dams fall under the jurisdiction of the US. Army Corps of Engineers (USACE) and the U.S. Department of Agriculture and Forest Service. There are no federally regulated dams in Clinton County. The USACE maintains the National Inventory of Dams (NID), which includes data and the hazard classification of dams described in Table 3.15.

Table 3.15. NID Dam Hazard Classification Definitions

Hazard Class	Definition
High Hazard	Loss of human life is probable and one or more is expected. Losses for the economy, the environment and lifeline are also expected.
Significant Hazard	No loss of human life expected; however losses are expected for the economy, the environment and lifeline.
Low Hazard	No loss of human life expected and low/generally limited effect to owner on economic/environmental and lifeline losses.

(Source: National Inventory of Dams)

There is not a direct correlation between the MDNR classifications and the NID classifications.

Geographic Location

Dams in Planning Area

The MDNR database lists 26 dams in Clinton County and four of those dams are regulated by the state. They are:

Regulated Class I Dams: Lake Arrowhead Dam and Spring Lake Dam

Regulated Class II Dam: Six Mile Lane Lake Dam

Regulated Class III Dam: Apac-Kansas Inc., Lake Dam

The USACE lists 25 dams in their NID for Clinton County; nine of these dams are classified as high hazard, with the failure of the dam likely resulting in loss of human life and none are classified as significant, with no expected loss of human life but economic, environmental or lifeline losses expected. These are displayed in Table 3.16.

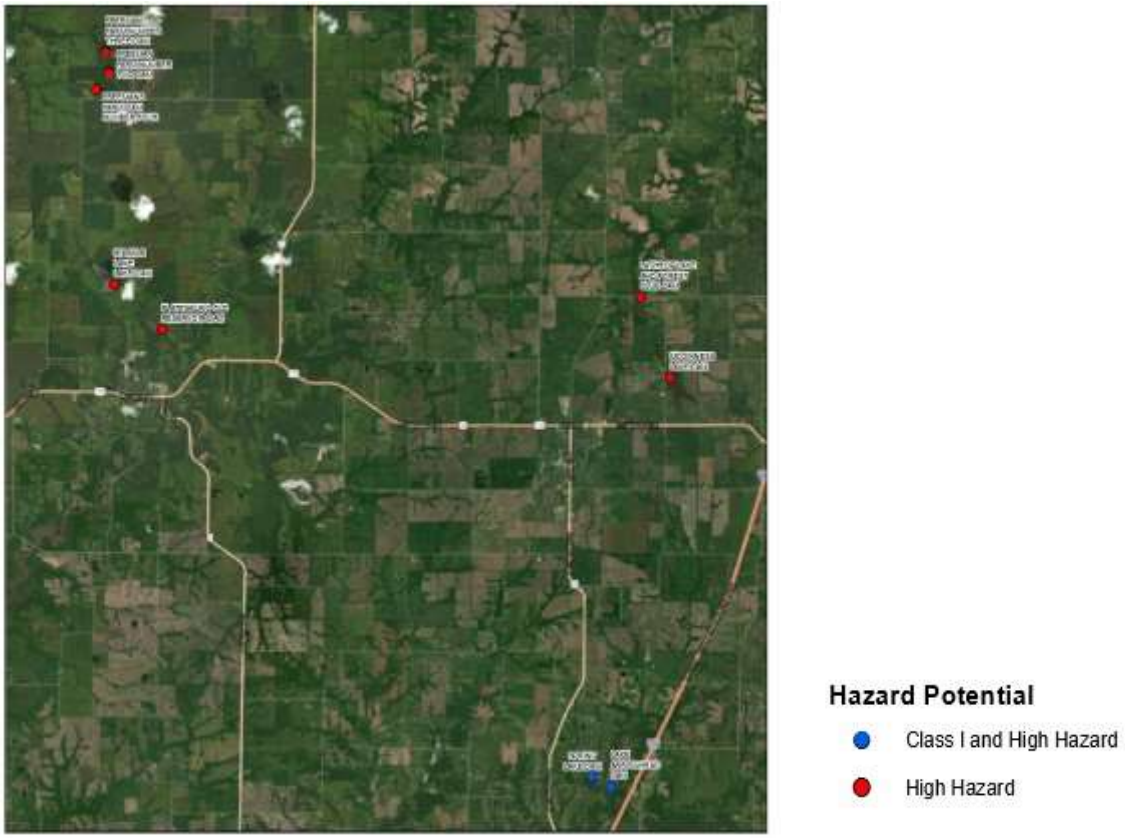
Table 3.16. High Hazard Dams in the Clinton County Planning Area

Dam Name	Emergency Action Plan (EAP)AP	Dam Height (Ft)	Normal Storage (Acre-Ft)	Last Inspection Date	River	Nearest Downstream City	Distance To Nearest City (Miles)	Dam Owner
Lake Arrowhead	Yes	51	2754	10/01/14	Muddy Fork	Holt	2	Lake Arrowhead POA
Spring Lake	Yes	45	179	10/01/14	Muddy Fork	Holt	0	Lake Arrowhead Trustees
Freeman Farm #3	NR	32	107	NA	McGuire Branch & Castile Creek	Plattsburg	0	Eldon Freeman
Freeman Farm #2	NR	33	72	NA	McGuire Branch & Castile Creek	Plattsburg	0	Eldon Freeman
Freemans Farm #4	NR	32	130	NA	McGuire & Castile	Plattsburg	0	Eldon Freeman
Lathrop Lake and Forest Club	NR	25	100	NA	Shoal Creek	Lathrop	4	Lathrop Lake + Forest Club
Mcginness Lake	NR	29	327	NA	Shoal Creek	Lathrop	3	Logan McGuinness
Plattsburg Old Reservior	NR	33	171	NA	Little Platte	Plattsburg	1	City of Plattsburg
Six Mile Lane Lake	Yes	37	402	03/05/15	Horse Fork	Plattsburg	1	Plattsburg Casters

(Sources: Missouri Department of Natural Resources, http://dnr.mo.gov/env/wrc/dam-safety/statemap.htm and National Inventory of Dams, http://nid.usace.army.mil/cm_apex/f?p=838:12)

Figure 3.2 shows the locations of NID high hazard dams located in the planning area. Dams that are both NID high hazard and MDR Class I dams are identified.

Figure 3.21. High Hazard Dam Locations in Clinton County



(Source: U.S. Army Corps of Engineers, Missouri Department of Natural Resources)

Upstream Dams Outside the Planning Area

Dams located outside if Clinton County are unlikely to impact the county in the event of failure.

Severity/Magnitude/Extent

The severity/magnitude of dam failure would be similar in some cases to the impacts associated with flood events (see the flood hazard vulnerability analysis and discussion). Based on the hazard class definitions, failure of any of the High Hazard/Class I dams could result in a serious threat of loss of human life, serious damage to residential, industrial or commercial areas, public utilities, public buildings, or major transportation facilities. Catastrophic failure of any high hazard dams has the potential to result in greater destruction due to the potential speed of onset and greater depth, extent, and velocity of flooding. For this reason, dam failures could flood areas outside of mapped flood hazards.

Previous Occurrences

There are no records of recent dam failure in Clinton County. However, Lake Arrowhead Dam experienced one embankment slide and two inflow floods (hydrological events) between 1993 and 1995. None of these events resulted in dam failure. Since there are zero recorded events causing damage in the planning area, a calculation of a probability percent is not possible. According to

information from the 2013 State Plan, Missouri's percentage of high hazard dams in the MDNR inventory puts the State at about the national average for that category.

Probability of Future Occurrence

There is no record of a dam failure within the county so it is not possible to calculate the probability of future occurrence. If development occurs in inundation zones the likelihood of loss of life increases in the event of dam failure. Additionally, the probability of dam failure increases as many of the smaller and privately owned dams continue to deteriorate without the benefit of further regulation or improvements. Regular inspection and maintenance schedules for dams greatly reduces the probability of dam failure. MDNR Class I dams must be inspected every two years, Class II every three years and Class III every five years. By adhering to this schedule the likelihood of failure will be kept to a minimum.

Vulnerability

Vulnerability Overview

Vulnerability to dam failure in Clinton County is limited to structures located in dam inundation zones. The dams are located in unincorporated parts of the county and no critical structures are located in the inundation zones. Currently, there are four state regulated dams with heights of 35 or greater. Although failure potential certainly exists for these non-regulated dams, it is very difficult to attempt to analyze vulnerability due to data limitations. There are no federally regulated dams in Clinton County.

Potential Losses to Existing Development: (including types and numbers, of buildings, critical facilities, etc.)

Table 3.17 lists the exposure vulnerability for four state regulated dams (over 35 feet in height) in Clinton County.

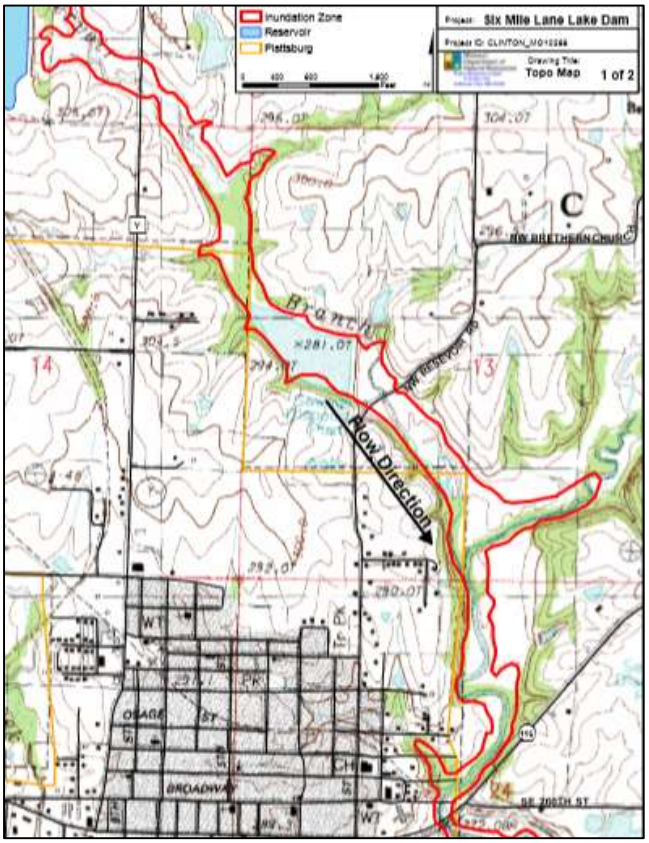
Table 3.17 Vulnerability Analysis for Failure of State-regulated Dams

Jurisdiction	Estimated # of Buildings Vulnerable	Average Exposure Value Per Structure	Estimated Total Potential Building Exposure	Estimated Total Population Exposure	Estimated Building Losses
Clinton County	25	$122,538	$5,074,802	62	$2537,401

(Source: 2013 State Plan)

A portion of the Six Mile Lane Lake Dam inundation zone is shown in Figure 3.3. Approximately 20 minutes after a breach the flood would reach the Plattsburg Old City Reservoir, potentially triggering a secondary breach. The flow direction is just towards the east of Plattsburg city limits, missing nearly all development. As previously noted, depending on the speed and velocity of a breach and flooding, inundation zones might be exceeded.

Figure 3.3 Six Mile Lane Lake Dam Inundation Zone near Plattsburg



(Source: MDNR Six Mile Lake Dam Report)

Figure 3.4 shows the Lake Arrowhead Dam's inundation zone in Holt, which is estimated to receive flooding after an hour of a breach. A number of structures are located in the inundation zone, outlined in red, including city hall, the fire department and post office. The school is located just outside of the inundation zone. As previously noted, depending on the speed and velocity of a breach and flooding, inundation zones might be exceeded.

Figure 3.4 Lake Arrowhead Dam Inundation Zone in Holt

(Source: MDNR, Lake Arrowhead Dam Report)

The Spring Lake Dam inundation zone runs to east of Holt. MDNR inspections and inundation maps for Lake Arrowhead Dam, Spring Lake Dam and Six Mile Lane Lake Dam by the State can be found in Appendix A.

Impact of Previous and Future Development

Future development in Clinton County could impact the amount of damages caused by a dam failure in the planning area if development occurs in the dam inundation area. Most of Clinton County is rural but the northwest area of the county, around the City of Cameron, is experiencing growth. Caution must be exercised in developing areas in and near inundation zones of High Hazard/Class I dams.

Hazard Summary by Jurisdiction

Vulnerability to dam failure varies across the planning area. The City of Holt has several structures, including critical facilities located in dam breach inundation areas, increasing their vulnerability in the case of an event. According to the 2013 State Plan an estimated 62 people and 25 buildings are vulnerable to a dam failure.

Problem Statement

Although the probability of dam failure in the county is low the potential for damage remains. Three dams have emergency action plans. Emergency action plans written for dams include procedures for notification and coordination with local law enforcement and other governmental agencies, information on the potential inundation area, plans for warning and evacuation, and procedures for making emergency repairs. Residents near a Class I or Class II hazard dams should become familiar with what action to take if there is a dam breach. Public education campaigns can help inform and prepare citizens.

3.4.2 Drought

Hazard Profile

Hazard Description

Drought is generally defined as a condition of moisture levels significantly below normal for an extended period of time over a large area that adversely affects plants, animal life, and humans. A drought period can last for months, years, or even decades. There are four types of drought conditions relevant to Missouri, according to the State Plan, which are as follows.

- Meteorological drought is defined in terms of the basis of the degree of dryness (in comparison to some "normal" or average amount) and the duration of the dry period. A meteorological drought must be considered as region-specific since the atmospheric conditions that result in deficiencies of precipitation are highly variable from region to region.

- Hydrological drought is associated with the effects of periods of precipitation (including snowfall) shortfalls on surface or subsurface water supply (e.g., streamflow, reservoir and lake levels, ground water). The frequency and severity of hydrological drought is often defined on a watershed or river basin scale. Although all droughts originate with a deficiency of precipitation, hydrologists are more concerned with how this deficiency plays out through the hydrologic system. Hydrological droughts are usually out of phase with or lag the occurrence of meteorological and agricultural droughts. It takes longer for precipitation deficiencies to show up in components of the hydrological system such as soil moisture, streamflow, and ground water and reservoir levels. As a result, these impacts also are out of phase with impacts in other economic sectors.

- Agricultural drought focus is on soil moisture deficiencies, differences between actual and potential evaporation, reduced ground water or reservoir levels, etc. Plant demand for water depends on prevailing weather conditions, biological characteristics of the specific plant, its stage of growth, and the physical and biological properties of the soil.

- Socioeconomic drought refers to when physical water shortage begins to affect people.

(Source: http://www.drought.unl.edu/ http://droughtreporter.unl.edu/)

Geographic Location

The entire planning area is at risk to drought. Clinton County covers 423 square miles and approximately 300 square miles (71 percent) of the land is in farm use. Of the 758 farms in the county, only six irrigate. From 2002 to 2012 the number of farms decreased by 14.7 percent and the amount of land in farm use farm use decreased by 15.38 percent. The northeast area of the county, where Cameron is located, is experiencing the most growth (Source:http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/Missouri/).

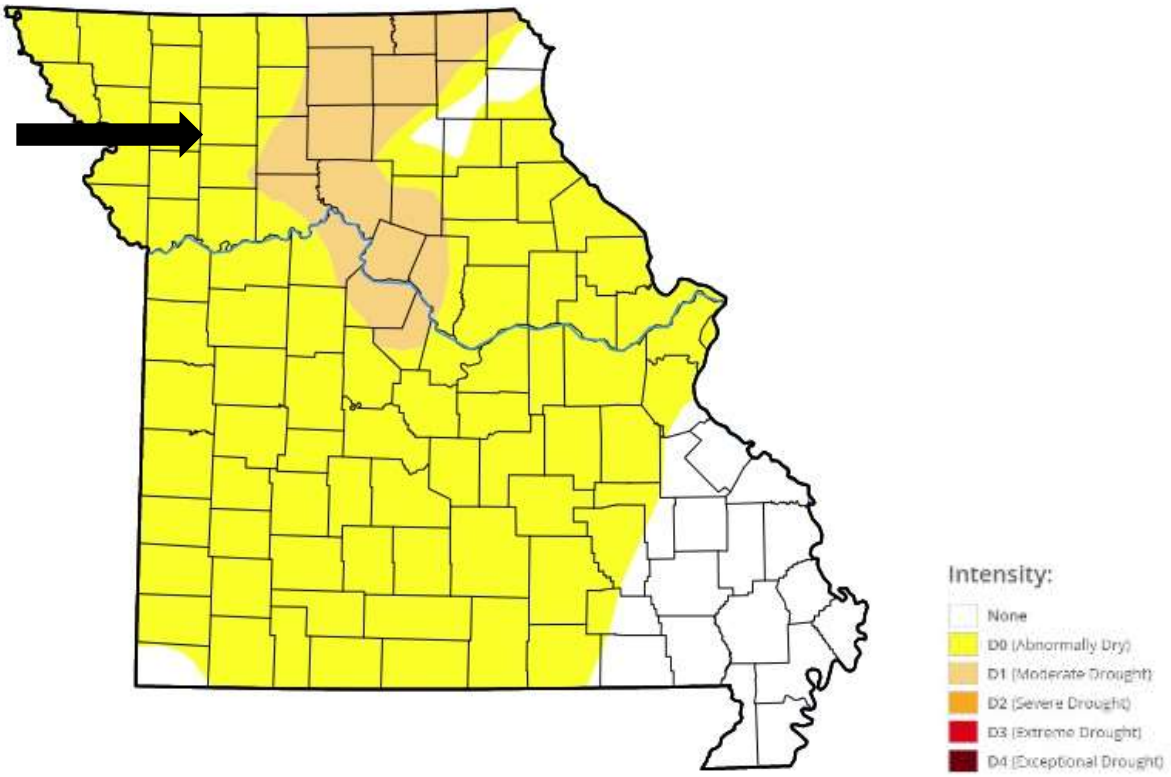
Severity/Magnitude/Extent

The National Drought Monitor Center at the University of Nebraska at Lincoln summarized the potential severity of drought as follows. Drought can create economic impacts on agriculture and

related sectors, including forestry and fisheries, because of the reliance of these sectors on surface and subsurface water supplies. In addition to losses in yields in crop and livestock production, drought is associated with increases in insect infestations, plant disease, and wind erosion. Droughts also bring increased problems with insects and disease to forests and reduce growth. The incidence of forest and range fires increases substantially during extended droughts, which in turn place both human and wildlife populations at higher levels of risk. Income loss is another indicator used in assessing the impacts of drought because so many sectors are affected. Finally, while drought is rarely a direct cause of death, the associated heat, dust and stress can all contribute to increased mortality.

The U.S. Drought Monitor is an example of the geographic area that could be in drought at any given moment in time. It is only a snapshot of conditions at a given moment in time. Figure 3.5 shows that DeKalb County is located in D0 – Abnormally Dry zone.

Figure 3.5. U.S. Drought Monitor Map of Missouri on March 15, 2018



(Source: U.S. Drought Monitor, http://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?MO)

The USDA's Risk Management Agency tracks insured crop loss payments in the county as a result of drought. Table 3.18 shows the crop loss payments in Clinton County from 2007 to 2016. Crop loss payments were the highest in 2012, with a total of $21,647,013.00.

Table 3.18 Crop Loss Payments in Clinton County from 2007-2016

Year	Crop Loss Payment
2016	$18,418
2015	$0
2014	$17,813.50
2013	$2,497,189
2012	$21,647,013
2011	$151,431
2010	$0
2009	$0
2008	$185,174
2007	$315,742

(Source: http://www.rma.usda.gov/data/cause.html)

The Palmer Drought Indices measure dryness based on recent precipitation and temperature. The indices are based on a "supply-and-demand model" of soil moisture. Calculation of supply is relatively straightforward, using temperature and the amount of moisture in the soil. However, demand is more complicated as it depends on a variety of factors, such as evapotranspiration and recharge rates. These rates are harder to calculate. Palmer tried to overcome these difficulties by developing an algorithm that approximated these rates, and based the algorithm on the most readily available data — precipitation and temperature.

The Palmer Index has proven most effective in identifying long-term drought of more than several months. However, the Palmer Index has been less effective in determining conditions over a matter of weeks. It uses a "0" as normal, and drought is shown in terms of negative numbers; for example, negative 2 is moderate drought, negative 3 is severe drought, and negative 4 is extreme drought. Palmer's algorithm also is used to describe wet spells, using corresponding positive numbers.

Palmer also developed a formula for standardizing drought calculations for each individual location based on the variability of precipitation and temperature at that location. The Palmer index can therefore be applied to any site for which sufficient precipitation and temperature data is available.

None of the communities in Clinton County use water from a well as the only source of water. There are surface water sites in Plattsburg and Holt. (Source: http://maps. waterdata. usgs.gov/ map per /index.html).

Previous Occurrences

Clinton County experienced droughts in 2000 and 2012-2013 (Source: www.ncdc.noaa.gov/storm events). The Drought Reporter included in reports about the drought disaster declarations in "Drought-related USDA disaster declarations in 2013" (Dates of Impact: 2013-01-09 to 2013-05-16), "USDA Designates 97 Counties in Missouri as Primary Natural Disaster Areas with Assistance to Producers in Surrounding States" (Dates of Impact: 2012-04-01 to unknown) and "All but three Missouri counties received drought disaster designation" (Dates of Impact: 2011-07-01 to 2011-10-18) (Source: http://droughtreporter.unl.edu/).

Probability of Future Occurrence

A 20-year period is used from which to draw data on drought events in order to obtain a more accurate estimate of probability. Over the 20-year record period, Clinton County was in a drought for nine months. There are a total of 240 months in the record period. The calculated risk percent from the number of months of drought and the total number of months in the record period equates to the

annual average percentage of 3.75 percent probability of drought occurrence in the county. Although drought is not predictable, long-range outlooks and predicted impacts of climate change could indicate an increased chance of drought persistence and severity. The nine events took place in 2000 (one event), 2012 (six events) and 2013 (two events) (Source: https://www.ncdcnoaa.gov /stormevents).

Vulnerability

Vulnerability Overview

The agriculture sector is particularly vulnerable to drought. Periods of dry weather can reduce stock ponds and force the early sale of livestock. Between 2007 and 2012, the number of cattle has decreased by forty-two percent, which lessens the demand for stock ponds (Source: Ag. Census 2012 and 2007). However, drought can still stress stock ponds water levels and be disruptive to crop production. Those relying on private wells are likely to be impacted by reductions in the groundwater supply.

Potential Losses to Existing Development

The 2013 State Plan shows that from 1998 through 2012 there were $26,930,631.00 in insured crop loss payments in Clinton County (Source: http://sema.dps.mo.gov/docs/ programs/LRMF/ mitigation /MO Hazard Mitigation Plan 2013.pdf). In addition, according to the USDA Risk Management Agency, there was a total of $2,515,002.50 in insured crop loss payments from 2013-2016. (Source: http://www.rma.usda.gov/data/cause.html). According to this data, the total losses divided by the 19-year timeframe ($26,930,631.00 + $2,515,002.50/19) equals $1,549,770.18 per year. There are no anticipated structural losses, loss of life or injuries associated with this hazard.

Impact of Previous and Future Development

Increases in acreage planted with crops would add to exposure to drought-related agricultural losses. In addition, increases in population result in increased demand for treated water, adding additional strain on water supply systems.

Impact of Climate Change

A new analysis, performed for the Natural Resources Defense Council, examined the effects of climate change on water supply and demand in the contiguous United States. The study found that more than 1,100 counties will face higher risks of water shortages by mid-century as a result of climate change. Two of the principal reasons for the projected water constraints are shifts in precipitation and potential evapotranspiration (PET). Climate models project decreases in precipitation in many regions of the U.S., including areas that may currently be described as experiencing water shortages of some degree.

The Natural Resources Defense Council developed a new water supply sustainability index. The risk to water sustainability is based on the following criteria:

- Projected water demand as a share of available precipitation
- Groundwater use as a share of projected available precipitation
- Susceptibility to drought
- Projected increase in freshwater withdrawals
- Projected increase in summer water deficit

The risk to water sustainability for counties meeting two of the criteria are classified as “moderate” while those meeting three of the criteria are classified as “high,” and those meeting four or more are classified as “extreme.” Counties meeting less than two criteria are considered to have low risk to water sustainability. According to the Natural Resources Defense Council, without climate change the water sustainability index for Clinton County is low. With climate change, the water supply sustainability index increases to moderate (Source: https://www.nrdc.org/issues/climate-change).

Hazard Summary by Jurisdiction

Although the probability of drought is the same for the entire county, farming and livestock enterprises in the unincorporated parts of the county would feel the greatest impact. These impacts are mitigated somewhat by the purchase of crop insurance. The communities in Clinton County are on water systems. There are source water sites near Plattsburg and Holt. However, many rural residents rely on limited source wells, which would be impacted during water shortages. In cities, the drought conditions would be the same as those experienced in rural areas, but the magnitude would be different with only lawns and local gardens impacted. In addition, building foundations could be weakened due to shrinking and expanding soils. School and special districts would be the least impacted by drought, however, those districts in communities with single source wells may experience water shortages prior to those in larger communities.

Problem Statement

Although drought most likely will not cause structural damage, the impact is greatest on the agriculture sector and if persistent enough, could cause reductions in groundwater and water shortages in communities that provide potable water services. Potential solutions to mitigate the impact of drought would be for communities to develop an ordinance to restrict the use of public water resources for non-essential usage, such as landscaping, washing cars, filling swimming pools, etc. during extreme drought periods. Schools can also implement water conservation measures at all district facilities.

3.4.3 Earthquakes

Hazard Profile

Hazard Description

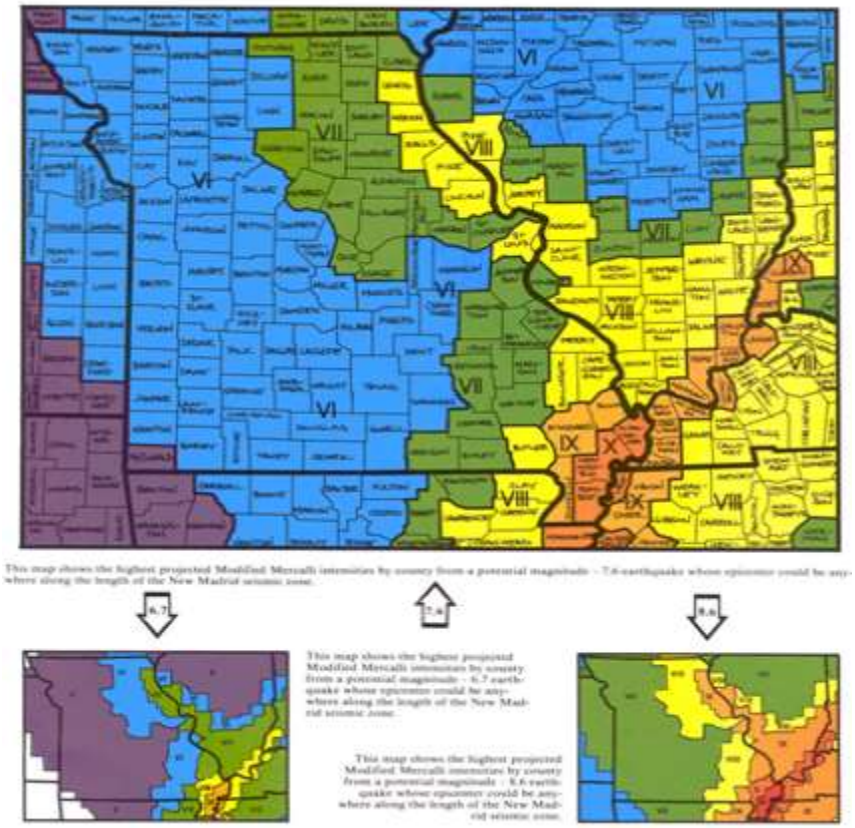
An earthquake is a sudden motion or trembling that is caused by a release of energy accumulated within or along the edge of the earth's tectonic plates. Earthquakes occur primarily along fault zones and tears in the earth's crust. Along these faults and tears in the crust, stresses can build until one side of the fault slips, generating compressive and shear energy that produces the shaking and damage to the built environment. Heaviest damage generally occurs nearest the earthquake epicenter, which is that point on the earth's surface directly above the point of fault movement. The composition of geologic materials between these points is a major factor in transmitting the energy to buildings and other structures on the earth's surface.

The greatest hazard from earthquakes in Clinton County comes from the New Madrid Seismic Zone situated in the boot-\heel area of southeast Missouri. The potential of high magnitude earthquakes occurring along the New Madrid fault presents risk that does not vary across the planning area. The Nemaha uplift in central Kansas is also prone to seismic activity, however, the center of the Humbolt fault zone near the Nemeha Uplift is approximately 250 miles southwest of Clinton County and produces lower magnitude seismic events.

Geographic Location

Figure 3.6 shows the highest projected Modified Mercalli intensities by county from a potential magnitude 7.6 earthquake whose epicenter could be anywhere along the length of the New Madrid Seismic Zone The secondary maps in Figure 3.6 show the same regional intensities for 6.7 and 8.6 earthquake, respectively.

Figure 3.6 Impact Zones for Earthquake Along the New Madrid Fault



PROJECTED EARTHQUAKE INTENSITIES

MODIFIED MERCALLI INTENSITY SCALE

I People do not feel any Earth movement.

II A few people might notice movement.

III Many people indoors feel movement. Hanging objects swing.

IV Most people indoors feel movement. Dishes, windows, and doors rattle. Walls and frames of structures creak. Liquids in open vessels are slightly disturbed. Parked cars rock.

V Almost everyone feels movement. Most people are awakened. Doors swing open or closed. Dishes are broken. Pictures on the wall move. Windows crack in some cases. Small objects move or are turned over. Liquids might spill out of open containers.

VI Everyone feels movement. Poorly built buildings are damaged slightly. Considerable quantities of dishes and glassware, and some windows are broken. People have trouble walking. Pictures fall off walls. Objects fall from shelves. Plaster in walls might crack. Some furniture is overturned. Small bells in churches, chapels and schools ring.

VII People have difficulty standing. Considerable damage in poorly built or badly designed buildings, adobe houses, old walls, spires and others. Damage is slight to moderate in well-built buildings. Numerous windows are broken. Weak chimneys break at roof lines. Cornices from towers and high buildings fall. Loose bricks fall from buildings. Heavy furniture is overturned and damaged. Some sand and gravel stream banks cave in.

VIII Drivers have trouble steering. Poorly built structures suffer severe damage. Ordinary substantial buildings partially collapse. Damage slight in structures especially built to withstand earthquakes. Tree branches break. Houses not bolted down might shift on their foundations. Tall structures such as towers and chimneys might twist and fall. Temporary or permanent changes in springs and wells. Sand and mud is ejected in small amounts.

IX Most buildings suffer damage. Houses that are not bolted down move off their foundations. Some underground pipes are broken. The ground cracks conspicuously. Reservoirs suffer severe damage.

X Well-built wooden structures are severely damaged and some destroyed. Most masonry and frame structures are destroyed, including their foundations. Some bridges are destroyed. Dams are seriously damaged. Large landslides occur. Water is thrown on the banks of canals, rivers, and lakes. Railroad tracks are bent slightly. Cracks are opened in cement pavements and asphalt road surfaces.

XI Few if any masonry structures remain standing. Large, well-built bridges are destroyed. Wood frame structures are severely damaged, especially near epicenters. Buried pipelines are rendered completely useless. Railroad tracks are badly bent. Water mixed with sand, and mud is ejected in large amounts.

XII Damage is total, and nearly all works of construction are damaged greatly or destroyed. Objects are thrown into the air. The ground moves in waves or ripples. Large amounts of rock may move. Lakes are dammed, waterfalls formed and rivers are deflected.

Intensity is a numerical index describing the effects of an earthquake on the surface of the Earth, on man, and on structures built by man. The intensities shown in these maps are the highest likely under the most adverse geologic conditions. There will actually be a range in intensities within any small area such as a town or county, with the highest intensity generally occurring at only a few sites. Earthquakes of all three magnitudes represented in these maps occurred during the 1811 - 1812 "New Madrid earthquakes." The isoseismal patterns shown here, however, were simulated based on actual patterns of somewhat smaller but damaging earthquakes that occurred in the New Madrid seismic zone in 1843 and 1895.

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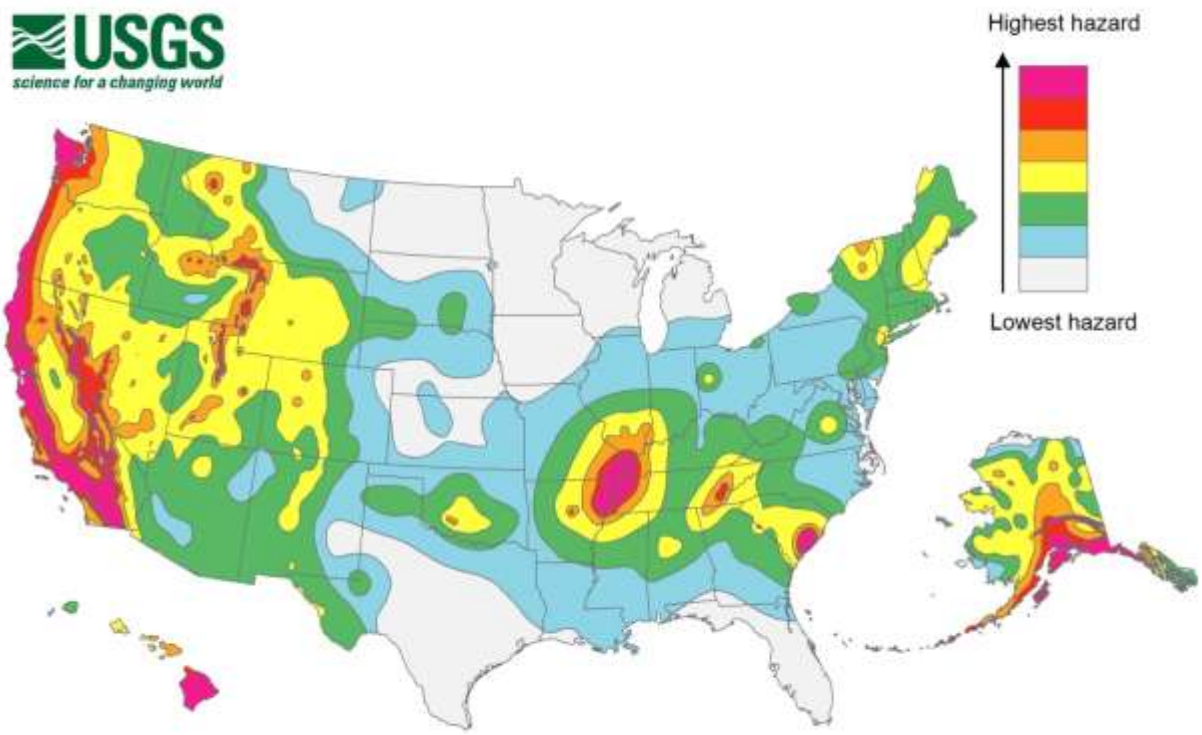
Figure 3.7 illustrates seismicity in the United States. Clinton County is located in the blue zone, which is the second lowest hazard area.

Figure 3.7. United States Seismic Hazard Map



(Source: United States Geological Survey at http://earthquake.usgs.gov/hazards/products/conterminous/2014/HazardMap2014_lg.jpg)

Severity/Magnitude/Extent

The extent or severity of earthquakes is generally measured in two ways: 1) the Richter Magnitude Scale is a measure of earthquake magnitude; and 2) the Modified Mercalli Intensity Scale is a measure of earthquake severity. The two scales are defined a follows.

Richter Magnitude Scale

The Richter Magnitude Scale was developed in 1935 as a device to compare the size of earthquakes. The magnitude of an earthquake is measured using a logarithm of the maximum extent of waves recorded by seismographs. Adjustments are made to reflect the variation in the distance between the various seismographs and the epicenter of the earthquakes. On the Richter Scale, magnitude is expressed in whole numbers and decimal fractions. For example, comparing a 5.3 and a 6.3 earthquake shows that the 6.3 quake is ten times bigger in magnitude. Each whole number increase in magnitude represents a tenfold increase in measured amplitude because of the logarithm. Each whole number step in the magnitude scale represents a release of approximately 31 times more energy.

Modified Mercalli Intensity Scale

The intensity of an earthquake is measured by the effect of the earthquake on the earth's surface. The intensity scale is based on the responses to the quake, such as people awakening, movement of furniture, damage to chimneys, etc. The intensity scale currently used in the United States is the Modified Mercalli (MM) Intensity Scale. It was developed in 1931 and is composed of 12 increasing levels of intensity. They range from imperceptible shaking to catastrophic destruction, and each of the twelve levels is denoted by a Roman numeral. The scale does not have a mathematical basis, but is based on observed effects. Its use gives the laymen a more meaningful idea of the severity.

Previous Occurrences

Earthquakes are rare in Clinton County. There have been no reported earthquakes since 1931 and according to Homefacts.com, there is a .35 percent of a 5.0 earthquake or greater in the next 50 years.

On February 13, 2016 a neighboring county, Buchanan County, felt tremors from a 5.1 earthquake originating near Fairview, Oklahoma. No damage was reported. There is speculation that the earthquake was the result of man-made activity, fracking. Thus, man-made activity may contribute to future earthquake activity.

Probability of Future Occurrence

The United States Geological Survey (USGS) earthquake probability map for the Clinton County area is shown in Figure 3.8. Clinton County falls into the 0 - .01% probability range, indicated by white on the map. No known earthquakes have occurred in Clinton County.

Figure 3.8. 2009 Earthquake Probability Mapping

Hazard Summary by Jurisdiction

Earthquake risk and intensity is not likely to vary greatly throughout the planning area. However, damages could differ if there are structural variations in the planning area built environment, such as a community having a high number of older structures. Many of the school districts' building are

newer than 1939 and would be able to better withstand earthquakes than older structures in the communities.

Impact of Previous and Future Development

Future development is not expected to increase the risk contributing to the overall damage exposure.

Vulnerability

Vulnerability Overview

Ground shaking is the most damaging effect from earthquakes. Ground shaking will impact all structures and critical infrastructure such as roads and electrical transmission systems. In the event of a 7.6 magnitude earthquake, damage to structures would vary depending on the quality of construction. In addition, some underground utilities may be damaged. Injuries may occur but fatalities are unlikely.

Potential Losses to Existing Development

A scenario based on an event with a 2% probability of exceedance in 50 years, was done to model a worst case scenario, as demonstrated in the 2013 State Plan. The methodology is based on probabilistic seismic hazard shaking grids developed by the U.S. Geological Survey (USGS) for the National Seismic Hazard Maps that are included with Hazus. The USGS maps provide estimates of peak ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively, which have a 2% probability of exceedance in the next 50 years. Table 3.19 depicts the estimated losses for the county based on this scenario.

Table 3.19 Estimated Earthquake Losses for Clinton County

Jurisdiction	Structural Damage	Non-Structural Damage	Contents Damage and Inventory Loss	Loss Ratio (%) **	Income Loss	Total Economic Loss to Buildings ***
Clinton County	$2,983,000	$8,486,000	$2,475,000	.53	$2,979,000	$16,923,000

(Source: Hazus 2.1)
**Loss ratio is the sum of structural and nonstructural damage divided by the entire building inventory value within a county
***Total economic loss to buildings includes inventory loss, relocation loss, capital-related loss, wages loss, and rental income loss
****Note: Total loss numbers provide an estimate of total losses and due to rounding, these numbers may differ slightly from the glob al summary report outputs from HAZUS

Impact of Previous and Future Development

Future development is not expected to increase the risk other than contributing to the overall exposure of potential damage.

Hazard Summary by Jurisdiction

Since the earthquake intensity is not likely to vary greatly across the planning area, the risk will be the same throughout. As previously stated, damages could differ in communities that have older structures. Table 3.20 list the timeframe structures were built in the county's jurisdictions.

Table 3.20 Age of Housing Structures in Clinton County

Year Structure Built	Clinton County	Cameron	Holt	Gower	Lathrop	Plattsburg	Trimble	Turney
2014 or later	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2010 to 2013	0.6%	0.0%	0.0%	0.7%	1.5%	0.0%	1.1%	0.0%
2000 to 2009	17.9%	14.2%	8.8%	8.7%	17.4%	7.0%	13.7%	0.0%
1980 to 1999	28.5%	26.6%	29.6%	24.8%	26.9%	20.2%	30.3%	16.4%
1960 to 1979	28.9%	32.0%	14.4%	48.5%	34.9%	30.5%	33.1%	29.5%
1940 to 1959	7.2%	8.2%	19.2%	4.1%	9.3%	11.6%	5.6%	16.4%
1939 or earlier	16.9%	19.0%	28.0%	13.3%	10.0%	30.7%	16.2%	37.7%
Total # of Housing Units	8,888	2,900	216	632	970	1,097	295	74

(Source: http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml)

Problem Statement

Based on intensity damage description in Figure 3.6, a 7.6 magnitude earthquake along the New Madrid fault may result in slight damage to older, poorly built structures, if any. Twenty-eight percent or higher of the housing structures in Holt, Plattsburg and Turney were built prior to 1940 and may be impacted more by an earthquake. Impact to older homes can be somewhat mitigated during remodeling and renovation. Potential damages to future development can be mitigated by all jurisdictions adopting and enforcing IBC 2012 building codes.

3.4.4 Extreme Heat

Hazard Profile

Hazard Description

Extreme temperature events, both hot and cold, can impact human health and mortality, natural ecosystems, agriculture and other economic sectors. The remainder of this section profiles extreme heat. According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Ambient air temperature is one component of heat conditions, with relative humidity being the other. The relationship of these factors creates what is known as the apparent temperature. The Heat Index chart shown in Figure 3.9 uses both of these factors to produce a guide for the apparent temperature or relative intensity of heat conditions.

Figure 3.9. Heat Index (HI) Chart

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

(Source: National Weather Service)
Note: Exposure to direct sun can increase Heat Index values by as much as 15°F. The shaded zone above 105°F corresponds to a HI that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

Geographic Location

Extreme heat is an area-wide hazard event, and that the risk of extreme heat does not vary across the planning area.

Severity/Magnitude/Extent

Extreme heat can cause stress to crops and animals. According to USDA Risk Management Agency, losses to insurable crops during the 10-year time period from 2007 to 2016 were $122,401.00. Extreme heat can also strain electricity delivery infrastructure overloaded during peak use of air conditioning during extreme heat events. Another type of infrastructure damage from extreme heat is road damage. When asphalt is exposed to prolonged extreme heat, it can cause buckling of asphalt-paved roads, driveways, and parking lots.

From 1988-2011, there were 3,496 fatalities in the U.S. attributed to summer heat. This translates to an annual national average of 146 deaths. During the same period, no deaths were recorded in the planning area, according to NCDC data. The National Weather Service stated that among natural hazards, no other natural disaster—not lightning, hurricanes, tornadoes, floods, or earthquakes—causes more deaths.

Those at greatest risk for heat-related illness include infants and children up to five years of age, people 65 years of age and older, people who are overweight, and people who are ill or on certain medications. However, even young and healthy individuals are susceptible if they participate in strenuous physical activities during hot weather. In agricultural areas, the exposure of farm workers, as well as livestock, to extreme temperatures is a major concern.

Table 3.21 lists typical symptoms and health impacts due to exposure to extreme heat.

Table 3.21. Typical Health Impacts of Extreme Heat

Heat Index (HI)	Disorder
80-90° F (HI)	Fatigue possible with prolonged exposure and/or physical activity
90-105° F (HI)	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and/or physical activity
105-130° F (HI)	Heatstroke/sunstroke highly likely with continued exposure

(Source: National Weather Service Heat Index Program, www.weather.gov/os/heat/index.html)

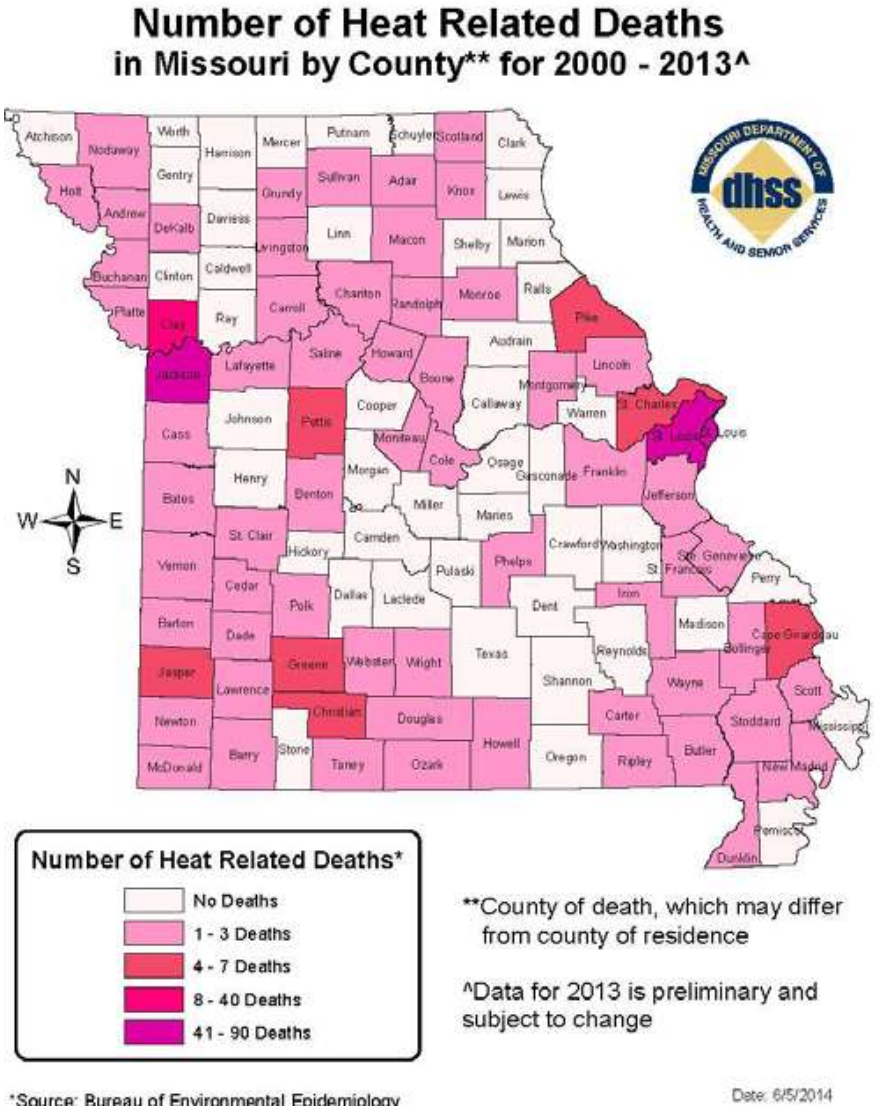
The National Weather Service has an alert system in place (advisories or warnings) when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. A common guideline for issuing excessive heat alerts is when for two or more consecutive days: (1) when the maximum daytime Heat Index is expected to equal or exceed 105 degrees Fahrenheit (°F); and the night time minimum Heat Index is 80°F or above. A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees.

Previous Occurrences

The NCDC database reports two events of heat from 1995-2015, with no deaths in Clinton County. No crop damage reported. An upper level ridge of high pressure, persisted across the area from August 6th through August 17th. The combination of heat and humidity, produced heat index readings in the 105 to 115 degree range in 2007 and unusually strong upper level ridge of high pressure, dominated the central United States with very hot and dry conditions, from July 18th through 25th 2012. Temperatures topped out from 100 to 110 degrees in 2012.

Figure 3.10 shows the number of heat related deaths in Clinton County between 2000-2013. The map illustrates in light pink that between no deaths occurred due heat during this timeframe.

Figure 3.10. Heat Related Deaths in Missouri 2000 - 2013



Probability of Future Occurrence

There are two recorded heat events in the National Climatic Data Center (NCDC) database from 1995 to 2017 for Clinton County. No injuries or property or crop damage associated with these events in the NCDC data for Clinton County.

The probability that an extreme heat event will occur in Clinton County in any given year is 14.5 percent. This equates to dividing 29 years with two the number of events. Data limitation indicates that extreme heat events could be underreported in the NCDC.

Vulnerability

Vulnerability Overview

High humidity, which often accompanies heat in Missouri, can make the effects of heat even more harmful. While heat-related illness and death can occur from exposure to intense heat in just one afternoon, heat stress on the body has a cumulative effect. Consequently, the persistence of a heat wave increases the threat to public health. The people most at risk are children under five years of age and adults over the age of 65 as well as people who work outdoors. The agriculture sector can also suffer crop loss during periods of extreme heat. Extreme heat may also cause buckling of roads.

Potential Losses to Existing Development

For agricultural losses, the USDA Crop Insurance payments during the 10-year period from 2007 – 2016 were used and annualized to determine an average annual loss. Losses from heat totaled $122,401.00 and this equates to $12,240.10 in average annual losses countywide.

Impact of Previous and Future Development

Population growth can result in increases in the age-groups that are most vulnerable to extreme heat. Population growth also increases the strain on electrical infrastructure, as more electricity is needed to accommodate the growing population. Although some jurisdictions are experiencing an increase in population, it is not significant enough to change the jurisdiction's vulnerability.

Hazard Summary by Jurisdiction

Those at greatest risk for heat-related illness and deaths include children up to five years of age, people 65 years of age and older, people who are overweight, and people who are ill or on certain medications. To determine jurisdictions within the planning area with populations more vulnerable to extreme heat, demographic data was obtained from the 2010 census on population percentages in each jurisdiction comprised of those under age 5 and over age 65. Data was not available for overweight individuals and those on medications vulnerable to extreme heat. Table 3.22 below summarizes vulnerable populations in the participating jurisdictions. Note that school and special districts are not included in the table because students and those working for the special districts are not customarily in these age groups.

Table 3.22. County Population Under Age 5 and Over Age 65, 2016 Census Data

Jurisdiction	Population Under 5 Yrs	Percentage Under 5 Yrs	Population 65 Yrs and Over	Percentage 65 Yrs and Over
Clinton County	1121	5.5%	53,495	17.1%
City of Cameron	424	4.2%	1,518	15.0%
City of Gower	115	7.3%	306	19.5%
City of Lathrop	135	6.0%	329	14.6%
City of Holt	32	6.4%	72	14.5%
City of Plattsburg	130	5.7%	440	19.1%
City of Trimble	49	7.4%	81	12.3%
Village of Turney	4	3.6%	18	16.4%

(Source: U.S. Census Bureau, 2016 American Community Survey (includes entire population of each city or county)

Mid-Buchanan School District School went from having 50% to 100% air-conditioned facilities in 2015, significantly decreasing the number of days that school closed early due to heat. The school

districts do not have policies mandating closure during high heat events, but monitor the situation and make school closures accordingly.

Problem Statement

Older and younger segments of the population are more vulnerable to the impact of extreme heat. In addition, people living in poverty may be more vulnerable during periods of extreme heat due to a lack of air conditioning or utilities in their homes. Institutionalized populations such as those living in nursing homes become more vulnerable to extreme heat due to power outages. This problem has been mitigated due to the installation of emergency generators at a number of these facilities. Churches and the senior center are aware of many of the vulnerable citizens. The jurisdictions can expand their partnerships with local community organizations who donate fans and offer weatherization programs to vulnerable populations in the county.

3.4.5 Fires (Urban/Structural and Wild)

Hazard Profile

Hazard Description

The incident types considered for urban/structural fire include all fires in the following categories: 1) general fires, 2) structure fire, 3) fire in mobile property used as a fixed structure, and 4) mobile property (vehicle) fire. The fire incident types for wildfires include: 1) natural vegetation fire, 2) outside rubbish fire, 3) special outside fire, and 4) cultivated vegetation, crop fire.

The Missouri Division of Fire Safety (MDFS) indicates that approximately 80 percent of the fire departments in Missouri are staffed with volunteers. Whether paid or volunteer, these departments are often limited by lack of resources and financial assistance. The impact of a fire to a single-story building in a small community may be as great as that of a larger fire to a multi-story building in a large city.

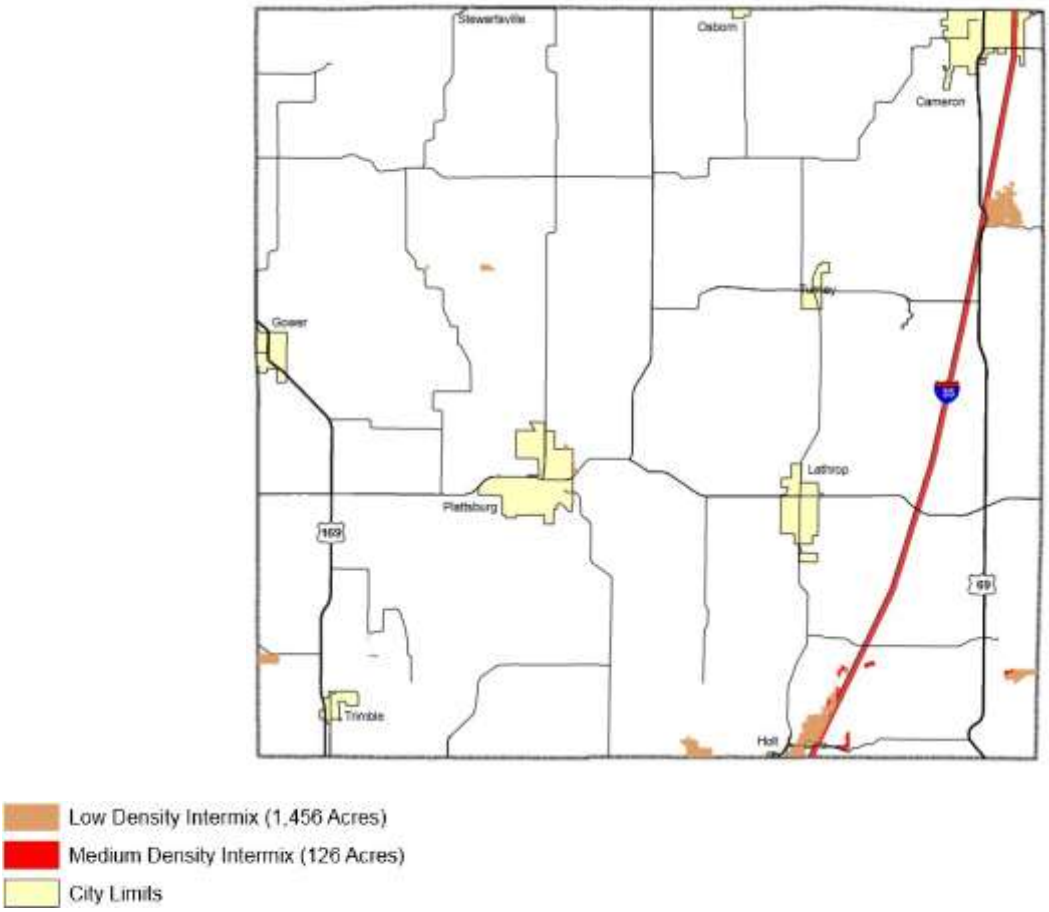
The Forestry Division of the Missouri Department of Conservation (MDC) is responsible for protecting privately owned and state-owned forests and grasslands from wildfires. To accomplish this task, eight forestry regions have been established in Missouri for fire suppression. The Forestry Division works closely with volunteer fire departments and federal partners to assist with fire suppression activities. Currently, more than 900 rural fire departments in Missouri have mutual aid agreements with the Forestry Division to obtain assistance in wildfire protection if needed.

Most of Missouri fires occur during the spring season between February and May. The length and severity of both structural and wildland fires depend largely on weather conditions. Spring in Missouri is usually characterized by low humidity and high winds. These conditions result in higher fire danger. In addition, due to the recent lack of moisture throughout many areas of the state, conditions are likely to increase the risk of wildfires. Drought conditions can also hamper firefighting efforts, as decreasing water supplies may not prove adequate for firefighting. It is common for rural residents burn their garden spots, brush piles, and other areas in the spring. Some landowners also believe it is necessary to burn their forests in the spring to promote grass growth, kill ticks, and reduce brush. Therefore, spring months are the most dangerous for wildfires. The second most critical period of the year is fall. Depending on the weather conditions, a sizeable number of fires may occur between mid-October and late November.

Geographic Location

The risk of structural fire probably does not vary widely across the planning area. However, damages due to wildfires would be higher in communities with more wildland–urban interface (WUI) areas. The term refers to the zone of transition between unoccupied land and human development and needs to be defined in the plan. Within the WUI, there are two specific areas identified: 1) Interface and 2) Intermix. The interface areas are those areas that abut wildland vegetation and the Intermix areas are those areas that intermingle with wildland areas. Figure 3.11 is a WUI map of Clinton County, that identifies the density intermix. Intermix is mostly located near Holt and several miles south of Cameron, near Wallace State Park. There is no interface in the county.

Figure 3.11 Wildland—Urban Interface and Intermix Areas in Clinton County



(Source: silvis.forest.wisc.edu/maps/wui)

Severity/Magnitude/Extent

Structural and urban fires are a daily occurrence throughout the State. Statewide, approximately 100 fatalities occur annually, as well as numerous injuries affecting the lives of the victims, their families, and many others—especially those involved in fire and medical services. Unlike other disasters, structural fires can be caused by human criminal activity: arson. All citizens pay the costs of arson whether through increased insurance rates, higher costs to maintain fire and medical services, or the costs of supporting the criminal justice system.

Wildfires damage the environment, killing some plants and occasionally animals. Firefighters have been injured or killed, and structures can be damaged or destroyed. The loss of plants can heighten the risk of soil erosion and landslides. Although Missouri wildfires are not the size and intensity of those in the Western United States, they could impact recreation and tourism in and near the fires.

Wildland fires in Missouri have been mostly a result of human activity rather than lightning or some other natural event. Wildfires in Missouri are usually surface fires, burning the dead leaves on the ground or dried grasses. They do sometimes “torch” or “crown” out in certain dense evergreen stands like eastern red cedar and shortleaf pine. However, Missouri does not have the extensive stands of evergreens found in the western US that fuel the large fire storms seen on television news stories.

While very unusual, crown fires can and do occur in Missouri native hardwood forests during prolonged periods of drought combined with extreme heat, low relative humidity, and high wind. Tornadoes, high winds, wet snow and ice storms in recent years have placed a large amount of woody material on the forest floor that causes wildfires to burn hotter and longer. These conditions also make it more difficult for fire fighters suppress fires safely.

Often wildfires in Missouri go unnoticed by the general public because the sensational fire behavior that captures the attention of television viewers is rare in the state. Yet, from the standpoint of destroying homes and other property, Missouri wildfires can be quite destructive.

Previous Occurrences

According to MDC Wildfire Data, there have been 865 fires reported in Clinton County from July 2002 to February 2018. A total of 8,985.59 acres burned as a result of these reported fires. The highest number of fires was 110 in 2012, burning 539.13 acres, followed by 106 fires in 2009, burning 1,729.21 acres.

Probability of Future Occurrence

Based on the fire reporting statistics from the MDC in Table 3.24, there were a total of 865 reported wildfires from July 2002 – February 2018 (188 months). This equates to an average of 4.60 wildfire events a month or 55.21 annually and a 100% probability of occurrence in any given year.

Vulnerability

Vulnerability Overview

The 2013 State Plan provides the detailed statistical data that was used for the vulnerability analysis for urban/structural fire for each county. See the 2013 State Plan (page 3.491) for specific data explanations. According to this data, the average annual number of fires in Missouri was 23,051 causing estimated total annual average damages in the amount of $3,709,720,410. The table that follows provides the results for the overall vulnerability rating calculated by assigning an equal weight to each of the five contributing factors. National Fire Incident Reporting System (NFIRS) data from 2004 to 2008 was used to determine vulnerability it is stated in the State Plan. However, only 61 percent of fire departments in Missouri reported to the NFIRS.

Table 3.24 Statistical Data and Factor Rating for Wildfire Vulnerability, 2004-2012

Jurisdiction	Average Annual # of Wildfires	Likelihood Rating	Acres Burned	Average Annual Acres Burned	Average Acres Burned Rating	Total Buildings Damaged	Overall Vulnerability
Clinton County	44.9	Medium-low	3817.58	424	Medium	2	Medium

(Source: 2013 State Plan)

Wildfires occur throughout wooded and open vegetation areas of Missouri. They can occur any time of the year, but mostly occur during long, dry hot spells. Any small fire, if not quickly detected and suppressed, can get out of control. Most wildfires are caused by human carelessness or negligence. However, some are precipitated by lightning strikes and in rare instances, spontaneous combustion. Structures and people in WUI areas in the county and cities are more vulnerable to the impact of wildfires due to the level of fuel mixed with structures.

Potential Losses to Existing Development

Individual jurisdiction data is not readily available for the area.

Impact of Previous and Future Development

It is anticipated that there will be future development in WUI areas throughout unincorporated areas of the county. Future growth in WUI areas of the county will increase the risk and exposure to wildfires. It is expected that WUI development in cities will be mitigated by development regulations reducing the risk to wildfire hazard.

Hazard Summary by Jurisdiction

Cameron, the largest community, reported no death or injuries due to fire of any type in the last 15 years. Table 3.25 summarizes the structure exposure for Clinton County, as stated in the 2013 State Plan.

Table 3.25 Statistical Data and Factor Ratings for Urban/Structure Fire Vulnerability, 2004-2008

	County Housing Units /sq. mi.	Housing Density Rating	Total Building Exposure	Building Exposure Rating	Average Annual Property Loss	Property Loss Ratio Rating	Total Death	Total Injuries	Overall Vulnerability Rating
Clinton County	21.2	Low	$2,143,758,000	Medium-High	$762,583	Medium	8	4	Medium

(Source: 2013 State Plan)

Problem Statement

Wildfire occurrence is frequent within Clinton County. These events can destroy, damage, and threaten structures in hazard prone areas. Populations and structures in WUI areas of the county have an increased risk to wildfires due to the level of fuel mixed with structures. Cities that have adopted landscape ordinances can include fire safe landscape design requirements in these areas. The school districts that have facilities located in WUI areas, have a slightly elevated risk of wildfire due to the proximate amount of fuel present.

The county and its communities can promote fire resistant construction materials and landscape design techniques to mitigate the risk to wildfire in future development. Information about these materials and techniques are included in the MDC publication, “Living with Wildfire”. Including this information to education and awareness programs for the public may potentially mitigate wildfire damage in the county.

3.4.6 Flooding (Flash and River)

Profile

Hazard Description

A flood is partial or complete inundation of normally dry land areas. Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt, or ice. There are several types of riverine floods, including headwater, backwater, interior drainage, and flash flooding. Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt or ice melt. The areas adjacent to rivers and stream banks that carry excess floodwater during rapid runoff are called floodplains. A floodplain is defined as the lowland and relatively flat area adjoining a river or stream. The terms “base flood” and “100- year flood” refer to the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year. Floodplains are part of a larger entity called a basin, which is defined as all the land drained by a river and its branches.

Flooding caused by dam and levee failure is discussed in Section 3.4.1 and Section 3.4.8 respectively. It will not be addressed in this section.

A flash flood occurs when water levels rise at an extremely fast rate as a result of intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Flash flooding can happen in Special Flood Hazard Areas (SFHAs) as delineated by the National Flood Insurance Program (NFIP), and can also happen in areas not associated with floodplains.

Ice jam flooding is a form of flash flooding that occurs when ice breaks up in moving waterways, and then stacks on itself where channels narrow. This creates a natural dam, often causing flooding within minutes of the dam formation.

In some cases, flooding may not be directly attributable to a river, stream, or lake overflowing its banks. Rather, it may simply be the combination of excessive rainfall or snowmelt, saturated ground, and inadequate drainage. With no place to go, the water will find the lowest elevations – areas that are often not in a floodplain. This type of flooding, often referred to as sheet flooding, is becoming increasingly prevalent as development outstrips the ability of the drainage infrastructure to properly carry and disburse the water flow.

Most flash flooding is caused by slow-moving thunderstorms or rain events repeatedly moving over the same area. Flash flooding is a dangerous form of flooding which can reach full peak in only a few minutes. Rapid onset allows little or no time for protective measures. Flash flood waters move at very fast speeds and can move boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. Flash flooding can result in higher loss of life, both human and animal, than slower developing river and stream flooding.

In certain areas, aging storm sewer systems are not designed to carry the capacity currently needed to handle the increased storm runoff. Typically, the result is water backing into basements, which damages mechanical systems and can create serious public health and safety concerns. This combined with rainfall trends and rainfall extremes all demonstrate the high probability, yet generally unpredictable nature of flash flooding in the planning area.

Although flash floods are somewhat unpredictable, there are factors that can point to the likelihood of flash floods occurring. Weather surveillance radar is being used to improve monitoring capabilities of

intense rainfall. This, along with knowledge of the watershed characteristics, modeling techniques, monitoring, and advanced warning systems has increased the warning time for flash floods.

Geographic Location

Riverine flooding is most likely to occur in SFHAs. Maps in Figures 3.12 to 3.18 shows SFHA's for Clinton County and jurisdictions that have a 100-year flood plain in their city limits. The 100-year flood plain boundaries are based on Hazus MH 3.2, which closely, but not completely, follows the preliminary Flood Insurance Rate Maps (FIRMs). According to these maps no schools or critical facilities are located in SFHAs. A number of critical and essential facilities are identified on the community flood plain maps.

Figure 3.12 Clinton County 100-Year Flood Plain

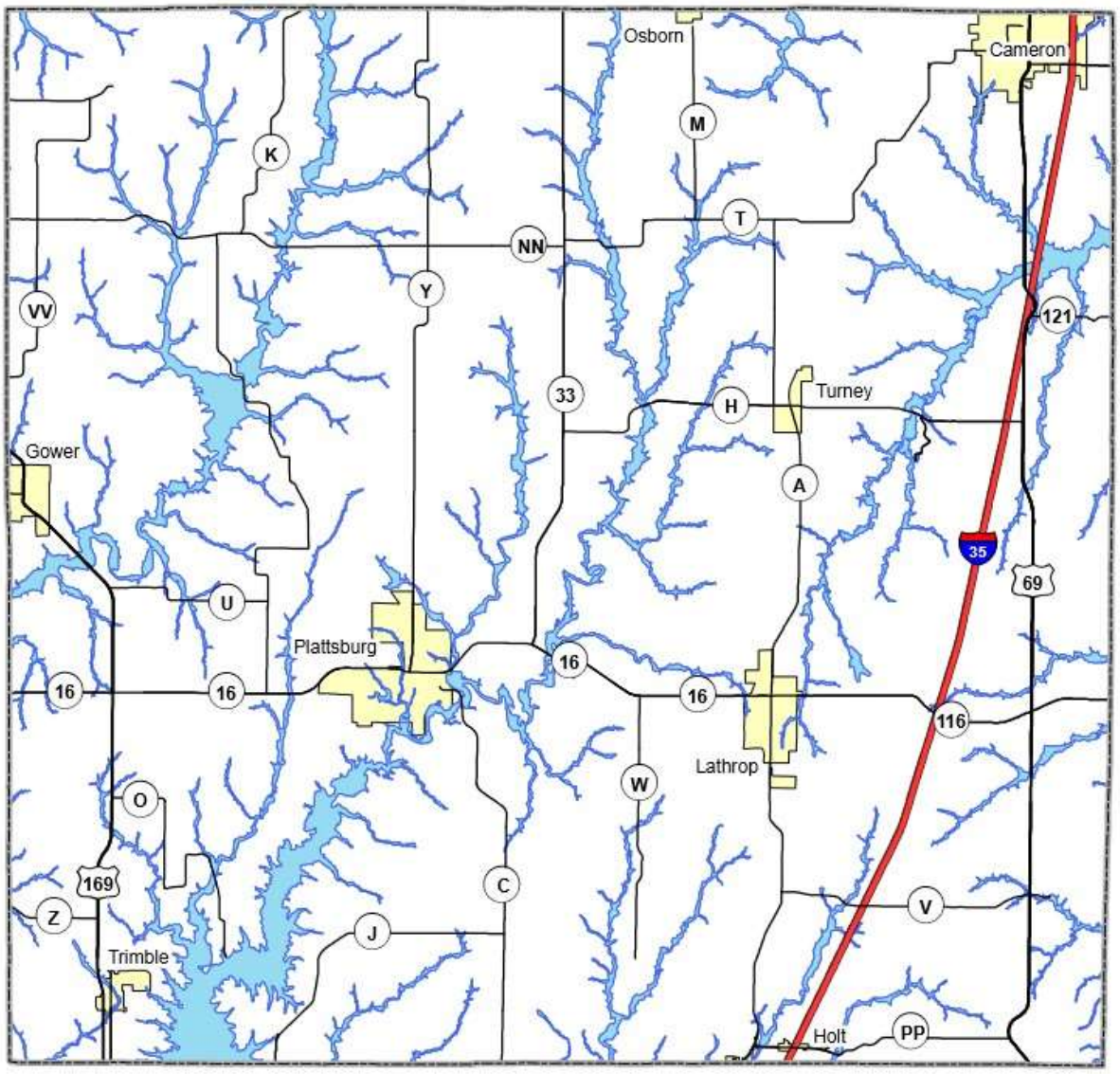


Figure 3.13 **Cameron 100-Year Flood Plain**

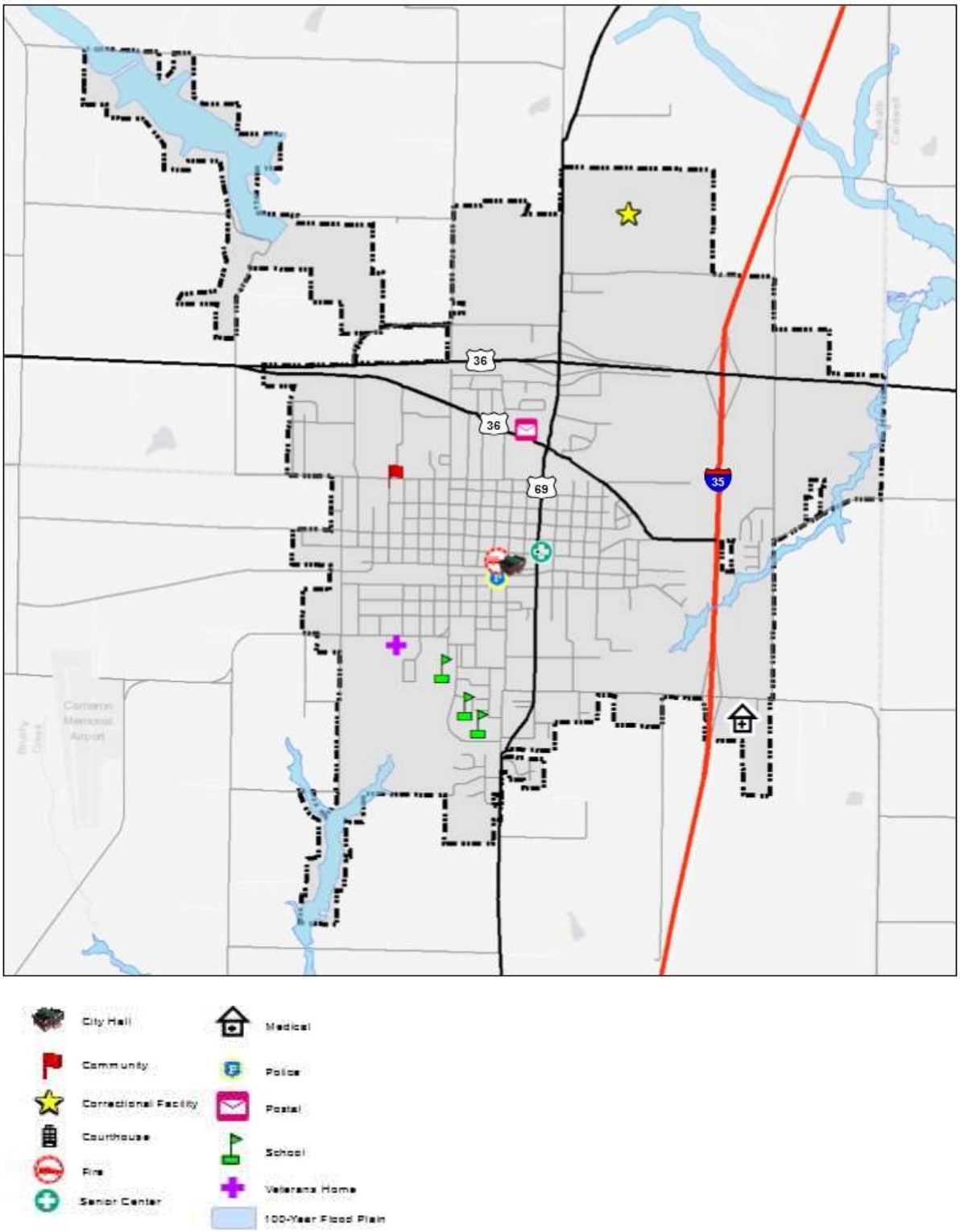
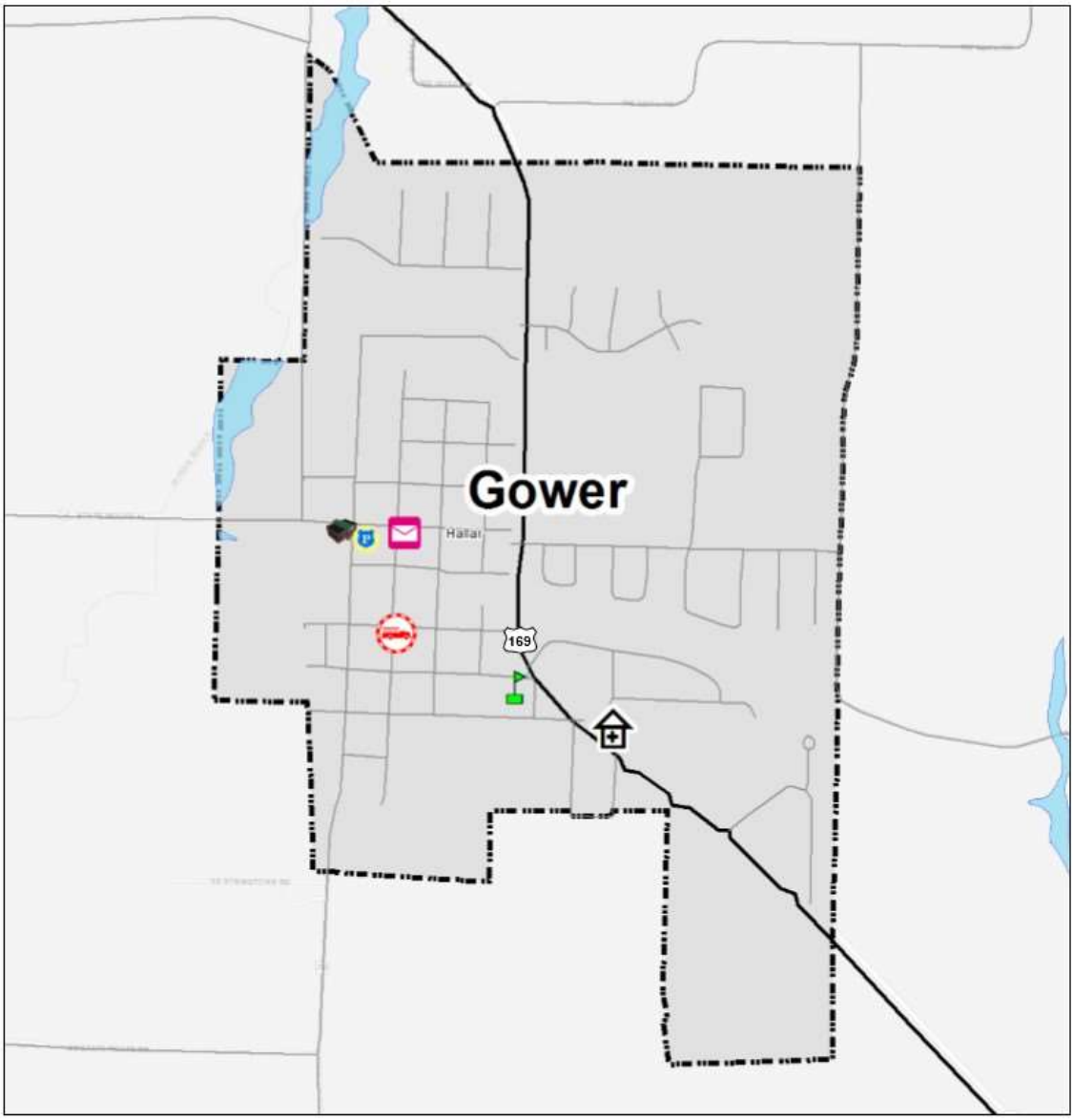


Figure 3.14 **Gower 100-Year Flood Plain**



City Hall
Fire
Medical
Police
Postal
School
100-Year Flood Plain

Figure 3.15 **Holt 100-Year Flood Plain**

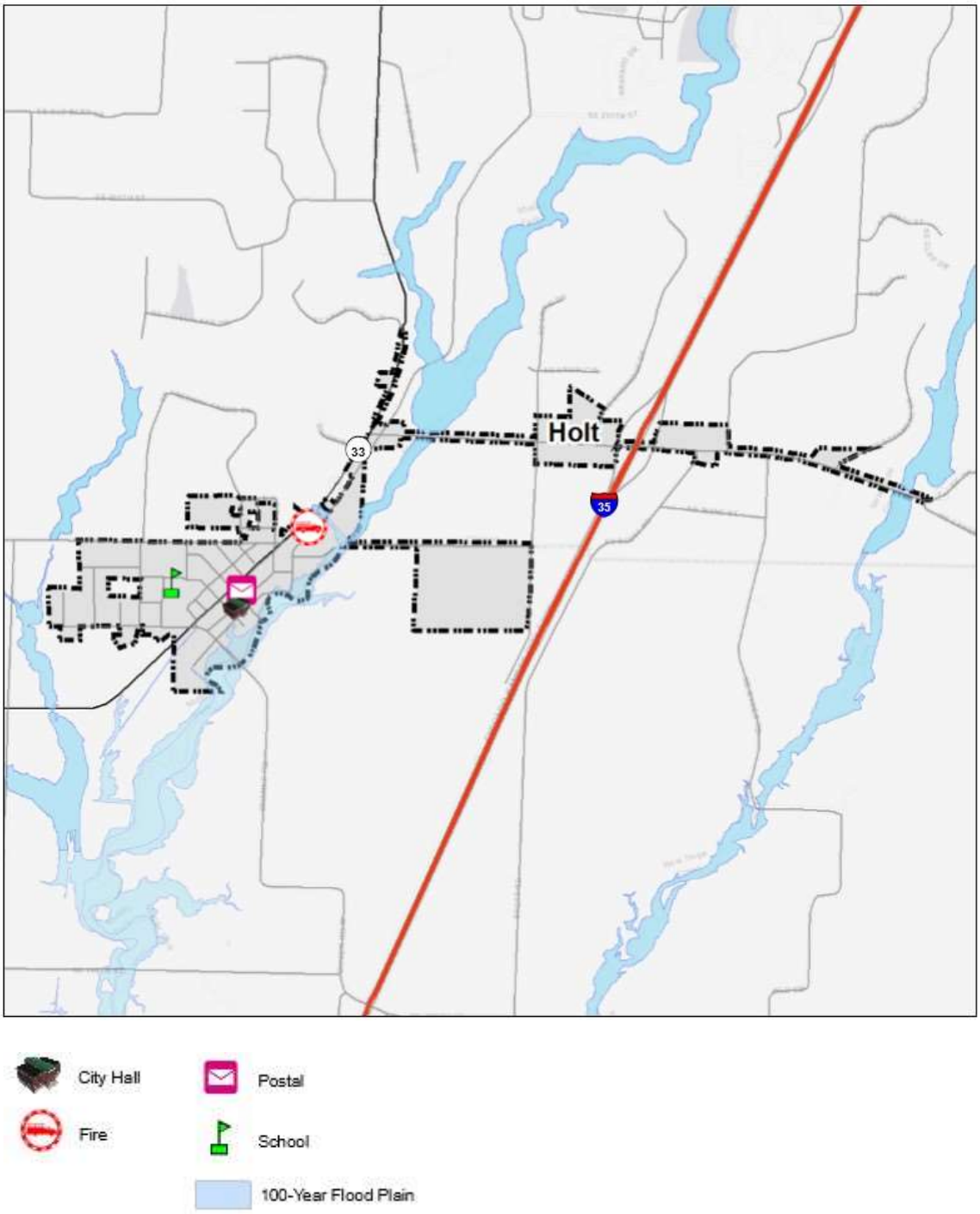


Figure 3.16 **Lathrop 100-Year Flood Plain**

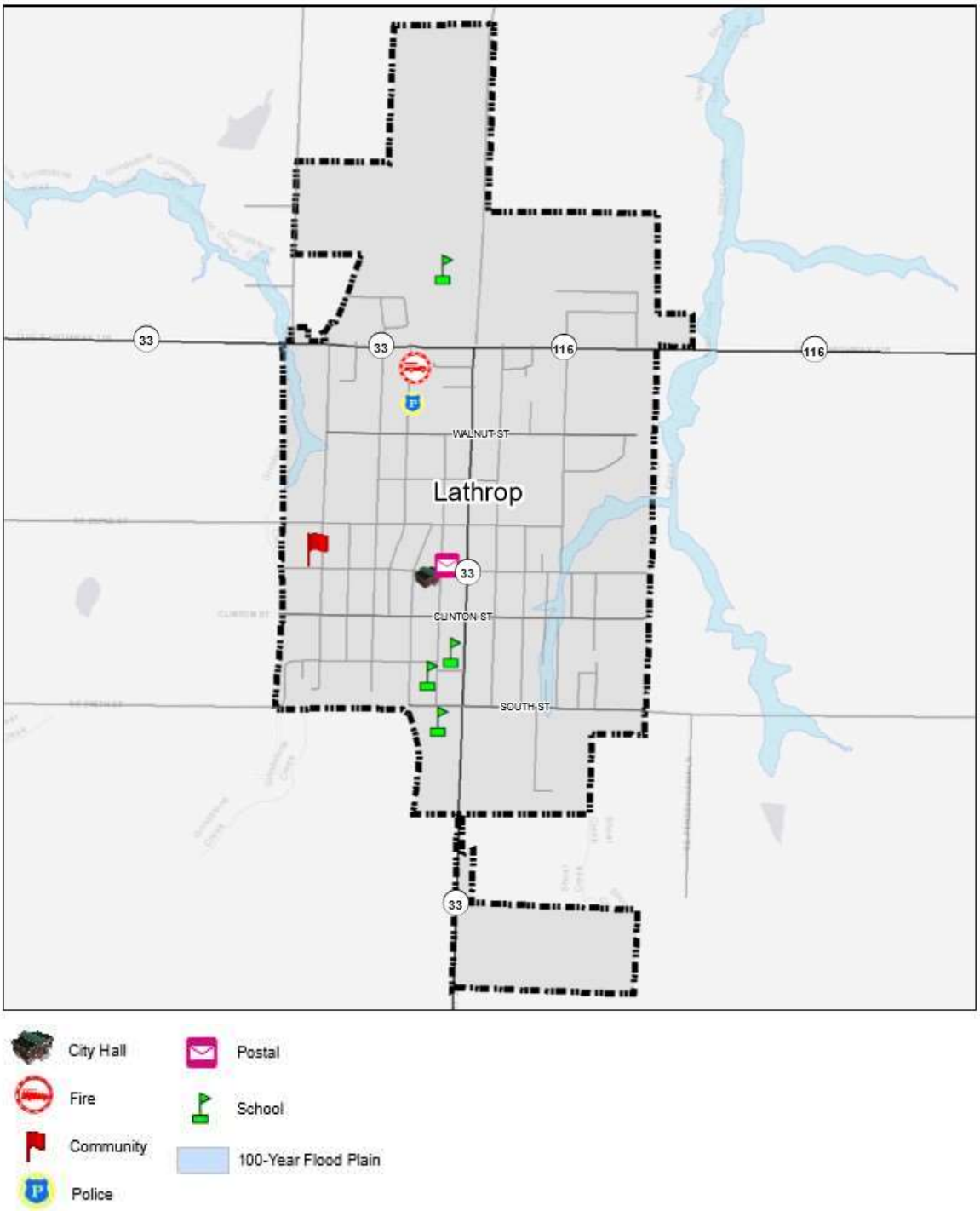
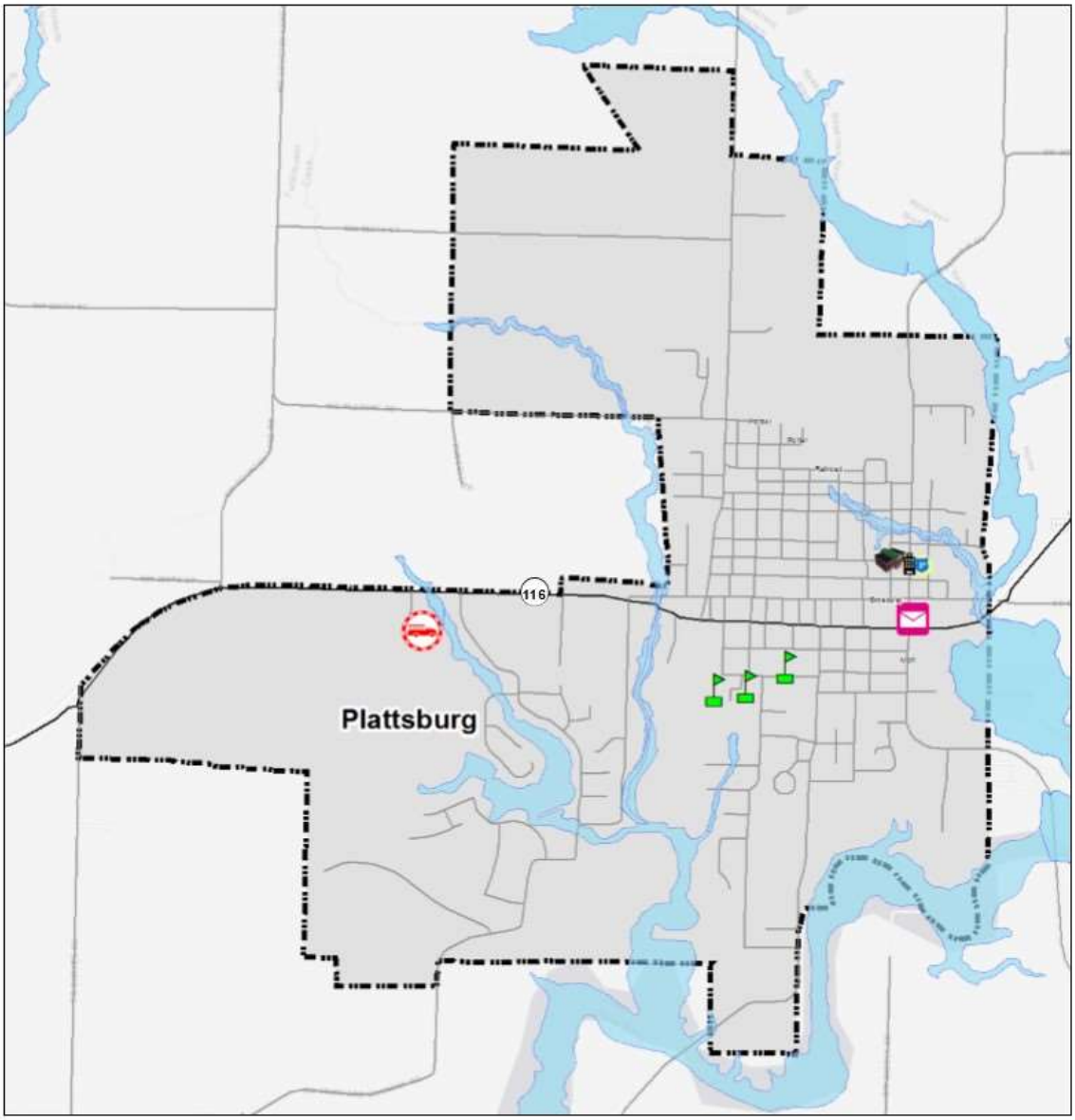
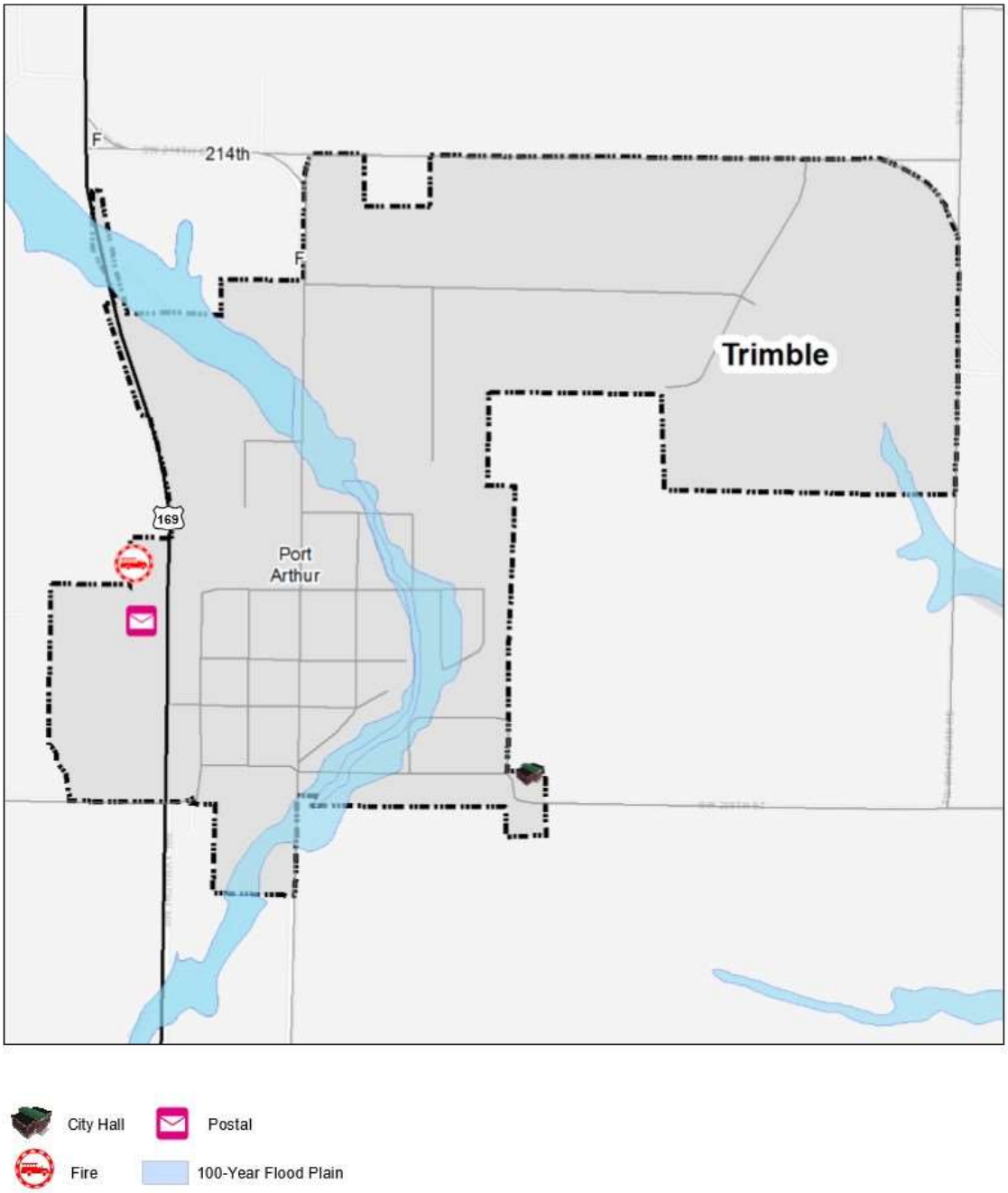


Figure 3.17 **Plattsburg 100-Year Flood Plain**



City Hall
Fire
Police
Courthouse
Postal
School
100-Year Flood Plain

Figure 3.18 **Trimble 100-Year Flood Plain**



There is no 100-year flood plain in Turney city limits and information for Grayson was not available.

Flash flooding events pose the most pervasive hazard of the two flood types in the county due to permeability of soils, slopes, increasing urban development and extensive network of streams and rivers. Sustained rainfall or downpours at the rate of one inch per hour have caused street flooding in incorporated areas and made a significant number of low water crossings impassible. In the instances of low water crossings, flash flooding occurs in the floodplain while low-lying areas in all jurisdictions are susceptible to flash floods outside the 100-year floodplain. They also occur in areas without adequate drainage to carry away the amount of water that falls during intense rainfall events.

A review of the NCDC storm event database determined which jurisdictions are most prone to flash flooding from 1996 to December 2017. These are listed in Table 3.26.

Table 3.23. Clinton County NCDC Flood Events by Location, 1996-2017

Location	# of Events
Clinton County Unincorporated	5
Cameron - 5/7/2007	1
Perrin – 5/4/2015	1
Total	**7**

(Source: National Climatic Data Center)

Flash flooding occurs in SFHAs and those locations in the planning area that are low-lying. They also occur in areas without adequate drainage to carry away the amount of water that falls during intense rainfall events. Table 3.24 shows the number of flash flood events by location recorded in NCDC for the 21-year period. NCDC event narratives may show that a given stretch of road is repeatedly underwater during flash flood events, so this information is included in the risk assessment.

Table 3.24. Clinton County NCDC Flash Flood Events by Location, 1996-2017

Location	# of Events
Perrin – 6/16/1996, 09/18/2004	2
Plattsburg – 05/29/2004, 06/21/2015, 07/06/2015	3
Turney – 08/16/2009, 06/26/2015	2
Gower – 08/16/2009	1
Gridley – 06/04/2010, 05/17/2015, 05/17/2015	3
Converse – 05/16/2015	1
Total	**12**

(Source: National Climatic Data Center)

Severity/Magnitude/Extent

Missouri has a long and active history of flooding over the past century, according to the 2013 State Hazard Mitigation Plan. Flooding along Missouri's major rivers generally results in slow-moving disasters. River crest levels are forecast several days in advance, allowing communities downstream sufficient time to take protective measures, such as sandbagging and evacuations. Nevertheless, floods exact a heavy toll in terms of human suffering and losses to public and private property. By contrast, flash flood events in recent years have caused a higher number of deaths and major property damage in many areas of Missouri.

Flooding presents a danger to life and property, often resulting in injuries, and in some cases, fatalities. Floodwaters themselves can interact with hazardous materials. Hazardous materials stored in large containers could break loose or puncture as a result of flood activity. Examples are bulk propane tanks. When this happens, evacuation of citizens is necessary.

Public health concerns may result from flooding, requiring disease and injury surveillance. Community sanitation to evaluate flood-affected food supplies may also be necessary. Private water and sewage sanitation could be impacted, and vector control (for mosquitoes and other entomology concerns) may be necessary.

When roads and bridges are inundated by water, damage can occur as the water scours materials around bridge abutments and gravel roads. Floodwaters can also cause erosion undermining road beds. In some instances, steep slopes that are saturated with water may cause mud or rock slides

onto roadways. These damages can cause costly repairs for state, county, and city road and bridge maintenance departments. When sewer back-up occurs, this can result in costly clean-up for home and business owners as well as present a health hazard.

National Flood Insurance Program (NFIP) Participation

Table 3.27 lists NFIP participation in the planning area. Table 3.28 lists the number of policies in force, amount of insurance in force, number of closed losses, and total payments for each jurisdiction.

Table 3.27. NFIP Participation in Clinton County

Community ID	Jurisdiction	NFIP Participant (Y/N)	Current Effective Map Date	Regular- Emergency Program Entry Date
290799	Clinton County	Y	04/04/11	06/18/87
290104	City of Cameron	Y	04/04/11 (M)	8/24/84
290105	City of Gower	Y	04/04/11 (M)	7/18/85
290093A	City of Holt	Y	08/03/15	4/17/80
290704	City of Lathrop	Y	04/04/11 (M)	7/18/85
290106	City of Plattsburg	Y	04/04/11	2/2/83
290510	City of Trimble	Y	04/04/11	4/1/82

(Source: NFIP Community Status Book, 9/26/2013; BureauNet, http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book; M= No elevation determined – all Zone A, C, and X: NSFHA = No Special Flood Hazard Area; E=Emergency Program)

Table 3.28. NFIP Policy and Claim Statistics as of January 2018

Community Name	Policies in Force	Insurance in Force	Closed Losses	Total Payments
Clinton County	4	$459,500	--	--
City of Lathrop	10	$1,521,900	2	$26,706.28
City of Plattsburg	5	$1,113,000	1	$1,992.84
City of Trimble	7	$1,033,700	1	$6,841.92

(Source: NFIP Community Status Book, [insert date]; BureauNet, http://bsa.nfipstat.fema.gov/reports/reports.html; *Closed Losses are those flood insurance claims that resulted in payment. Loss statistics are for the period from [date] to 01/31/2018).

Repetitive Loss/Severe Repetitive Loss Properties

Repetitive Loss Properties are those properties with at least two flood insurance payments of $5,000 or more in a 10-year period. According to the Flood Insurance Administration, jurisdictions included in the planning area have no repetitive loss properties.

Severe Repetitive Loss (SRL): A SRL property is defined it as a single family property (consisting of one-to-four residences) that is covered under flood insurance by the NFIP; and has (1) incurred flood-related damage for which four or more separate claims payments have been paid under flood insurance coverage with the amount of each claim payment exceeding $5,000 and with cumulative amounts of such claims payments exceeding $20,000; or (2) for which at least two separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property. There are no validated Severe Repetitive Loss residential structure located in Clinton County.

Previous Occurrences

Past Presidential Flooding Disaster Declarations in Clinton County and their impact are listed in Table 3.29.

Table 3.29 Presidential Disaster Declarations for Flood, 1975-2017

Date	Declaration #	Disaster
July 9, 1993	DR 995	Flooding, severe storm (IA)(PA)
May 6, 2003	DR 1463	Severe storms, tornado and flooding (IA)
June 11, 2004	DR 1524	Severe Storms, Tornadoes, and Flooding (IA)
June 11, 2007	DR 1708	Severe storms and flooding (IA)
August 17, 2010	DR 1934	Severe storms, flooding and tornado (PA)

(Source: 2013 State Plan)

Tables 3.30 and 3.31 are based off NCDC information for the last 22 years for both flash and river flooding.

Table 3.30. NCDC Clinton County Flash Flood Events Summary, 1996 to 2017

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
1996	1	0	0	0	0
2004	2	0	0	0	0
2009	2	0	0	$1,000	0
2010	1	0	0	0	0
2015	6	0	0	0	0
Total	**12**	**0**	**0**	**$1,000**	**0**

(Source: NCDC)

The 2009 event was during heavy rains resulting in water flowing over Highway A in Turney. One vehicle accident was reported with this flooding. A flood event in 2015 resulted in 1.5 foot of water briefly running over several roads in Plattsburg.

Table 3.31. NCDC Clinton County Riverine Flood Events Summary, 1995 to 2017

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
1998	5	0	0	0	0
2007	1	0	0	0	0
2015	1	0	0	0	0
Totals	**7**	**0**	**0**	**0**	**0**

(Source: NCDC)

The 1998 events were considered to be minor to moderate flooding while the 2007 and 2015 events reported closed roads due to 6 to 8 inches of water flowing over the roads.

Probability of Future Occurrence

Over the past 22 years, seven riverine flood events have occurred. Based on this historical data, the average is (7 floods/22 years) .32 riverine flood events occur per year. Thus, there is a 32% chance of a riverine flood occurrence in a given year.

Over the past 22 years, 12 flash flood events have occurred. Based on this historical data, the average is (12 floods/22 years), .55 flash flood events occur per year. Thus, there is a 55% chance of a flash flood occurrence in a given year.

Vulnerability

Vulnerability Overview

Since 1975, Clinton County has been included in five of the 13 Presidential Disaster Declarations. Periods of heavy rain falling at the rate of one-inch per hour floods low water crossings throughout the county making many roads impassable. This creates a severe threat to motorists that attempt to drive through flood waters over the roadway. Riverine flooding occurs less frequently than flash flooding. Fortunately, there are no repetitive loss properties in the county. Areas in low lying areas outside of the floodplain are frequently flooded. Street flooding over roadways has been reported in all communities in the county. There are no school in SFHAs in Clinton County. Increases in development add to surface runoff and can exacerbate flash flooding in areas that previously have not experienced flooding.

Potential Losses to Existing Development

Table 3.32 shows the potential loss to existing development in the event of a 100-year flood, as shown in the 2013 State Plan. In addition, 624 households would need displaced, with 57 needing shelter.

Table 3.32 Total Direct Building Loss and Income Loss to Clinton County

Jurisdiction	Structural Damage	Contents Damage	Inventory Loss	Total Direct Loss	Income Loss
Clinton County	$9,261,614.52	$8,429,883.50	$146,454.61	$17,837,952.63	$42,624.85

(Source: 2013 State Plan)

Impact of Previous and Future Development

Future development could impact flash and riverine flooding in the planning area. Development in low-lying areas near rivers and streams or where interior drainage systems are not adequate to provide drainage during heavy rainfall events can increase the risk of flood. Future development would also increase impervious surfaces causing additional water run-off and drainage problems during heavy rainfall events.

Hazard Summary by Jurisdiction

Many areas are in the county are potentially at risk to flood hazards and exposure of assets in SFHAs varies among jurisdictions. It should be noted that all communities in Clinton County can be impacted by the flooding of major roads and low water crossings. There are no school facilities in SFHAs and no previous damages were reported on the Data Collection Questionnaire for schools.

Problem Statement

Floods have been listed in five out of 13 Presidential Disaster Declarations that have included Clinton County. The county and six communities in the county participate in the NFIP. Their participation in the NFIP enables residents to purchase flood insurance. Street flooding in incorporated areas can be addressed through storm water management projects and enforce storm water management regulations.

3.4.7 Land Subsidence/Sinkholes

Hazard Profile

Hazard Description

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that naturally can be dissolved by ground water circulating through them. As the rock dissolves, spaces and caverns develop underground. The sudden collapse of the land surface above them can be dramatic and range in size from broad, regional lowering of the land surface to localized collapse. However, the primary causes of most subsidence are human activities: underground mining of coal, groundwater or petroleum withdrawal, and drainage of organic soils. In addition, sinkholes can develop as a result of subsurface void spaces created over time due to the erosion of subsurface limestone (karst).

Land subsidence occurs slowly and continuously over time, as a general rule. On occasion, it can occur abruptly, as in the sudden formation of sinkholes. Sinkhole formation can be aggravated by flooding.

In the case of sinkholes, the rock below the surface is rock that has been dissolving by circulating groundwater. As the rock dissolves, spaces and caverns form, and ultimately the land above the spaces collapse. In Missouri, sinkhole problems are usually a result of surface materials above openings into bedrock caves eroding and collapsing into the cave opening. These collapses are called “cover collapses” and geologic information can be applied to predict the general regions where collapse will occur. Sinkholes range in size from several square yards to hundreds of acres and may be quite shallow or hundreds of feet deep.

According to the U.S. Geological Survey (USGS), the most damage from sinkholes tends to occur in Florida, Texas, Alabama, Missouri, Kentucky, Tennessee, and Pennsylvania. Fifty-nine percent of Missouri is underlain by thick, carbonate rock that makes Missouri vulnerable to sinkholes. Sinkholes occur in Missouri on a fairly frequent basis. Most of Missouri‘s sinkholes occur naturally in the State‘s karst regions (areas with soluble bedrock). They are a common geologic hazard in southern Missouri, but also occur in the central and northeastern parts of the State. Missouri sinkholes have varied from a few feet to hundreds of acres and from less than one to more than 100 feet deep. The largest known sinkhole in Missouri encompasses about 700 acres in western Boone County southeast of where Interstate 70 crosses the Missouri River. Sinkholes can also vary is shape like shallow bowls or saucers whereas other have vertical walls. Some hold water and form natural ponds.

Other potential causes of collapse include man-made features such as septic tanks, cisterns, pipelines, and old hand-dug wells and shallow mine workings, all of which lose their structural integrity as they age. However, unlike sinkholes, these features normally remain stable once remediated. Clinton County has had 86 mineral mines.

Geographic Location

There are no known documented sinkholes in Clinton County.

Severity/Magnitude/Extent

Sinkholes vary in size and location, and these variances will determine the impact of the hazard.

Previous Occurrences

Although the 2013 State Plan states that sinkholes are a regular occurrence in Missouri, they are rarely events of any significance. There are no documented sinkholes occurrences in the county.

Probability of Future Occurrence

Since there are no records of previous event dates in the planning area, the probability of a future occurrence cannot be calculated.

Vulnerability

Vulnerability Overview

Clinton County has not experienced any sinkhole events.

Potential Losses to Existing Development

It is difficult to estimate future losses based on historical losses since no known losses have occurred.

Impact of Previous and Future Development

Even though Missouri has a moderate probability of a sinkhole event, the soil and subsoil structure of Clinton County make significant land movement events unlikely.

Hazard Summary by Jurisdiction

Clinton County has not experienced any sinkhole events.

Problem Statement

Even though the county has not experienced any sinkhole events jurisdictions should be mindful that an event could occur.

3.4.8 Levee Failure

Hazard Profile

Hazard Description

Levees are earth embankments constructed along rivers and coastlines to protect adjacent lands from flooding. Floodwalls are concrete structures, often components of levee systems, designed for urban areas where there is insufficient room for earthen levees. When levees and floodwalls and their appurtenant structures are stressed beyond their capabilities to withstand floods, levee failure can result in injuries and loss of life, as well as damages to property, the environment, and the economy.

Levees can be small agricultural levees that protect farmland from high-frequency flooding. Levees can also be larger, designed to protect people and property in larger urban areas from less frequent flooding events such as the 100-year and 500-year flood levels. For purposes of this discussion, levee failure will refer to both overtopping and breach as defined in FEMA's Publication "So You Live Behind a Levee" (http://content.asce.org/ASCELeveeGuide.html). Following are the FEMA publication descriptions of different kinds of levee failure.

> **Overtopping: When a Flood Is Too Big**
> Overtopping occurs when floodwaters exceed the height of a levee and flow over its crown. As the water passes over the top, it may erode the levee, worsening the flooding and potentially causing an opening, or breach, in the levee.
>
> **Breaching: When a Levee Gives Way**
> A levee breach occurs when part of a levee gives way, creating an opening through which floodwaters may pass. A breach may occur gradually or suddenly. The most dangerous breaches happen quickly during periods of high water. The resulting torrent can quickly swamp a large area behind the failed levee with little or no warning.

Earthen levees can be damaged in several ways. For instance, strong river currents and waves can erode the surface. Debris and ice carried by floodwaters—and even large objects such as boats or barges—can collide with and gouge the levee. Trees growing on a levee can blow over, leaving a hole where the root wad and soil used to be. Burrowing animals can create holes that enable water to pass through a levee. If severe enough, any of these situations can lead to a zone of weakness that could cause a levee breach. In seismically active areas, earthquakes and ground shaking can cause a loss of soil strength, weakening a levee and possibly resulting in failure. Seismic activity can also cause levees to slide or slump, both of which can lead to failure.

Geographic Location

Missouri is a state with many levees. Currently, there is no single comprehensive inventory of levee systems in the state. Levees have been constructed across the state by public entities and private entities with varying levels of protection, inspection oversight, and maintenance. The lack of a comprehensive levee inventory is not unique to Missouri.

There are two concurrent nation-wide levee inventory development efforts, one led by the United State Army Corps of Engineers (USACE) and one led by Federal Emergency Management Agency (FEMA). The National Levee Database (NLD), developed by USACE, captures all USACE related levee projects, regardless of design levels of protection. The Midterm Levee Inventory (MLI), developed by FEMA, captures all levee data (USACE and non-USACE) but primarily focuses on levees that provide 1% annual-chance flood protection on FEMA Flood Insurance Rate Maps

(FIRMs).

Agricultural levees and other non-regulated levees within the planning area exist that are not inventoried or inspected. These levees that are not designed to provide protection from the 1-percent annual chance flood would overtop or fail in the 1-percent annual chance flood scenario. Therefore, any associated losses would be taken into account in the loss estimates provided in the Flood Hazard Section.

None of Clinton County's population is protected from regulated levees. There are likely are low-head agricultural levees, that are not regulated. In the event of a breach, it is unlikely that widespread damage would occur.

Severity/Magnitude/Extent

Levee failure is typically an additional or secondary impact of another disaster such as flooding or earthquake. The main difference between levee failure and losses associated with riverine flooding is magnitude. Levee failure often occurs during a flood event, causing destruction in addition to what would have been caused by flooding alone. In addition, there would be an increased potential for loss of life due to the speed of onset and greater depth, extent, and velocity of flooding due to levee breach.

As previously mentioned, agricultural levees and levees that are not designed to provide flood protection from at least the 1-percent annual chance flood likely do exist in the planning area. However, none of these levees are shown on the Preliminary DFIRM, nor are they enrolled in the USACE Levee Safety Program. As a result, an inventory of these types of levees is not available for analysis. Additionally, since these types of levees do not provide protection from the 1-percent annual chance flood, losses associated with overtopping or failure are captured in the Flood Section of this plan.

The USACE regularly inspects levees within its Levee Safety Program to monitor their overall condition, identify deficiencies, verify that maintenance is taking place, determine eligibility for federal rehabilitation assistance (in accordance with P.L. 84-99), and provide information about the levees on which the public relies. Inspection information also contributes to effective risk assessments and supports levee accreditation decisions for the National Flood Insurance Program administered by the Federal Emergency Management Agency (FEMA).

The USACE now conducts two types of levee inspections. Routine Inspection is a visual inspection to verify and rate levee system operation and maintenance. It is typically conducted each year for all levees in the USACE Levee Safety Program. Periodic Inspection is a comprehensive inspection led by a professional engineer and conducted by a USACE multidisciplinary team that includes the levee sponsor. The USACE typically conducts this inspection every five years on the federally authorized levees in the USACE Levee Safety Program.

Both Routine and Periodic Inspections result in a rating for operation and maintenance. Each levee segment receives an overall segment inspection rating of Acceptable, Minimally Acceptable, or Unacceptable. Figure 3.33 below defines the three ratings.

Table 3.33 Definitions of the Three Levee System Ratings

Levee System Inspection Ratings	
Acceptable	All inspection items are rated as Acceptable.
Minimally Acceptable	One or more levee segment inspection items are rated as Minimally Acceptable or one or more items are rated as Unacceptable and an engineering determination concludes that the Unacceptable inspection items would not prevent the segment/system from performing as intended during the next flood event.
Unacceptable	One or more levee segment inspection items are rated as Unacceptable and would prevent the segment/system from performing as intended, or a serious deficiency noted in past inspections (previous Unacceptable items in a Minimally Acceptable overall rating) has not been corrected within the established timeframe, not to exceed two years.

Previous Occurrences

There is no levee system in the planning area, therefore there have been no breaches or incidents. It is unknown if there have been previous occurrences from unregulated levees.

Probability of Future Occurrence

There is no probability of future occurrence since there is no levee system.

Vulnerability

Vulnerability Overview

The planning area is not vulnerable to a levee breach or incident from regulated levees.

Potential Losses to Existing Development

There are no buildings or property protected by a levee system so there is no potential loss to existing development.

Impact of Previous and Future Development

There is no known impact to previous and future development.

Hazard Summary by Jurisdiction

No jurisdictions in Clinton County have levee protected areas.

Problem Statement

Clinton County does not have a regulated levee system so there have been no levee breaches or incidents. However, it's likely that low-head agricultural levees exist in the planning area.

3.4.9 Thunderstorm/High Winds/Lightning/Hail

Hazard Profile

Hazard Description

A thunderstorm is formed from a combination of moisture, rapidly rising warm air and a force capable of lifting air such as warm or cold fronts, a sea breeze or a mountain. Nearly 1,800 thunderstorms are in progress over the surface of the earth at any time. The United States experiences 100,000 thunderstorms each year. Approximately 1,000 tornadoes develop from these storms. At any given moment across the world, there are about 1,800 thunderstorms occurring.

Thunderstorms

A thunderstorm is defined as a storm that contains lightning and thunder which is caused by unstable atmospheric conditions. When cold upper air sinks and warm moist air rises, storm clouds or 'thunderheads' develop resulting in thunderstorms. This can occur singularly, as well as in clusters or lines. The National Weather Service defines a thunderstorm as "severe" if it includes hail that is one inch or more, or wind gusts that are at 58 miles per hour or higher. Severe thunderstorms in Missouri most often occur in the spring and summer during the afternoon and evenings, but can occur at any time. Other hazards associated with thunderstorms are heavy rains resulting in flooding are discussed under those hazards.

High Winds

A severe thunderstorm can produce winds causing as much damage as a weak tornado. The damaging winds of thunderstorms include downbursts, microbursts, and straight-line winds. Downbursts are localized currents of air blasting down from a thunderstorm, which induce an outward burst of damaging wind on or near the ground. Microbursts are minimized downbursts covering an area of less than 2.5 miles across. They include a strong wind shear (a rapid change in the direction of wind over a short distance) near the surface. Microbursts may or may not include precipitation and can produce winds at speeds of more than 150 miles per hour. Damaging straight-line winds are high winds across a wide area that can reach speeds of 140 miles per hour.

Lightning

All thunderstorms produce lightning which can strike outside of the area of precipitation. In fact, lightning has been known to fall more than 10 miles away from the rainfall area. Lightning is a discharge of electricity that shoots through the air causing vibrations and creating the sound of thunder.

Hail

According to the National Oceanic and Atmospheric Administration (NOAA), hail is precipitation that is formed when thunderstorm updrafts carry raindrops upward into an extremely cold atmosphere causing them to freeze. The raindrops then form into small frozen droplets. They continue to grow as they come into contact with super-cooled water which will freeze on contact with the frozen rain droplet. As long as the updraft forces can support or suspend the weight of the hailstone, hail can continue to grow before it hits the earth.

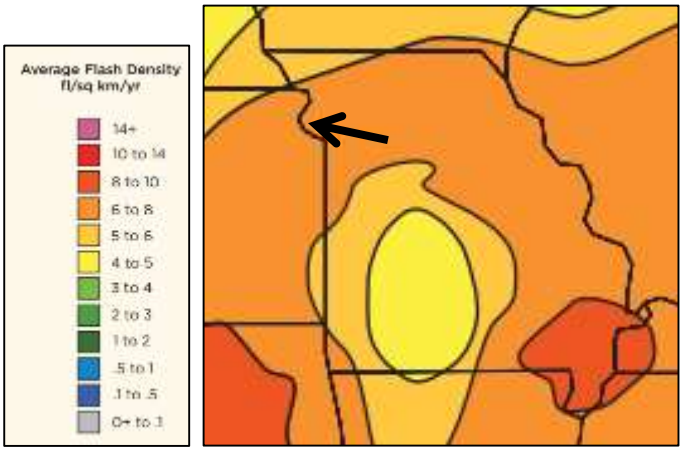
At the time when the updraft can no longer support the hailstone, it will fall to the earth. For example, a ¼" diameter or pea sized hail requires updrafts of 24 miles per hour, while a 2 ¾" diameter or baseball

sized hail requires an updraft of 81 miles per hour. According to the NOAA, the largest hailstone in diameter recorded in the United States was found in Vivian, South Dakota on July 23, 2010. It was eight inches in diameter, almost the size of a soccer ball. Soccer-ball-sized hail is the exception, but even small pea-sized hail can do damage.

Geographic Location

Figure 3.19 shows lightning frequency in the state. Clinton County, identified with an arrow, is at risk for thunderstorms. The county is located in the orange zone on the map, indicating a six to eight average flash density per square kilometer per year. Much of the state is in the same zone.

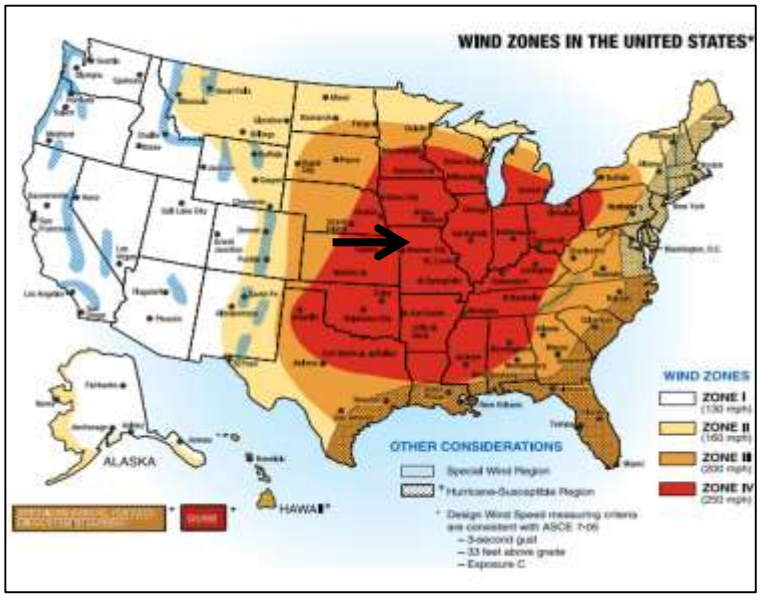
Figure 3.19 Location and Frequency of Lightning in Missouri



(Source: http://www.lightningsafety.noaa.gov/stats/08_Vaisala_NLDN_Poster.pdf)

Figure 3.20 shows wind zones in the United States. Clinton County is identified with an arrow. It is located in the red zone, Zone IV, on the map. Winds can reach 250 miles per hour in this zone.

Figure 3.20 Wind Zones in the United States



(Source: FEMA 320, Taking Shelter from the Storm, 3rd edition)

Severity/Magnitude/Extent

Severe thunderstorm losses are usually attributed to the associated hazards of hail, winds, lightning and heavy rains. Losses due to hail and high wind are typically insured losses that are localized and do not result in presidential disaster declarations. However, in some cases, impacts are severe and widespread making federal assistance necessary. Hail and wind have devastating impacts on crops. Severe thunderstorms/heavy rains that lead to flooding are discussed in the flooding hazard profile. Hailstorms cause damage to property, crops, and the environment, and can injure and even kill livestock. In the United States, hail causes more than $1 billion in damage to property and crops each year. Even relatively small hail can destroy plants in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are also commonly damaged by hail. Hail has been known to cause injury, occasionally fatal, to humans.

In general, assets in Clinton County vulnerable to thunderstorms with lightning, high winds, and hail include people, crops, vehicles, and structures. Although this hazard results in high annual losses, private property insurance and crop insurance usually cover the majority of losses. Considering insurance coverage as a recovery capability, the overall financial impact on jurisdictions is reduced.

Most lightning damages occur to electronic equipment located inside buildings. Structural damage can also occur when a lightning strike causes a building fire. In addition, lightning strikes can cause damages to crops if fields or forested lands are set on fire. Communications equipment and warning transmitters and receivers can also be rendered useless by lightning strikes.

Based on information provided by the Tornado and Storm Research Organization (TORRO), Table 3.34 below describes typical damage impacts of the various sizes of hail.

Table 3.34. Tornado and Storm Research Organization Hailstorm Intensity Scale

Intensity Category	Diameter (mm)	Diameter (inches)	Size Description	Typical Damage Impacts
Hard Hail	5-9	0.2-0.4	Pea	No damage
Potentially Damaging	10-15	0.4-0.6	Mothball	Slight general damage to plants, crops
Significant	16-20	0.6-0.8	Marble, grape	Significant damage to fruit, crops, vegetation
Severe	21-30	0.8-1.2	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
Severe	31-40	1.2-1.6	Pigeon's egg > squash ball	Widespread glass damage, vehicle bodywork damage
Destructive	41-50	1.6-2.0	Golf ball > Pullet's egg	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
Destructive	51-60	2.0-2.4	Hen's egg	Bodywork of grounded aircraft dented, brick walls pitted
Destructive	61-75	2.4-3.0	Tennis ball > cricket ball	Severe roof damage, risk of serious injuries
Destructive	76-90	3.0-3.5	Large orange > Soft ball	Severe damage to aircraft bodywork
Super Hailstorms	91-100	3.6-3.9	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Super Hailstorms	>100	4.0+	Melon	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

(Source: Tornado and Storm Research Organization (TORRO), Department of Geography, Oxford Brookes University
Notes: In addition to hail diameter, factors including number and density of hailstones, hail fall speed and surface wind speeds affect severity. http://www.torro.org.uk/site/hscale.php)

Straight-line winds are defined as any thunderstorm wind that is not associated with rotation (i.e., is not a tornado). It is these winds, which can exceed 100 miles per hour, which represent the most common type of severe weather. They are responsible for most wind damage related to

thunderstorms. Since thunderstorms do not have narrow tracks like tornadoes, the associated wind damage can be extensive and affect entire (and multiple) counties. Objects like trees, barns, outbuildings, high-profile vehicles, and power lines/poles can be toppled or destroyed, and roofs, windows, and homes can be damaged as wind speeds increase.

The tables below (Tables 3.35 through Table 3.36) summarize past crop damages as indicated by crop insurance claims. The tables illustrate the magnitude of the impact on the planning area's agricultural economy. Thunderstorms, high winds and lightning were not listed as the cause of loss for any insurance claims in Clinton County from 2007 – 2016.

Table 3.35. Crop Insurance Claims Paid in Clinton County from Hail, 2007-2016

Crop Year	Crop Name	Crop Loss Description	Insurance Paid
2009	Soybeans	Hail	$2,310.00
2009	Soybeans	Hail	$6,751.00
2010	Corn	Hail	$39,480.00
2010	Soybeans	Hail	$7,103.00
2011	Corn	Hail	$8,024.00
2011	Soybeans	Hail	$24,721.00
2012	Corn	Hail	$1,631.00
2012	Corn	Hail	$4,338.00
2012	Corn	Hail	$2,473.00
2012	Soybeans	Hail	$9,357.00
2014	Soybeans	Hail	$592.80
2016	Corn	Hail	$1,723.20
Total			**$108,504.00**

(Source: USDA Risk Management Agency, Insurance Claims, http://www.rma.usda.gov/data/cause.htm)

The onset of thunderstorms with lightning, high wind, and hail is generally rapid. Duration is less than six hours and warning time is generally six to twelve hours. Nationwide, lightning kills 75 to 100 people each year. Lightning strikes can also start structural and wildland fires, as well as damage electrical systems and equipment.

Previous Occurrences

The tables below include NCDC reported events and damages for the past 22 years for thunderstorms, wind, and hail. There were no NCDC reported events for lightning. One limitation of NCDC reported lightning events is the fact that only those that result in fatality, injury, and/or property and crop damage are reported.

There were 51 days with recorded thunderstorm wind events in Clinton County, causing one injury and $79,750.00 in property damage. Table 3.36 lists only thunderstorm wind events resulting in injury or property damage.

Table 3.36 NCDC Thunderstorm Wind Events in Clinton County, 1996-2017

Jurisdiction	Date	Wind Speed (in knots)	Injuries	Property Damage
Turney	06/28/1998	--	0	$10,000
Cameron	10/04/1998	70 kts.	0	$50,000
Lathrop	07/23/1999	60 kts.	0	$10,000
Lathrop	06/12/2004 21:00	61 kts	0	$2,000
Lathrop	06/12/2004 21:15	61 kts.	0	$2,000
Cameron	06/03/2005	52 kts.	0	$1,000
Gower	10/02/2005	57 kts.	0	$2,000
Perrin	04/10/2008	52 kts.	0	$2,000
Converse	08/20/2010	70 kts.	0	$750
Lathrop	06/15/2013	52 kts.	1	$0
Total			**1**	**$79,750.00**

(Source: NCDC, https://www.ncdc.noaa.gov/stormevents)

There were 57 days with hail events in Clinton County, with no injuries or property damage reported. Table 3.37 lists only the hail events with hail over two inches in diameter and Table 3.38 lists wind events that are over 50 kts.

Table 3.37 NCDC Thunderstorm Hail Events in Clinton County, 1996-2017

Jurisdiction	Date	Size (in inches)	Injuries	Property Damage
Trimble	05/29/2004	2.75 in	0	0
Gower	05/29/2004	2.75 in.	0	0
Converse	06/11/2009	2.50 in.	0	0
Total			**0**	**0**

(Source: NCDC, https://www.ncdc.noaa.gov/stormevents)

Table 3.38 NCDC High Wind/Strong Wind Events in Clinton County, 1996-2017

Jurisdiction	Date	Wind Speed (in knots)	Injuries	Property Damage
Clinton County	11/11/2015	52 kts (59.8 mph)	0	0

(Source: NCDC, https://www.ncdc.noaa.gov/stormevents)

Probability of Future Occurrence

Thunderstorm Wind

There have been 51 recorded thunderstorm wind events over a 22-year period from 1996 to 2017. This equates to 2.32 thunderstorm wind events in any given year with a 100% probability of occurrence. There was one event that resulted in one injury and 9 events resulted in $79,750.00 of property damage. This equates to .40 damaging events per year with annualized losses of $3,625.00.

Hail

There have been 57 recorded hail events over a 22-year period from 1996 to 2017. This equates to 2.6 hail events in any given year with a 100% probability of occurrence. There were no reports of damage or injuries from the NCDC database so there are no annualized losses.

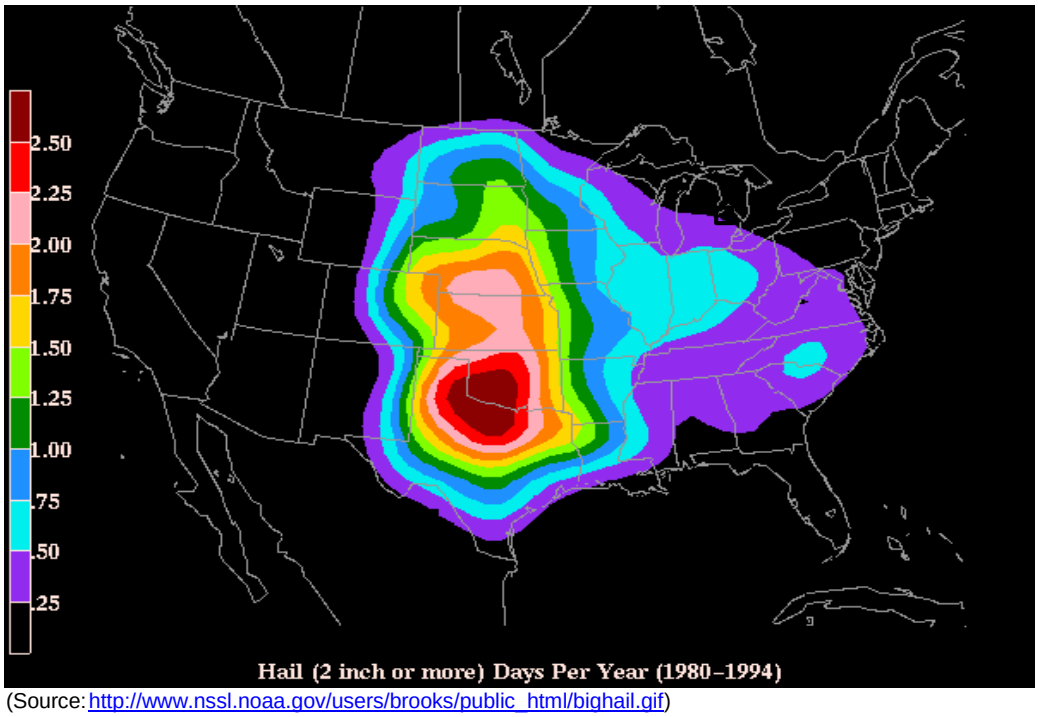
Strong Wind

There has been one recorded strong wind event over a 22-year period from 1996 to 2017. This equates .05 strong wind event in any given year. There were no reports of damage or injuries from

the NCDC database so there are no annualized losses.

Figure 3.21 is based on hailstorm data from 1980-1994. It shows the probability of hailstorm occurrence (2" diameter or larger) based on number of days per year. Clinton County is located in the light green zone, indicating the county's probability of hailstorm with 2" diameter or larger hail is 1.25 to 1.50 days per year.

Figure 3.21. Annual Hailstorm Probability (2'' diameter or larger), 1980-1994



(Source: http://www.nssl.noaa.gov/users/brooks/public_html/bighail.gif)

Vulnerability

Vulnerability Overview

Severe thunderstorms are a common occurrence in Clinton County. Wind, hail, and lightning are all contributing elements of severe thunderstorms. The 2013 State Plan focused on damaging winds in excess of 67 miles per hour (58 knots), hail in excess of 0.75 inches or larger and damaging lightning strikes to analyze vulnerability, risk, and estimated losses to this hazard.

The method used to determine vulnerability to severe thunderstorms was statistical analysis of data from several sources: National Climatic Data Center (NCDC) storm events data (1993 to December 31 2012), Crop Insurance Claims data from USDA's Risk Management Agency (2009-2012), U.S. Census Data (2010), USDA's Census of Agriculture (2007), and the calculated Social Vulnerability Index for Missouri Counties from the Hazards and Vulnerability Research Institute in the Department of Geography at the University of South Carolina. Table 3.39 provides the housing density, building exposure, crop exposure, and social vulnerability data. These are the common data elements for the analysis of wind, hail, and lightning with one exception; the lightning analysis did not consider crop exposure as crop loss is an unlikely result of lightning events. Table 3.40 provides additional statistical data compiled for vulnerability analysis from the 2013 State Plan.

Table 3.39 Housing Density, Building Exposure and Crop Exposure Data

Jurisdiction	County Housing Units/sq. mi.	Total Building Exposure ($)	Crop Exposure (2007 Census of Agriculture)	Social Vulnerability Index
Clinton County	21.4	$2,143,758,000.	$32,487,000.	Medium-High

(Source: 2013 State Plan)

Table 3.40 Additional Statistical Data Compiled for Vulnerability Analysis

Jurisdictions	County Annualized Property Loss and Crop Claims-Wind ($)	Annualized Property Loss and Crop Claims-Hail ($)	Annualized Property Loss-Lightning ($)	Combined Annualized Losses (wind, hail, lightning) ($)
Clinton County	$649,760.00	$197,526.00	$0.00	$847,286.00

(Source: 2013 State Plan)

Potential Losses to Existing Development

The average annual loss determined from historical losses for high wind and hail are indicators of the potential losses to existing development. High wind events in Clinton County have damaged private property and commercial buildings. Based on the $127,000.00 loss from thunderstorm wind damage recorded in the NCDC database from 1996-2017, potential losses for future events is annualized at $3,625.00.

Previous and Future Development

Additional development would result in the exposure of more households and businesses vulnerable to damages from severe thunderstorms/high winds/lightning/hail.

Hazard Summary by Jurisdiction

Although thunderstorms/high winds/lightning/hail events are area-wide, there may be demographics indicating higher losses in one jurisdiction as compared to another. Structures built before 1939 are considered to be more vulnerable to the impact of high wind and hail damage. Please see page Table 3.20 for ages of structures in jurisdictions in Clinton County.

Risk to new development is somewhat mitigated by IBC 2012 building codes.

Problem Statement

Poorly built structures, barns, outbuildings are more vulnerable to the impact of high winds during thunderstorms. High winds can topple utility poles and lead to power outages. Both high winds and hail can damage roofs. Hail can also damage crops and dent cars and trucks. People are also at risk of injury and death during high wind events. Crop insurance mitigates the risk to farmers and the agriculture sector within the county.

The risk of injury and death in the county can be mitigated by identifying safe refuge areas in public buildings, nursing homes and other facilities that house vulnerable populations that do not have a saferoom. Retrofitting school district facilities to better withstand high winds will provide more

protection for students and staff. Additional warnings and alerts will also provide the public and schools more time to take cover during high wind events. Education and hazard awareness programs would also increase public safety in the event of severe thunderstorm events.

3.4.10 Tornado

Hazard Profile

Hazard Description

National Weather Service (NWS) defines a tornado as “a violently rotating column of air extending from a thunderstorm to the ground.” It is usually spawned by a thunderstorm and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. Often, vortices remain suspended in the atmosphere as funnel clouds. When the lower tip of a vortex touches the ground, it becomes a tornado.

High winds not associated with tornadoes are profiled separately in this document in Section 3.4.9, Thunderstorm/High Wind/Hail/Lightning.

Essentially, tornadoes are a vortex storm with two components of winds. The first is the rotational winds that can measure up to 500 miles per hour, and the second is an uplifting current of great strength. The dynamic strength of both these currents can cause vacuums that can overpressure structures from the inside.

Although tornadoes have been documented in all 50 states, most of them occur in the central United States due to its unique geography and presence of the jet stream. The jet stream is a high-velocity stream of air that separates the cold air of the north from the warm air of the south. During the winter, the jet stream flows west to east from Texas to the Carolina coast. As the sun moves north, so does the jet stream, which at summer solstice flows from Canada across Lake Superior to Maine. During its move northward in the spring and its recession south during the fall, the jet stream crosses Missouri, causing the large thunderstorms that breed tornadoes.

A typical tornado can be described as a funnel-shaped cloud in contact with the earth‘s surface that is “anchored” to a cloud, usually a cumulonimbus. This contact on average lasts 30 minutes and covers an average distance of 15 miles. The width of the tornado (and its path of destruction) is usually about 300 yards. However, tornadoes can stay on the ground for upwards of 300 miles and can be up to a mile wide. The NWS, in reviewing tornadoes occurring in Missouri between 1950 and 1996, calculated the mean path length at 2.27 miles and the mean path area at 0.14 square mile.

The average forward speed of a tornado is 30 miles per hour but may vary from nearly stationary to 70 miles per hour. The average tornado moves from southwest to northeast, but tornadoes have been known to move in any direction. Tornadoes are most likely to occur in the afternoon and evening, but have been known to occur at all hours of the day and night.

Geographic Location

In contrast to thunderstorms, which can cause widespread damage, tornadoes represent a hazard that is a more defined area. With this tradeoff of a smaller impact area, the damage will be much more catastrophic. The geographic location in which these tornadoes have occurred in the past will be discussed in previous occurrences. The numbers on the markers correspond with the class of tornado.

Severity/Magnitude/Extent

Tornadoes are the most violent of all atmospheric storms and are capable of tremendous destruction. Wind speeds can exceed 250 miles per hour and damage paths can be more than one-mile wide and

50 miles long. Tornadoes have been known to lift and move objects weighing more than 300 tons a distance of 30 feet, toss homes more than 300 feet from their foundations, and siphon millions of tons of water from water bodies. Tornadoes also can generate a tremendous amount of flying debris which becomes airborne shrapnel that causes additional damage. If wind speeds are high enough, debris can be thrown at a building with enough force to penetrate windows, roofs, and walls. However, the less spectacular damage is much more common.

Tornado magnitude is classified according to the EF- Scale (or the Enhance Fujita Scale, based on the original Fujita Scale developed by Dr. Theodore Fujita, a renowned severe storm researcher). The EF- Scale (see Table 3.41) attempts to rank tornadoes according to wind speed based on the damage caused. This update to the original F Scale was implemented in the U.S. on February 1, 2007.

Table 3.41. Enhanced F Scale for Tornado Damage

FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest ¼-mile (mph)	3 Second Gust (mph)	EF Nu	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

Source: The National Weather Service, www.spc.noaa.gov/faq/tornado/ef-scale.html

The wind speeds for the EF scale and damage descriptions are based on information on the NOAA Storm Prediction Center as listed in Table 3.42. The damage descriptions are summaries. For the actual EF scale it is necessary to look up the damage indicator (type of structure damaged) and refer to the degrees of damage associated with that indicator. Information on the Enhanced Fujita Scale's damage indicators and degrees or damage is located online at www.spc.noaa.gov/efscale/ef-scale.html.

Table 3.42. Enhanced Fujita Scale with Potential Damage

Enhanced Fujita Scale			
Scale	Wind Speed (mph)	Relative Frequency	Potential Damage
EF0	65-85	53.5%	Light. 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	31.6%	Moderate. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	10.7%	Considerable. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes complete destroyed; large trees snapped or uprooted; light object missiles generated; cars lifted off ground.
EF3	136-165	3.4%	Severe. Entire stores 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
EF4	166-200	0.7%	Devastating. Well-constructed houses and whole frame houses completely levelled; cars thrown and small missiles generated.
EF5	>200	<0.1%	Explosive. Strong frame houses levelled off foundations and swept away; automobile-sized missiles fly through the air in excess of 300 ft.; steel reinforced concrete structure badly damaged; high rise buildings have significant structural deformation; incredible phenomena will occur.

(Source: NOAA Storm Prediction Center, http://www.spc.noaa.gov/efscale/ef-scale.html)

Enhanced weather forecasting has provided the ability to predict severe weather likely to produce tornadoes days in advance. Tornado watches can be delivered to those in the path of these storms several hours in advance. Lead time for actual tornado warnings 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 if they occur after sundown or due to blowing dust or driving rain and hail.

Previous Occurrences

Table 3.43 includes NCDC reported tornado events and damages since 1995 in the planning area. Prior to that date, only destructive tornadoes were recorded

There are limitations to the use of NCDC tornado data that must be noted. For example, one tornado may contain multiple segments as it moves geographically. A tornado that crosses a county line or state line is considered a separate segment for the purposes of reporting to the NCDC. Also, a tornado that lifts off the ground for less than five minutes or 2.5 miles is considered a separate segment. If the tornado lifts off the ground for greater than five minutes or 2.5 miles, it is considered a separate tornado. Tornadoes reported in Storm Data and the Storm Events Database are in segments.

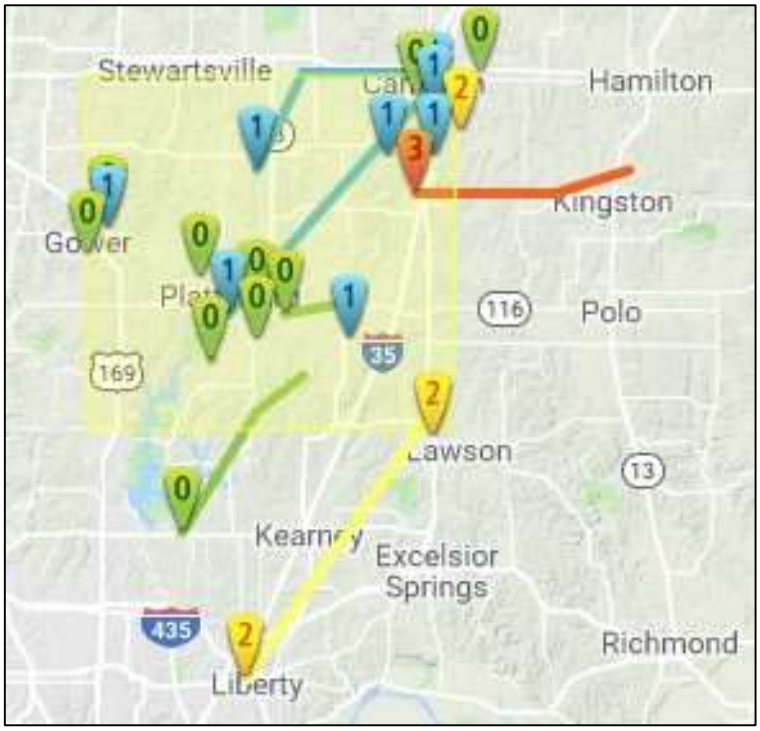
Table 3.43. Recorded Tornadoes in Clinton County, 1993 – 2017

Date	Beginning Location	Ending Location	Length (miles)	Width (yards)	F/EF Rating	Death	Injury	Property Damage	Crop Damages
05/06/1993	Kearney	Holt	10	50	F0	0	0	$5,000	$0
05/06/1993	Cameron		1.2	50	F1	0	0	$50,000	$0
05/08/2002	Plattsburg	Plattsburg	.1	25	F0	0	0	$0	$0
05/29/2004	Gower	Gower	1	75	F0	0	0	$0	$0
05/29/2004	Plattsburg	Osborn	19	150	F1	0	0	$20,000	$0
05/01/2008	Plattsburg	Plattsburg	.1	25	EF0	0	0	$0	$0
04/25/2009	Cameron Airport	Cameron Airport	.1	25	EF0	0	0	$0	$0
05/12/2010	Plattsburg	Plattsburg	.29	25	EF0	0	0	$10,000	$0
08/26/2016	Lathrop	Lathrop	3.27	25	EF0	0	0	$2,000	$0
03/06/2017	Trimble	Lathrop	16.28	1,000	EF 2	0	0	$0	$0
Total						**0**	**0**	**$87,000**	**$0**

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/stormevents/

There were 10 tornado events recorded in the NCDC database from 1995-2017. Fortunately, the damages from these events resulted in no deaths, injuries or crop damage. There was $87,000 in property damage. Figure 3.22 shows historic tornado paths in the planning area.

Figure 3.22. Clinton County Map of Historic Tornado Events



(Source: Missouri Tornado History Project, http://www.tornadohistoryproject.com/tornado/Missouri)

According to the NCDC, there were no insurance payments for crop damages from 2007 - 2015 as a result of tornadoes.

Probability of Future Occurrence

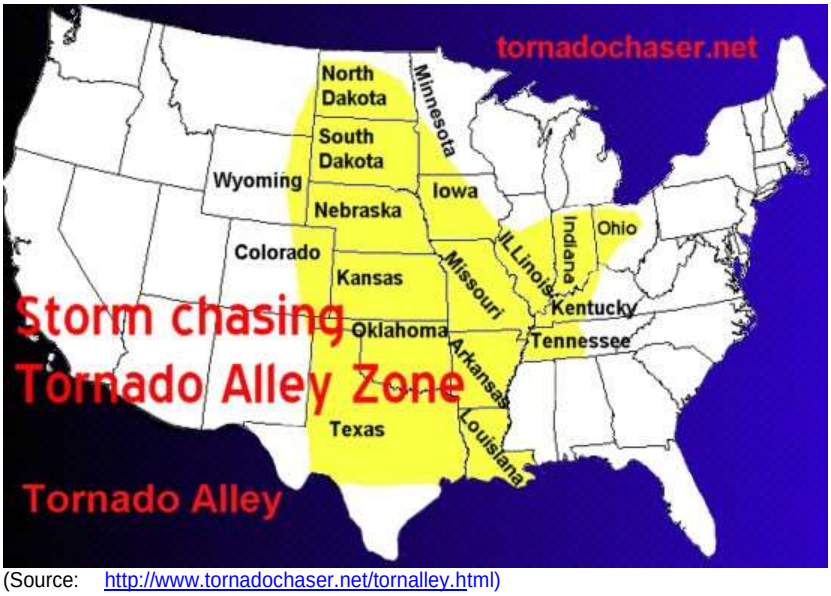
According to the NCDC, 10 tornados have occurred during the 23-year period from 1995 to 2015 resulting in a probability percentage of 43% chance of a tornado of any magnitude event in the planning area in any given year.

Vulnerability

Vulnerability Overview

Tornado Alley refers to the area of the United States where tornadoes are most likely to occur. Some view it as the area where the most dangerous tornadoes occur, such as F4 and F5 tornadoes on the Fujita rating system, this is not necessarily true. Most dangerous tornadoes are sporadic. Tornado Alley is in reference to the most frequently reported tornadoes. Figure 3.23 refers to this area known as Tornado Alley. This area averages three tornadoes or more per year per 10,000 square miles in general. Clinton County is located in the center of Tornado Alley, which poses a high risk for future tornadoes.

Figure 3.23. Tornado Alley in the U.S.



(Source: http://www.tornadochaser.net/tornalley.html)

The 2013 State Plan looked at four factors to determine tornado vulnerability. This vulnerability analysis measured the likelihood of future tornado impacts, average annual property loss ratio (total building exposure value divided by average annualized historic losses), population change (percent change), and housing change (percent change). Devastating tornadoes could still impact counties that ranked lower in this process. For this reason, the low end of the risk is still considered Moderate and the top end Very High. Clinton County is considered to have moderate risk. The State's data shows a 30.89% likelihood of occurrence in a year.

Potential Losses to Existing Development

In the 2013 State Plan, a statistical vulnerability methodology was used to determine annualized tornado losses by county. This methodology used the National Climatic Data Center data for tornado losses between 1950 and July 31, 2012. It is important to realize that one limitation to this data is that

many tornadoes that might have occurred in uninhabited areas, as well as some in inhabited areas, may not have been reported. The incompleteness of the data suggests that it is not appropriate for use in parametric modeling. In addition, NOAA data cannot show a realistic frequency distribution of different Fujita scale tornado events, except for recent years. Thus a parametric model based on a combination of many physical aspects of the tornado to predict future expected losses was not used. The statistical model used for this analysis was probabilistic based purely on tornado frequency and historic losses. It is based on past experience and forecasts the expected results for the immediate or extended future. The approach to the 2013 update of tornado risk in Missouri included an update of the tornado events and annualized losses and an enhanced analysis and representation of the risk assessment results. The number of tornado occurrences was updated by adding the events that have been reported in each county since July 31, 2009 through July 31, 2012. Figure 3.44 shows the annualized historic losses of The 2013 State Plan.

Figure 3.44 Tornado Probability, Potential Loss, and Risk Summary

Jurisdiction	# of Tornados	Likelihood of Occurrence	Total Exposure	Annualized Historic Loss	Loss Ratio	Total Vulnerability
Clinton County	19	30.89%	$2,143,758,000	$41,065	.0002%	Moderate

(Source: 2013 State Plan)

Previous and Future Development

Development may result in an increase in population in terms of increased exposure to damage. Due to the vulnerability of mobile homes to tornado and high wind damage, some jurisdictions do not allow mobile home parks. As expansion occurs, Clinton County and local jurisdictions monitor the warning siren coverage area.

Hazard Summary by Jurisdiction

In Clinton County, a tornado could occur due to its location in Tornado Alley and historical precedence. The county also has an at-risk population of homes that are valued below $50,000 (6.2 percent) and mobile homes (4.9 percent). These homes are at risk due to the fact that they could have weak structural protection from high winds associated with tornados due to their low value, or may not have foundation.

Homes that are over 25-years old also face the risk of older building codes and deteriorating structure. A tornado, of any magnitude, could have a large, adverse impact on these homes. Because 66.3 percent of homes in Clinton County were built before 1990, the impact of a tornado could be substantial. Please see Table 3.20 for the ages of homes of jurisdictions in Clinton County.

A tornado event could occur anywhere in the planning area, but some jurisdictions, would suffer heavier damages because of the age of the housing, concentration of buildings and higher number of mobile homes. School district assets are also at risk from tornados and conduct regular tornado drills. The Mid-Buchanan School District constructed a tornado shelter with funding from a 2011 FEMA mitigation grant. The shelter can accommodate 1,100 people and is available to the public for shelter during tornado and high wind events. Churches throughout the county also serve as public shelters.

Problem Statement

Tornadoes are the most violent of all atmospheric storms and are capable of tremendous destruction. Wind speeds can exceed 250 miles per hour and damage paths can be more than one-mile wide and 50 miles long. According to the NCDC, over the past 23-years tornado events in Clinton County have

resulted in zero deaths, injuries and crop insurance claims. but $87,700 in property damage. Information in the 2013 State Plan indicates that Clinton County has a moderate vulnerability to tornados based on frequency of occurrence and previous damages.

The risk of property damage, injury, and death in the county can be mitigated by constructing FEMA saferooms in facilities that house vulnerable populations such as nursing homes government buildings, and schools. In addition, identifying safe refuge areas in public buildings, nursing homes and other facilities that house vulnerable populations that do not have a saferoom. Retrofitting school district facilities with protective filming of windows and installation of blast proof doors will provide more protection for students and staff at school facilities. Additional warnings and alerts will also provide the public and schools more time to take cover during tornado. In addition, public safety fairs provide an opportunity to disseminate information to homeowners about individual saferoom construction in homes. Cities can adopt or update and enforce IBC 2012 building codes that include construction techniques such as roof tie down straps for mobile homes to mitigate damage to future development.

3.4.11 Winter Weather/Snow/Ice/Severe Cold

Hazard Profile

Hazard Description

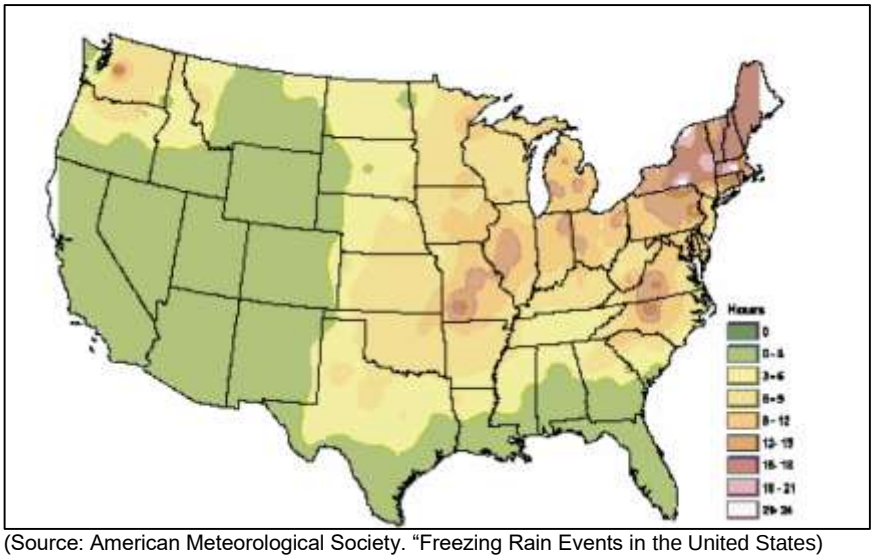
A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. The National Weather Service describes different types of winter storm events as follows.

- **Blizzard**—Winds of 35 miles per hour or more with snow and blowing snow reducing visibility to less than ¼ mile for at least three hours.
- **Blowing Snow**—Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- **Snow Squalls**—Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.
- **Snow Showers**—Snow falling at varying intensities for brief periods of time. Some accumulation is possible.
- **Freezing Rain**—Measurable rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces, such as trees, cars, and roads, forming a coating or glaze of ice. Most freezing-rain events are short lived and occur near sunrise between the months of December and March.
- **Sleet**—Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects.

Geographic Location

The entire county is vulnerable to heavy snow, ice, extreme cold temperatures and freezing rain. Figure 3.24 shows the zones of average number of hours of freezing rain per year. Clinton County is located in the light yellow zone, indicating that the county receives three to six hours of freezing rain per year.

Figure 3.24. NWS Statewide Average Number of Hours per Year with Freezing Rain



(Source: American Meteorological Society. "Freezing Rain Events in the United States)

Severity/Magnitude/Extent

Severe winter storms include extreme cold, heavy snowfall, ice, and strong winds which can push the wind chill well below zero degrees in the planning area. Heavy snow can bring a community to a standstill by inhibiting transportation (in whiteout conditions), weighing down utility lines, and by causing structural collapse in buildings not designed to withstand the weight of the snow. Repair and snow removal costs can be significant. Ice buildup can collapse utility lines and communication towers, as well as make transportation difficult and hazardous. Ice can also become a problem on roadways if the air temperature is high enough that precipitation falls as freezing rain rather than snow.

Extreme cold often accompanies severe winter storms and can lead to hypothermia and frostbite in people without adequate clothing protection. Cold can cause fuel to congeal in storage tanks and supply lines, stopping electric generators. Cold temperatures can also overpower a building's heating system and cause water and sewer pipes to freeze and rupture. Extreme cold also increases the likelihood for ice jams on flat rivers or streams. When combined with high winds from winter storms, extreme cold becomes extreme wind chill, which is hazardous to health and safety.

The National Institute on Aging estimates that more than 2.5 million Americans are elderly and especially vulnerable to hypothermia, with the isolated elders being most at risk. About 10 percent of people over the age of 65 have some kind of bodily temperature-regulating defect, and 3-4 percent of all hospital patients over 65 are hypothermic.

Also at risk are those without shelter, those who are stranded, or who live in a home that is poorly insulated or without heat. Other impacts of extreme cold include asphyxiation (unconsciousness or death from a lack of oxygen) from toxic fumes from emergency heaters; household fires, which can be caused by fireplaces and emergency heaters; and frozen/burst pipes.

Buildings with overhanging tree limbs are more vulnerable to damage during winter storms when limbs fall. Businesses experience loss of income as a result of closure during power outages. In general, heavy winter storms increase wear and tear on roadways though the cost of such damages is difficult to determine. Businesses can experience loss of income as a result of closure during winter storms.

Overhead power lines and infrastructure are also vulnerable to damages from winter storms. In particular ice accumulation during winter storm events damage to power lines due to the ice weight on the lines and equipment. Damages also occur to lines and equipment from falling trees and tree limbs weighted down by ice. Potential losses could include cost of repair or replacement of damaged facilities, and lost economic opportunities for businesses.

Secondary effects from loss of power could include burst water pipes in homes without electricity during winter storms. Public safety hazards include risk of electrocution from downed power lines. Specific amounts of estimated losses are not available due to the complexity and multiple variables associated with this hazard. Standard values for loss of service for utilities reported in FEMA's 2009 BCA Reference Guide, the economic impact as a result of loss of power is $126 per person per day of lost service.

Wind can greatly amplify the impact of cold ambient air temperatures. Provided by the National Weather Service**,** Figure 3.25 below shows the relationship of wind speed to apparent temperature and typical time periods for the onset of frostbite.

Figure 3.25. Wind Chill Chart

Wind (mph)	Temperature (°F)																	
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph) Effective 11/01/01

(Source: National Weather Service, http://www.nws.noaa.gov/om/winter/windchill.shtml)

Winter storms, cold, frost and freezing take a toll on crop production in the planning area. Table 3.45 shows the USDA's Risk Management Agency payments for insured crop losses in the planning area as a result of cold conditions and snow for the past 10 years.

Table 3.45. Crop Insurance Claims Paid for Cold Conditions and Snow, 2007-2016

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2007	Wheat and Corn	Freeze, Frost, Cold Wet Weather and Cold Winter	$91,365.00
2008	Wheat, Corn and	Other (Snow-Lightning- Etc.) and Cold Wet Weather	$82,598.00
2009	Wheat and Corn	Cold Wet Weather and Cold Winter	$32,824.00
2010	Corn and Soybeans	Cold Wet Weather	$27,807.00
2011	Corn and Soybeans	Cold Wet Weather	$75,695.00
2012	Wheat	Cold Winter	$9,599.00
2013	Wheat and Soybeans	Cold Wet Weather	$50,491.00
2014	Corn and Wheat	Cold Wet Weather and Cold Winter	$9,639.00
Total			**$380,018.00**

(Source: USDA Risk Management Agency, http://www.rma.usda.gov/data/cause.htm)

Previous Occurrences

Table 3.46 includes NCDC reported events and damages for the past 23 years in Clinton County. There were 44 days with reported events.

Table 3.46. NCDC Clinton County Winter Weather Events Summary,1995-2017

Type of Event	Inclusive Dates	Magnitude	# of Injuries	Property Damages	Crop Damages
Cold/Wind Chill	01/10/1997 to 01/13/1997	Wind chill to 30 to 50 below zero	$0	$0	$0
Heavy Snow	01/27/1997 to 01/27/1997	2-4 ft. snow drift	$0	$0	$0
Winter Storm	02/21/1997 to 02/21/1997	1-5 in. snow	$0	$0	$0
Ice Storm	12/21/1997 to 12/21/1997	Icy roads, sub-freezing temp.	$0	$0	$0
Ice Storm	01/04/1998 to 01/04/1998	¼ to ½ in. of ice on roads	$0	$0	$0
Extreme Cold	10/06/2000 to 10/10/2000	Lows below freezing for 5 days	$0	$0	$0
Extreme Cold	12/10/2000 to 12/31/2000	Prolonged freezing temperatures	$0	$0	$0
Winter Storm	12/11/2000 to 12/11/2000	3-5 in. of snow, 3/8 in ice	$0	$0	$0
Winter Storm	01/28/2001 to 01/28/2001	1-5 in. of snow	$0	$0	$0
Winter Storm	02/09/2002 to 02/09/2001	6-8 in. of snow, ice	$0	$0	$0
Winter Storm	02/27/2001 to 02/27/2001	3-5 in. of snow	$0	$0	$0
Winter Storm	01/30/2002 to 01/31/2002	8-14 in. of snow, long storm	$0	$200,000	$0
Heavy Snow	03/02/2002 to 03/03/2002	6 in. of snow	$0	$0	$0
Winter Storm	12/09/2003 to 12/10/2003	2-4 in. of snow, 40 mph winds	$0	$0	$0
Winter Storm	01/25/2004 to 01/25/2004	¼ in. ice	$0	$0	$0
Winter Storm	02/05/2004 to 02/05/2004	6-8 in. of snow	$0	$0	$0
Winter Storm	01/04/2005 to 01/05/2005	2-5 in. of snow, ¼ to ¾ in. ice	$0	$0	$0
Ice Storm	11/29/2006 to 11/29/2006	¼ -1/2 in. ice	$0	$0	$0
Winter Storm	01/12/2007 to 01/14/2007	Sleet and freezing rain	$0	$0	$0
Heavy Snow	01/20/2007 to 01/21/2007	4-6 in. snow, drifts 1-3 ft.	$0	$0	$0
Frost/Freeze	04/04/2007 to 04/10/2007	Upper teens and 20s	$0	$0	$0
Ice Storm	12/10/2007 to 12/11/2007	¼ - ½ in. ice	$0	$5,000	$0
Winter Storm	12/22/2007 to 12/22/2007	7in. snow	$0	$0	$0
Heavy Snow	02/05/2008 to 020/6/2008	4-6 in. snow	$0	$0	$0
Ice Storm	12/18/2008 to 12/19/2008	¼ in. ice	$0	$0	$0
Heavy Snow	02/28/2009 to 02/28/2009	6 in. snow	$0	$0	$0
Winter Storm	03/28/2009 to 03/28/2009	2-3 in. snow, sleet and rain	$0	$0	$0
Blizzard	12/07/2009 to 12/09/2009	6 in. snow	$0	$0	$0
Blizzard	12/24/2009 to 12/26/2009	11-14 in. snow	$0	$0	$0
Winter Storm	01/6/2010 to 01/07/2010	Up to 6 in. snow	$0	$0	$0
Winter Storm	02/21/2010 to 02/21/2010	Up to 8 in. snow	$0	$0	$0
Winter Weather	01/10/2011 to 01/11/2011	Up to 6 in. snow	$0	$0	$0
Blizzard	02/01/2011 to 02/01/2011	Up to 6 in. snow	$0	$0	$0
Winter Storm	02/24/2011 to 02/24/2011	Up to 6 in. snow	$0	$0	$0
Winter Weather	02/13/2012 to 02/13/2012	3 in. snow	$0	$0	$0
Winter Weather	01/30/2013 to 01/30/2013	2 in. snow	$0	$0	$0
Winter Storm	02/21/2013 to 02/22/2013	7 in. snow	$0	$0	$0
Winter Storm	02/25/2013 to 02/25/2013	7 in. snow	$0	$0	$0
Winter Storm	03/23/2013 to 03/24/2013	4-6 in. snow	$0	$0	$0
Winter Weather	05/02/2013 to 05/03/2013	4 in. snow	$0	$0	$0
Heavy Snow	12/21/2013 to 12/22/2013	6-9 in. snow	$0	$0	$0
Cold/Wind Chill	01/06/2014 to 01/06/2014	30 degrees below 0	$0	$0	$0
Heavy Snow	02/4/2014 to 02/05/2014	1 ft. snow	$0	$0	$0
Winter Storm	12/27/2015 to 12/28/2015	3-4 in. snow	$0	$0	$0
Total			$0	**$205,000**	**$0**

(Source: NCDC)

The storm on January 30, 2002 was a long-lived storm that resulted in widespread power outages from tree limbs falling on power lines. Some residents went two weeks before power was restored.

Probability of Future Occurrence

The probability for all of the different types of winter weather are included as one probability, since one storm generally includes several different types of events. There were 44 severe winter weather events in Clinton County from 1995 to 2017 (23 years). This equates to a 100% probability of occurrence in any given year with approximately 1.91 events in any given year.

Vulnerability

Vulnerability Overview

Heavy snow can bring a community to a standstill by inhibiting transportation (in whiteout conditions), weighing down utility lines, and by causing structural collapse in buildings not designed to withstand the weight of the snow. Repair and snow removal costs can be significant. Ice buildup can collapse utility lines and communication towers, as well as make transportation difficult and hazardous. People over 65 and those living in poverty have an increased risk of hypothermia and frostbite due to extreme cold and wind chill.

In the 2013 State Plan, seven factors were considered in determining overall severe winter storm vulnerability as follows: housing density, likelihood of occurrence, building exposure, crop exposure, average annual property loss ratio, average annual crop insurance claims and social vulnerability. The state ranked each of these criteria using a scale from one to five, one being lowest and five being the highest, to rank each county's vulnerability to severe winter weather. Clinton County received a vulnerability rating of medium-low and a social with no individual criterion scoring above two, except a three for crop exposure rating. Table 3.47 lists exposure and loss amounts.

Table 3.47 Vulnerability Analysis for Severe Weather

Jurisdiction	Housing Units/sq. mi.	Total Building Exposure	Crop Exposure	Total Incidents	Total $ Property Loss	Total Crop Insurance Paid
Clinton County	21.2	$2,143,758,000	$32,487,000	34	$6,194,986	$186,204

(Source: 2013 State Plan)

As previously noted, NCDC crop losses are likely under reported.

Potential Losses to Existing Development

During the 23-year period from 1995 to 2017, a total of $205,000 in property losses equates to $8,913.04 in average annual losses countywide.

Previous and Future Development

Future commercial development can expect functional downtime and decreased revenues during periods of severe winter weather. Road construction in the county will increase the need for snow removal and salt to keep transportation lifelines open during periods of severe winter weather.

Hazard Summary by Jurisdiction

Severe winter weather can cause power outages and put structures at risk to fires when individuals in homes resort to using portable fuel heaters. The risk of extreme cold deaths and frostbite varies among segments of the populations. People over 65 and those living below the poverty level have an

increased vulnerability to severe winter weather. Table 3.48 includes information on populations over 65 and the percent living below the poverty level by jurisdiction.

Table 3.48 Population over 65 and Population Living Below the Poverty Level

Jurisdiction	% of Families Living Below Poverty Level	% of Population Over 65
Clinton County	9.5%	17.1%
City of Cameron	19.2%	15.0%
City of Gower	7.5%	19.5%
City of Holt	13.9%	14.6%
City of Lathrop	11.8%	14.5%
City of Plattsburg	4.5%	19.1%
City of Trimble	14.7%	12.3%
Village of Turney	23.3%	16.4%

(Source: American Community Survey, 2011-2015)

Turney and Cameron are the jurisdictions with the highest percent of families living in poverty. Plattsburg and Gower have the highest percentage of population over 65. The senior center in Plattsburg offers meal delivery to homebound seniors. This provides a communication network to the most vulnerable seniors. The churches in Gower actively seek out vulnerable seniors to assist.

Problem Statement

Heavy snow can bring a community to a standstill by inhibiting transportation (in whiteout conditions), weighing down utility lines, and by causing structural collapse in buildings not designed to withstand the weight of the snow. Repair and snow removal costs can be significant. Ice buildup can collapse utility lines and communication towers, as well as make transportation difficult and hazardous. People over 65 and those living in poverty and the homeless have an increased risk of hypothermia and frostbite due to extreme cold and wind chill.

Public works departments and road districts can develop snow removal plans and maintain adequate snow removal equipment and salt to quickly open roads after periods of heavy snow and freezing rain. The county and cities can work with local electric coops and utility companies to develop vegetation management programs in rights of way to minimize damage to falling tree limbs laden with ice resulting from ice storms to minimize power outages throughout the county.

44 CFR Requirement §201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section presents the mitigation strategy updated by the Mitigation Planning Committee (MPC) based on the [updated] risk assessment. The mitigation strategy was developed through a collaborative group process. The process included review of [updated] general goal statements to guide the jurisdictions in lessening disaster impacts as well as specific mitigation actions to directly reduce vulnerability to hazards and losses. The following definitions are taken from FEMA's *Local Hazard Mitigation Review Guide (October 1, 2012)*.

- **Mitigation Goals** are general guidelines that explain what you want to achieve. Goals are long-term policy statements and global visions that support the mitigation strategy. The goals address the risk of hazards identified in the plan.

- **Mitigation Actions** are specific actions, projects, activities, or processes taken to reduce or eliminate long-term risk to people and property from hazards and their impacts. Implementing mitigation actions helps achieve the plan's mission and goals.

4.1 Goals

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

This planning effort is an update to Clinton County's original hazard mitigation plan approved by FEMA in 2005. Therefore, the goals from the 2013 Clinton County's Hazard Mitigation Plan were reviewed to see if they were still valid, feasible, practical, and applicable to the defined hazard impacts. The MPC conducted a discussion session during their second meeting to review and update the plan goals. To ensure that the goals developed for this update were comprehensive and supported State goals, the 2013 State Hazard Mitigation Plan goals were reviewed. The MPC also reviewed the goals from current surrounding county plans.

Clinton County's 2018 HMP goals are:

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens.

- Objective 1.1: Protect the lives and property of Clinton County residents.
- Objective 1.2: Provide sufficient warning of impending disasters.
- Objective 1.3: Identify the citizens most vulnerable to disasters and plan accordingly.

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

- Objective 2.1: Decrease the impact of natural hazards.
- Objective 2.2: Decrease the cost of the next disaster.
- Objective 2.3: Increase Clinton County's economic resistance to disasters.

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

- Objective 3.1: Increase disaster mitigation management capability in local governments.
- Objective: 3.2: Strengthen critical infrastructure.

Goal 4: Ensure Access to Information About Hazard Preparation and Recovery.

- Objective 4.1: Increase knowledge among citizens about disaster safety.

4.2 Identification and Analysis of Mitigation Actions

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

During the second MPC meeting changes in risk since adoption of the previously approved plan were discussed. The second meeting concluded with the distribution of a list of possible mitigation actions to prompt discussions within and among the jurisdictions. Actions from the previous plan included completed actions, on-going actions, and actions upon which progress had not been made. he MPC Each jurisdiction was instructed to prove information regarding the "Action Status" using the following status choices:

- Completed, with a description of the process (if provided)
- Not Started/Continue in Plan Update, with a reason for the lack of progress (if provided)
- In Progress/Continue in Plan Update, with a description of the progress to date (if provided)
- Deleted, with a description for the reason for deletion (if provided)

Former actions that have been completed were deleted since the jurisdiction has that capability. New actions were created that reflected the changes in development and priorities, such as actions for acquiring additional outdoor warning sirens for areas with recent growth. Plan actions have been revised to reflect progress. For the third meeting, individual jurisdictions, including school and special districts, discussed mitigation strategy. They were also provided a link to the FEMA's publication, *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (January 2013).* This document was developed by FEMA as a resource for identification of a range of potential mitigation actions for reducing risk to natural hazards and disasters. The MPC reviewed:

- A list of actions proposed in the previous mitigation plan, the current State Plan, and approved plans in surrounding counties,
- Key issues from the risk assessments, including the Problem Statements concluding each hazard profile and vulnerability analysis, and
- Public input during meetings, responses to Data Collection Questionnaires, and other efforts to involve the public in the plan development process.

Based on the 2013 status updates, there were 64 completed actions, 162 deleted actions, and 52 continuing actions. Each participating jurisdiction has at least one continuing or new action. Table 4.1 provides a summary of the 2013 action statuses for each jurisdiction.

Table 4.1. 2013 Action Status Summary

Jurisdiction	Completed Actions	Deleted Actions	Continuing Actions
Clinton County	1.1.5, 1.1.7, 1.2.5, 1.2.6, 1.3.2, 1.3.4, 2.3.3, 3.1.6, 3.1.7	1.1.2, 1.1.3, 1.1.6, 1.1.8, 1.2.1, 1.2.3, 1.3.1, 1.3.3, 2.2.1, 2.2.3, 2.2.4, 2.2.5, 2.3.1, 2.3.2, 3.1.5, 3.2.2, 3.2.3, 3.2.5, 3.2.6, 4.1.1, 4.1.4, 4.1.5, 4.1.6, 4.1.7	1.1.1, 1.1.4, 1.1.10, 1.1.11, 1.2.4, 2.1.2, 2.1.3, 2.2.2, 2.3.4, 2.3.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.2.1, 3.2.4, 4.1.2, 4.1.3
City of Cameron	1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.1.6, 1.1.7, 1.1.8, 1.1.10, 1.1.11, 1.2.1, 1.2.5, 1.2.6, 1.3.2, 1.3.4 2.3.3, 2.3.4	1.3.1, 1.3.3, 1.3.4, 2.2.1, 2.2.3, 2.2.4, 2.2.5, 2.3.1, 2.3.2, 2.3.5, 3.1.1, 3.1.2, 3.1.4, 3.1.5, 3.1.6, 3.1.7, 3.2.1, 3.2.4, 3.2.6, 4.1.1, 4.1.2	2.1.2
Village of Grayson		1.1.2, 1.1.5, 1.2.2, 2.2.5, 2.3.4, 2.3.5, 3.1.1, 3.1.2, 3.1.4, 3.1.5, 3.1.6, 3.2.1, 3.2.4, 4.1.1	1.3.1
City of Gower	1.1.5, 1.3.1, 1.3.3, 1.3.4, 2.2.5, 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 3.1.1, 3.1.2, 3.1.4, 3.1.5, 3.1.6, 3.2.1, 3.2.4, 4.1.1	2.2.4, 3.2.6	1.1.2, 2.1.2
Village of Holt		1.1.2, 1.1.5, 1.3.1, 1.3.3, 1.3.4, 2.2.4, 2.2.5, 2.3.4, 2.3.5, 3.1.1, 3.1.2, 3.1.4, 3.1.5, 3.1.6, 3.2.1, 3.2.4, 3.2.6, 4.1.1	2.1.2
City of Lathrop	1.1.7, 2.3.3, 2.3.5, 3.2.6, 3.1.2, 3.1.6	1.1.2, 1.1.3, 1.1.4, 1.1.6, 1.1.8, 1.1.10, 1.1.11, 1.2.1, 1.3.1, 1.3.3, 2.2.1, 2.2.4, 2.2.5, 2.3.2, 2.3.5, 3.1.5, 3.1.7, 4.1.1	1.1.5, 1.1.7, 1.3.4, 2.1.2, 2.2.3, 2.3.1, 2.3.4, 3.1.4, 3.1.1, 3.2.1, 3.2.4
City of Plattsburg	1.1.7, 2.3.4, 3.1.2, 3.1.6	1.1.2, 1.2.2, 1.1.3, 1.1.4, 1.1.5, 1.1.6, 1.1.8, 1.1.10, 1.1.11, 1.2.1, 1.3.1, 1.3.3,	2.1.2, , 3.2.1

		1.3.4, 2.2.1, 2.2.3, 2.2.4, 2.2.5, 2.3.1, 2.3.2, 2.3.3, 2.3.5, 3.1.1, 3.1.4, 3.1.5, 3.1.7, 3.2.4, 3.2.6, 4.1.1, 4.1.2	
City of Trimble	**2.3.4, 3.2.1**	**1.1.4, 1.1.5, 1.1.11, 1.2.1, 1.3.3, 2.2.4, 2.2.5, 3.1.5, 3.1.6, 3.2.4, 4.1.1**	**1.2.2, 1.3.1, 2.1.2 2.3.5**
Village of Turney	**1.3.2**	**1.1.5, 1.2.2, 1.3.3, 2.2.4, 2.3.4, 2.3.5, 3.1.1, 3.1.2, 3.1.4, 3.1.5, 3.1.6, 4.1.1, 4.1.2,**	**1.1.2, 1.3.1, 2.2.5, 3.2.4, 3.2.1**
Cameron School District	**1.1.8, 3.2.1**	**1.1.3, 1.1.10, 1.3.1, 2.3.4 , 2.3.5, 3.1.5**	**3.1.1 3.1.4 , 4.1.3**
Clinton School District (non-participant)	**--**	**--**	**--**
East Buchanan School District (non-participant)	**--**	**--**	**--**
Lathrop School District	**1.1.11, 1.2.1, 3.1.6, 3.2.4, 4.1.1, 4.1.3**	**1.1.8, 1.3.1, 2.3.4, 2.3.5, 3.1.5, 3.2.1**	**1.1.3, 1.1.10, 3.1.1, 3.1.4**

Table 4.2 provides a summary of the completed and deleted actions from the previous plan.

Table 4.2. Summary of Completed and Deleted Actions from the Previous Plan

Completed Actions	Completion Details (date, amount, funding source)
1.1.2 – Cameron – Local governments should encourage residents to purchase weather radios to ensure that everyone has sufficient access to information in times of severe weather.	Radios purchased and distributed. Supply exhausted.
1.1.3 – Cameron – Encourage the incorporation and design of safe rooms in the construction of new public facilities like libraries, community centers, etc.	Completed.
1.1.3 – Cameron School District – Encourage the incorporation and design of safe rooms in the construction of new public facilities like libraries, community centers, etc.	Completed.
1.1.4 – Cameron –Incorporate hazard buffer zones into subdivision platting regulations.	Completed.
1.1.5 – Clinton County -- Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services.	Completed.
1.1.5 – Cameron -- Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a tornado or high winds disaster.	Completed.
1.1.5 – Gower -- Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a tornado or high winds disaster.	Completed.
1.1.6 – Cameron – Continue to cooperate with agencies to provide air conditioners to those people in their community who do not have them and are at risk during a heat wave.	Completed.
1.1.7 – Clinton County – Designate certain air-conditioned facilities as "heat emergency shelters" and encourage people without air conditioning to use them in a heat wave.	Completed.
1.1.7 – Cameron – Designate certain air-conditioned facilities as "heat emergency shelters" and encourage people without air conditioning to use them in a heat wave.	Completed.
1.1.7 – Lathrop – Designate certain air-conditioned facilities as "heat emergency shelters" and encourage people without air conditioning to use them in a heat wave.	City hall and community center became heat emergency shelters.
1.1.7 – Plattsburg – Designate certain air-conditioned facilities as "heat emergency shelters" and encourage people without air conditioning to use them in a heat wave.	Completed.
1.1.8 – Cameron – Businesses should be encouraged to implement "snow-day" policies for their employees that mirror official plans. These measures may reduce the number of people on the roadways during periods of severe winter weather.	Completed.
1.1.8 – Cameron School District– Businesses should be encouraged to implement "snow-day" policies for their employees that mirror official plans. These measures may reduce the number of people on the roadways during periods of severe winter weather.	Completed.
1.1.10 – Cameron - Assess existing public facilities for the location of suitable "safe areas." If available, these "safe areas" should be clearly marked and employees and visitors should be informed of their location in public facilities.	Completed.
1.1.11 – Cameron – Review emergency access routes and evacuation routes and mitigate any problem areas.	Completed.
1.1.11 – Lathrop School District – Review emergency access routes and evacuation routes and mitigate any problem areas.	Completed.
1.2.1 – Cameron – Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations	Completed.
1.2.1 – Lathrop School District – Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations	Completed.
1.2.5 – Clinton County – Study and develop alternative warning systems to counteract the public's indifference toward existing warning systems.	Completed.
1.2.5 – Cameron – Study and develop alternative warning systems to counteract the public's indifference toward existing warning systems.	Completed.
1.2.6 – Clinton County –Work with MoDOT to utilize electronic signs for emergencies and public notification.	Completed.
1.2.6 – Cameron –Work with MoDOT to utilize electronic signs for emergencies and public notification.	Completed.
1.3.1 – Gower - Citizens should be encouraged to know ahead of time what they should do to help elderly or disabled friends and neighbors or employees during times of natural hazard.	Completed.

1.3.2 – Clinton County – Determine how to accommodate individuals with special needs in emergency shelters, including complying with the American with Disabilities Act (ADA)	Completed.
1.3.2 – Cameron – Determine how to accommodate individuals with special needs in emergency shelters, including complying with the American with Disabilities Act (ADA)	Completed.
1.3.3 – Gower - Coordinate with volunteer groups, utilities, etc. to assist at-risk groups in winterizing their homes.	Completed.
1.3.4 – Clinton County – Develop an inventory of facilities with generators/emergency power that can be used as shelters in the event of natural disasters	Completed.
1.3.4 – Cameron – Develop an inventory of facilities with generators/emergency power that can be used as shelters in the event of natural disasters	Completed.
1.3.4 – Cameron – Develop an inventory of facilities with generators/emergency power that can be used as shelters in the event of natural disasters	Completed.
1.3.4 – Gower – Develop an inventory of facilities with generators/emergency power that can be used as shelters in the event of natural disasters	Completed.
2.2.5 – Gower - Encourage residents to take water-saving measures prioritize water use, particularly for emergency uses such as firefighting.	Completed.
2.3.1 – Gower - Encourage up-to-date commercial and industrial disaster plans that are coordinated with community disaster plans.	Completed.
2.3.2 – Gower - Determine how long large businesses and employers can operate without individual services.	Completed.
2.3.3 – Clinton County – Emergency lists should be developed and maintained with names and phone numbers of plant managers and other large employers.	Completed.
2.3.3 – Cameron – Emergency lists should be developed and maintained with names and phone numbers of plant managers and other large employers.	Completed.
2.3.3 – Gower – Emergency lists should be developed and maintained with names and phone numbers of plant managers and other large employers.	Completed.
2.3.3 – Lathrop – Emergency lists should be developed and maintained with names and phone numbers of plant managers and other large employers.	Keep updating lists.
2.3.4 – Cameron – Add back-up generators to critical facilities including water distribution, wastewater treatment facilities and emergency shelters.	Completed.
2.3.4 – Gower – Add back-up generators to critical facilities including water distribution, wastewater treatment facilities and emergency shelters.	Completed.
2.3.4 – Plattsburg – Add back-up generators to critical facilities including water distribution, wastewater treatment facilities and emergency shelters.	Completed.
2.3.4 – Trimble – Add back-up generators to critical facilities including water distribution, wastewater treatment facilities and emergency shelters.	Completed.
2.3.5 - Gower - Develop plans for backup water systems for critical facilities.	Completed.
2.3.5 - Lathrop - Develop plans for backup water systems for critical facilities.	Added a second tower and repaired the first tower.
3.1.5 – Clinton County – Encourage property owners, businesses and occupants in hazard area to participate in mitigation policy formulation.	
3.1.1. – Cameron School District - Maintain a publicly accessible list of names, positions, contact information, roles, and responsibilities for all public safety positions and departments.	Completed.
3.1.1. – Gower - Maintain a publicly accessible list of names, positions, contact information, roles, and responsibilities for all public safety positions and departments.	Completed.
3.1.2 – Gower -- Execute and maintain mutual aid agreements with all relevant agencies.	Completed.
3.1.2 – Plattsburg -- Execute and maintain mutual aid agreements with all relevant agencies.	Completed.
3.1.2 – **Lathrop** -- Execute and maintain mutual aid agreements with all relevant agencies.	Completed.
3.1.2 – Turney - Execute and maintain mutual aid agreements with all relevant agencies.	Fire District completed this.
3.1.4 – Cameron School District - Coordinate and link web sites for counties, municipalities, school districts, Local Emergency Planning Commission and emergency services.	Completed.
3.1.4 – Gower - Coordinate and link web sites for counties, municipalities, school districts, Local Emergency Planning Commission and emergency services.	Completed.
3.1.5 – Gower - Encourage property owners, businesses and occupants in hazard areas to participate in mitigation policy formulation.	Completed.
3.1.6 – Clinton County – Inform all city/county department heads and major employers of the county mitigation plan.	Completed.
3.1.6 – Gower – Inform all city/county department heads and major employers of the county mitigation plan.	Completed.

3.1.6 – Lathrop - Inform all city/county department heads and major employers of the county mitigation plan.	Completed.
3.1.6 – Lathrop School District – Inform all city/county department heads and major employers of the county mitigation plan.	Completed.
3.1.6 – Plattsburg - Inform all city/county department heads and major employers of the county mitigation plan.	Completed.
3.1.7 – Clinton County – Craft new plans or update existing comprehensive land use plans to specifically address development in hazard prone areas and recommend strategies for decreasing the jurisdiction's vulnerability to hazards.	Completed.
3.2.1 – Cameron School District – Determine the impact the less of government records would have and plan to safeguard the most important records accordingly.	Completed.
3.2.1 – Gower – Determine the impact the less of government records would have and plan to safeguard the most important records accordingly.	Completed.
3.2.1 – Trimble – Determine the impact the less of government records would have and plan to safeguard the most important records accordingly.	Completed.
3.2.4 – Gower - Review, prioritize, institute and monitor needed upgrades or retrofits for critical buildings and infrastructures.	Completed.
3.2.4 – Lathrop School District – Review, prioritize, institute and monitor needed upgrades or retrofits for critical buildings and infrastructures.	Completed.
3.2.6 – Lathrop - Encourage water and wastewater districts to elevate vulnerable equipment, electrical controls and other equipment at wastewater treatment plants, potable water treatment plants and pump stations.	Completed.
4.1.1 – Gower – Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each month of the year, and coordinate this campaign with a variety of distribution channels.	Completed.
4.1.1 – Lathrop School District – Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each month of the year, and coordinate this campaign with a variety of distribution channels.	Completed.
4.1.3. — Lathrop School District – Educate grade school-age children in disaster preparedness and how to survive disasters.	Completed.
Deleted Actions	**Reason for Deletion**
1.1.1 – Clinton County – Have video and audio Public Service Announcements (PSA) pre-made, delivered to the media and ready to be broadcast during emergencies and disasters.	No longer needed; PSAs are electronic format now.
1.1.2 – Clinton County – Local governments should encourage residents to purchase weather radios to ensure that everyone has sufficient access to information in times of severe weather.	Not practical
1.1.2 – Grayson – Local governments should encourage residents to purchase weather radios to ensure that everyone has sufficient access to information in times of severe weather.	No staff
1.1.2 – Holt – Local governments should encourage residents to purchase weather radios to ensure that everyone has sufficient access to information in times of severe weather.	Not practical
1.1.2 – **Lathrop** – Local governments should encourage residents to purchase weather radios to ensure that everyone has sufficient access to information in times of severe weather.	Weather apps are more commonly used now.
1.1.2 – Plattsburg – Local governments should encourage residents to purchase weather radios to ensure that everyone has sufficient access to information in times of severe weather.	Not practical.
1.1.3 – Clinton County – Encourage the incorporation and design of safe rooms in the construction of new public facilities like libraries, community centers, etc.	Not practical.
1.1.3 – Cameron School District – Encourage the incorporation and design of safe rooms in the construction of new public facilities like libraries, community centers, etc.	Not practical.
1.1.3 – Plattsburg – Encourage the incorporation and design of safe rooms in the construction of new public facilities like libraries, community centers, etc.	Not practical.
1.1.3 – Lathrop – Encourage the incorporation and design of safe rooms in the construction of new public facilities like libraries, community centers, etc.	Not practical.
1.1.4 – Lathrop – Incorporate hazard buffer zones into subdivision platting regulations.	Not practical.
1.1.4 – Plattsburg – Incorporate hazard buffer zones into subdivision platting regulations.	Not practical.
1.1.4 – Trimble - Incorporate hazard buffer zones into subdivision platting regulations.	Not practical.
1.1.5 – Grayson – Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after natural hazard event.	No staff.

1.1.5 – Holt – Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after natural hazard event.	Not practical.
1.1.5 – Plattsburg – Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after natural hazard event.	Not practical.
1.1.5 – **Trimble** – Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after natural hazard event.	Not practical.
1.1.5 – **Turney** – Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after natural hazard event.	No local shelters.
1.1.6 – Clinton County – Create a program to provide air conditioners and/or fans to those people in their community who do not have them and are at risk during a heat wave.	No resources.
1.1.6 – Lathrop – Create a program to provide air conditioners and/or fans to those people in their community who do not have them and are at risk during a heat wave.	No resources for that project.
1.1.6 – Plattsburg – Create a program to provide air conditioners and/or fans to those people in their community who do not have them and are at risk during a heat wave.	No resources for that project.
1.1.8 – Clinton County – Businesses should be encouraged to implement "snow-day" policies for their employees that mirror official plans. These measures may reduce the number of people on the roadways during periods of severe winter weather.	Not practical.
1.1.8 –Lathrop – Businesses should be encouraged to implement "snow-day" policies for their employees that mirror official plans. These measures may reduce the number of people on the roadways during periods of severe winter weather.	No resources to implement.
1.1.8 – Lathrop School District– Businesses should be encouraged to implement "snow-day" policies for their employees that mirror official plans. These measures may reduce the number of people on the roadways during periods of severe winter weather.	Not a business.
1.1.8 – Plattsburg – Businesses should be encouraged to implement "snow-day" policies for their employees that mirror official plans. These measures may reduce the number of people on the roadways during periods of severe winter weather.	Not a measurable action.
1.1.8 – Lathrop School District – Businesses should be encouraged to implement "snow-day" policies for their employees that mirror official plans. These measures may reduce the number of people on the roadways during periods of severe winter weather.	Not a business.
1.1.10 – Cameron School District – Assess existing public facilities for the location of suitable "safe areas." If available these "safe areas" should be clearly marked and employees and visitors should be informed of their location in public facilities.	Not practical.
1.1.10 – Lathrop – Assess existing public facilities for the location of suitable "safe areas." If available these "safe areas" should be clearly marked and employees and visitors should be informed of their location in public facilities.	Not practical.
1.1.10 – Plattsburg – Assess existing public facilities for the location of suitable "safe areas." If available these "safe areas" should be clearly marked and employees and visitors should be informed of their location in public facilities.	Not practical.
1.1.11 – Lathrop – Review emergency access routes and evacuation routes, mitigate problem areas.	Not practical.
1.1.11 – Plattsburg – Review emergency access routes and evacuation routes, mitigate problem areas.	Not practical.
1.1.11 – Trimble – Review emergency access routes and evacuation routes, mitigate problem areas.	Not practical.
1.2.1 – Clinton County – Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	Not measurable.
1.2.1 – Lathrop – Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	Not measurable.
1.2.1 – Plattsburg – Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	Not measurable.
1.2.1 – Trimble – Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	Not measurable.
1.2.2 – Grayson - Cities that do not already possess warning systems should purchase a system.	Not practical.
1.2.2 – Plattsburg - Cities that do not already possess warning systems should purchase a system.	Not practical.
1.2.3 – Clinton County – Place warning sirens in unincorporated areas of the county.	Lack of funding.
1.3.1 – Clinton County – Citizens should be encouraged to know ahead of time what they should do to help elderly, disabled and neighbors or employees during natural hazards.	Not measurable.

1.3.1 – Cameron – Citizens should be encouraged to know ahead of time what they should do to help elderly or disabled friends and neighbors or employees during natural hazards.	Not measurable.
1.3.1 – Cameron School District – Citizens should be encouraged to know ahead of time what they should do to help elderly or disabled friends and neighbors or employees during natural hazards.	Not measurable.
1.3.1 – Holt – Citizens should be encouraged to know ahead of time what they should do to help elderly or disabled friends and neighbors or employees during natural hazards.	Not measurable.
1.3.1 – Lathrop – Citizens should be encouraged to know ahead of time what they should do to help elderly or disabled friends and neighbors or employees during natural hazards.	Not measurable.
1.3.1 – Lathrop School District – Citizens should be encouraged to know ahead of time what they should do to help elderly or disabled friends and neighbors or employees during natural hazards.	Not measurable.
1.3.1 – Plattsburg – Citizens should be encouraged to know ahead of time what they should do to help elderly or disabled friends and neighbors or employees during natural hazards.	Not measurable.
1.3.3 – Clinton County – Provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	No resources.
1.3.3 – Cameron – Provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	No resources.
1.3.3 – Holt – Provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	No resources.
1.3.3 – Lathrop – Provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	No resources.
1.3.3 – Plattsburg – Provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	No resources.
1.3.3 – Trimble – Provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	No resources.
1.3.3 – Turney – Provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	Lack of staff
1.3.4 – Cameron – Develop an inventory of facilities with generators/emergency power that can be used as shelters in the event of natural disasters.	Not practical.
1.3.4 – Holt – Develop an inventory of facilities with generators/emergency power that can be used as shelters in the event of natural disasters.	Not practical.
1.3.4 – Plattsburg – Develop an inventory of facilities with generators/emergency power that can be used as shelters in the event of natural disasters.	Not practical.
2.2.1 – Clinton County – Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in an all comprehensive land use plan.	Not practical.
2.2.1 – Cameron – Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in an all comprehensive land use plan.	Not practical.
2.2.1 – Lathrop – Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in an all comprehensive land use plan.	Not practical.
2.2.1 – Plattsburg – Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in an all comprehensive land use plan.	Not practical.
2.2.3 – **Clinton County –** Amend municipal ordinances to include a section mandating the building of a wind-resistant shelter with a capacity suitable to handle the expected population in any new trailer park, or park undergoing renovation or expansion.	Not practical.
2.2.3 – **Cameron –** Amend municipal ordinances to include a section mandating the building of a wind-resistant shelter with a capacity suitable to handle the expected population in any new trailer park, or park undergoing renovation or expansion.	Not practical.
2.2.3 – **Plattsburg –** Amend municipal ordinances to include a section mandating the building of a wind-resistant shelter with a capacity suitable to handle the expected population in any new trailer park, or park undergoing renovation or expansion.	Not practical.
2.2.4 – Cameron – Explore the use of snow fencing on roads prone to drifting and blowing snows.	Not needed.
2.2.4 – Cameron – Explore the use of snow fencing on roads prone to drifting and blowing snows.	Not needed.
2.2.4 – Clinton County – Explore the use of snow fencing on roads prone to drifting and blowing snows.	Not needed.
2.2.4 – Gower - Explore the use of snow fencing on roads prone to drifting and blowing snows.	Not needed.
2.2.4 – Holt - Explore the use of snow fencing on roads prone to drifting and blowing snows.	Not needed.

2.2.4 – Lathrop – Explore the use of snow fencing on roads prone to drifting and blowing snows.	Not needed.
2.2.4 – Plattsburg – Explore the use of snow fencing on roads prone to drifting and blowing snows.	Not needed.
2.2.4 – Trimble – Explore the use of snow fencing on roads prone to drifting and blowing snows.	Not needed.
2.2.4 – Turney – Explore the use of snow fencing on roads prone to drifting and blowing snows.	Not needed.
2.2.5 – Clinton County – Encourage residents to take water-saving measurers prioritize water use, particularly for emergency uses.	Not measurable.
2.2.5 – Cameron – Encourage residents to take water-saving measurers prioritize water use, particularly for emergency uses.	Not measurable.
2.2.5 – Grayson – Encourage residents to take water-saving measurers prioritize water use, particularly for emergency uses.	Not measurable.
2.2.5 – Holt – Encourage residents to take water-saving measurers prioritize water use, particularly for emergency uses.	Not measurable.
2.2.5 – Lathrop – Encourage residents to take water-saving measurers prioritize water use, particularly for emergency uses.	Not measurable.
2.2.5 – Plattsburg – Encourage residents to take water-saving measurers prioritize water use, particularly for emergency uses.	Not measurable.
2.2.5 – Trimble – Encourage residents to take water-saving measurers prioritize water use, particularly for emergency uses.	Not measurable.
2.3.1 – Clinton County – Encourage up-to-date commercial and industrial disaster plans that are coordinated with community disaster plans.	Not measurable.
2.3.1 – Cameron – Encourage up-to-date commercial and industrial disaster plans that are coordinated with community disaster plans.	Not measurable.
2.3.1 – Plattsburg – Encourage up-to-date commercial and industrial disaster plans that are coordinated with community disaster plans.	Not measurable.
2.3.2 – Clinton County – Determine how long large businesses and employers can operate without individual services.	No resources.
2.3.2 – Cameron – Determine how long large businesses and employers can operate without individual services.	No resources.
2.3.2 – Lathrop – Determine how long large businesses and employers can operate without individual services.	No resources.
2.3.2 – Plattsburg – Determine how long large businesses and employers can operate without individual services.	No resources.
2.3.3 – Cameron – Emergency lists should be developed and maintained with names and phone numbers of plant managers and other large employers.	Not practical.
2.3.3 – Plattsburg – Emergency lists should be developed and maintained with names and phone numbers of plant managers and other large employers.	Not practical.
2.3.4 – Cameron School District – Add backup generators to critical facilities, including water distribution, wastewater treatment facilities and emergency shelters.	Not practical.
2.3.4 – Holt – Add backup generators to critical facilities, including water distribution, wastewater treatment facilities and emergency shelters.	Not practical.
2.3.4 – Lathrop School District – Add backup generators to critical facilities, including water distribution, wastewater treatment facilities and emergency shelters.	Not practical.
2.3.4 – Turney – Add backup generators to critical facilities, including water distribution, wastewater treatment facilities and emergency shelters.	Not practical.
2.3.4 – Grayson – Add backup generators to critical facilities, including water distribution, wastewater treatment facilities and emergency shelters.	Not practical.
2.3.5 – Cameron – Develop plans for backup water systems for critical facilities.	Not practical.
2.3.5 – Cameron School District – Develop plans for backup water systems for critical facilities.	Not practical.
2.3.5 – Grayson – Develop plans for backup water systems for critical facilities.	Not practical.
2.3.5 – Holt – Develop plans for backup water systems for critical facilities.	Not practical.
2.3.5 – Lathrop – Develop plans for backup water systems for critical facilities.	Not practical.
2.3.5 – Lathrop School District – Develop plans for backup water systems for critical facilities.	Not practical.
2.3.5 – Plattsburg – Develop plans for backup water systems for critical facilities.	Not practical.
2.3.5 – Turney – Develop plans for backup water systems for critical facilities.	There's no water system
3.1.1 – Cameron – Maintain a publicly accessible list of names, positions, contact information, rules and responsibilities for all public safety positions and departments.	Not practical.

3.1.1 – Grayson – Maintain a publicly accessible list of names, positions, contact information, rules and responsibilities for all public safety positions and departments.	Not practical.
3.1.1 – Holt – Maintain a publicly accessible list of names, positions, contact information, rules and responsibilities for all public safety positions and departments.	Not practical.
3.1.1 – Plattsburg – Maintain a publicly accessible list of names, positions, contact information, rules and responsibilities for all public safety positions and departments.	Not practical.
3.1.1 – Turney – Maintain a publicly accessible list of names, positions, contact information, rules and responsibilities for all public safety positions and departments**.**	No staff
3.1.2 – Cameron – Execute and maintain mutual agreements with all relevant agencies.	No resources.
3.1.2 – Grayson – Execute and maintain mutual agreements with all relevant agencies.	No resources.
3.1.2 – Holt – Execute and maintain mutual agreements with all relevant agencies.	No resources.
3.1.4 – Cameron – Coordinate and link web sites for counties, municipalities, school districts, local emergency planning commission and emergency services.	No resources.
3.1.4 – Grayson – Coordinate and link web sites for counties, municipalities, school districts, local emergency planning commission and emergency services.	No staff or website.
3.1.4 – Holt – Coordinate and link web sites for counties, municipalities, school districts, local emergency planning commission and emergency services.	Not practical.
3.1.4 – Plattsburg – Coordinate and link web sites for counties, municipalities, school districts, local emergency planning commission and emergency services.	Not practical.
3.1.4 – Turney – Coordinate and link web sites for counties, municipalities, school districts, local emergency planning commission and emergency services.	No city website and no funds/staff to maintain it
3.1.5 – Cameron School District – Encourage property owners, businesses and occupants in hazard area to participate in mitigation policy formulation.	Not measurable.
3.1.5 – Clinton County – Encourage property owners, businesses and occupants in hazard area to participate in mitigation policy formulation.	Not measurable.
3.1.5 – Cameron – Encourage property owners, businesses and occupants in hazard area to participate in mitigation policy formulation.	Not measurable.
3.1.5 – Grayson – Encourage property owners, businesses and occupants in hazard area to participate in mitigation policy formulation.	Not measurable.
3.1.5 – Holt – Encourage property owners, businesses and occupants in hazard area to participate in mitigation policy formulation.	Not measurable.
3.1.5 – Lathrop – Encourage property owners, businesses and occupants in hazard area to participate in mitigation policy formulation.	Not measurable.
3.1.5 – Lathrop School District – Encourage property owners, businesses and occupants in hazard area to participate in mitigation policy formulation.	Not measurable.
3.1.5 – Plattsburg – Encourage property owners, businesses and occupants in hazard area to participate in mitigation policy formulation.	Not measurable.
3.1.5 – Trimble – Encourage property owners, businesses and occupants in hazard area to participate in mitigation policy formulation.	Not measurable.
3.1.5 – Turney – Encourage property owners, businesses and occupants in hazard area to participate in mitigation policy formulation.	Not measurable.
3.1.6 – Cameron – Inform all city/county department heads, school administrators, and major employers of the county mitigation plan.	Another agency does this.
3.1.6 – Holt – Inform all city/county department heads, school administrators, and major employers of the county mitigation plan.	Another agency does this.
3.1.6 – Trimble – Inform all city/county department heads, school administrators, and major employers of the county mitigation plan.	Another agency does this.
3.1.6 – Grayson – Inform all city/county department heads, school administrators, and major employers of the county mitigation plan.	Another agency does this.
3.1.6 – Turney – Inform all city/county department heads, school administrators, and major employers of the county mitigation plan.	Handled by another organization
3.1.7 – Cameron – Craft new plans or update existing comprehensive land use plans to specifically address development in hazard-prone areas and recommend strategies for decreasing the jurisdiction's vulnerability to hazards.	Not practical.
3.1.7 – Lathrop – Craft new plans or update existing comprehensive land use plans to specifically address development in hazard-prone areas and recommend strategies for decreasing the jurisdiction's vulnerability to hazards.	Not practical.
3.1.7 – Plattsburg – Craft new plans or update existing comprehensive land use plans to specifically address development in hazard-prone areas and recommend strategies for decreasing the jurisdiction's vulnerability to hazards .	Not practical.
3.2.1 – Cameron – Continue to safeguard the most important government records in case of power outage or disaster, update plans as necessary.	Not practical.

3.2.1 – Grayson – Continue to safeguard the most important government records in case of power outage or disaster, update plans as necessary.	Not practical.
3.2.1 – Holt – Continue to safeguard the most important government records in case of power outage or disaster, update plans as necessary.	Not practical.
3.2.1 – Lathrop School District – Continue to safeguard the most important government records in case of power outage or disaster, update plans as necessary.	Not practical.
3.2.2 – Clinton County – Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles, and similar structures.	Not measurable.
3.2.3 – Clinton County – Encourage tree trimming by electric companies.	Not practical.
3.2.4 – Cameron – Review, prioritize, institute and monitor needed upgrades or retrofits for critical buildings and infrastructures.	Not practical.
3.2.4 – Grayson – Review, prioritize, institute and monitor needed upgrades or retrofits for critical buildings and infrastructures.	Not practical.
3.2.4 – Holt – Review, prioritize, institute and monitor needed upgrades or retrofits for critical buildings and infrastructures.	Not practical.
3.2.4 – Plattsburg – Review, prioritize, institute and monitor needed upgrades or retrofits for critical buildings and infrastructures.	Not practical.
3.2.4 – Trimble - Review, prioritize, institute and monitor needed upgrades or retrofits for critical buildings and infrastructures.	Not practical.
3.2.5 – Clinton County – Utility providers should assess their facilities distribution systems, etc., for vulnerability to natural hazards.	Not practical.
3.2.6 – Clinton County – Encourage water and wastewater districts to elevate vulnerable equipment.	Not measurable.
3.2.6 – Cameron – Encourage water and wastewater districts to elevate vulnerable equipment, electrical controls and other equipment at wastewater treatment plants, potable water treatment plants and pump stations.	Not measurable.
3.2.6 – Gower - Encourage water and wastewater districts to elevate vulnerable equipment, electrical controls and other equipment at wastewater treatment plants, potable water treatment plants and pump stations.	Not relevant.
3.2.6 – Holt – Encourage water and wastewater districts to elevate vulnerable equipment, electrical controls and other equipment at wastewater treatment plants, potable water treatment plants and pump stations.	Not measurable.
3.2.6 – Plattsburg – Encourage water and wastewater districts to elevate vulnerable equipment, electrical controls and other equipment at wastewater treatment plants, potable water treatment plants and pump stations.	Not measurable.
4.1.1 – Clinton County – Develop an ongoing campaign to educate the community about seasonal hazards, and coordinate this campaign with a variety of advertising resources in order to reach the maximum number of people in a timely manner.	Not measurable.
4.1.1 – Cameron – Develop an ongoing campaign to educate the community about seasonal hazards, and coordinate this campaign with a variety of advertising resources in order to reach the maximum number of people in a timely manner.	Not measurable.
4.1.1 – Grayson – Develop an ongoing campaign to educate the community about seasonal hazards, and coordinate this campaign with a variety of advertising resources in order to reach the maximum number of people in a timely manner.	Not measurable.
4.1.1 – Holt – Develop an ongoing campaign to educate the community about seasonal hazards, and coordinate this campaign with a variety of advertising resources in order to reach the maximum number of people in a timely manner.	No resources.
4.1.1 – Lathrop – Develop an ongoing campaign to educate the community about seasonal hazards, and coordinate this campaign with a variety of advertising resources in order to reach the maximum number of people in a timely manner.	Lack of staff.
4.1.1 – Plattsburg – Develop an ongoing campaign to educate the community about seasonal hazards, and coordinate this campaign with a variety of advertising resources in order to reach the maximum number of people in a timely manner.	No resources.
4.1.1 – Trimble – Develop an ongoing campaign to educate the community about seasonal hazards, and coordinate this campaign with a variety of advertising resources in order to reach the maximum number of people in a timely manner.	No resources.
4.1.1 – Turney – Develop an ongoing campaign to educate the community about seasonal hazards, and coordinate this campaign with a variety of advertising resources in order to reach the maximum number of people in a timely manner.	No staff.
4.1.2 – Cameron – Publish detailed hazard maps on all city and county websites & provide paper copies to the public.	Not practical.
4.1.2 – Plattsburg – Publish detailed hazard maps on all city and county websites & provide paper copies to the public.	Not practical.

4.1.2 – Turney – Publish detailed hazard maps on all city and county websites & provide paper copies to the public.	No website or staff.
4.1.4 – Clinton County – Businesses and homeowners in flood prone areas should be encouraged to elevate mechanical systems (i.e. furnaces, hot water heaters, electric panels, etc.)	Not a measurable action.
4.1.5 – Clinton County – Citizens should be encouraged to assemble a home disaster supply kit and to prepare to be homebound for up to three days in an emergency situation.	Not a measurable action.
4.1.6 – Clinton County – Citizens will be encouraged to learn how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.	Not a measurable action.
4.1.7 – Clinton County - Citizens that live in areas near timber or tall grass should be encouraged to remove vegetation, yard debris, and other combustible materials that may be near structures.	Not a measurable action.

(Source: 2013 County Hazard Mitigation Plan and action evaluation forms)

Actions that have not been completed, are either (1) deleted with an explanation why the action is no longer relevant; or (2) continued with the intent to complete. Limited funding, staffing and resources are common barriers to implementation. MPC members were encouraged to view proposed actions within the broad priorities of hazard mitigation and weighed the potential cost of each project in relation to the anticipated future cost savings.

4.3 Implementation of Mitigation Actions

44 CFR Requirement §201.6(c)(3)(ii): The mitigation strategy shall include an action strategy describing how the actions identified in paragraph (c)(2)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefits review of the proposed projects and their associated costs.

Jurisdictional MPC members were encouraged to meet with others in their community to finalize the actions to be submitted for the updated mitigation strategy. Throughout the MPC consideration and discussion, emphasis was placed on the importance of a benefit-cost analysis in determining project priority. The Disaster Mitigation Act requires benefit-cost review as the primary method by which mitigation projects should be prioritized. The MPC decided to pursue implementation according to when and where damage occurs, available funding, political will, jurisdictional priority, and priorities identified in the Missouri State Hazard Mitigation Plan. The benefit/cost review at the planning stage primarily consisted of a qualitative analysis, and was not the detailed process required grant funding application. For each action, the plan sets forth a narrative describing the types of benefits that could be realized from action implementation. The cost was estimated as closely as possible, with further refinement to be supplied as project development occurs.

FEMA's STAPLEE methodology was used to assess the costs and benefits, overall feasibility of mitigation actions, and other issues impacting project. During the prioritization process, the MPC used worksheets to assign scores. The worksheets posed questions based on the STAPLEE elements as well as the potential mitigation effectiveness of each action. Scores were based on the responses to the questions as follows:

Definitely yes = 3 points
Maybe yes = 2 points
Probably no = 1
Definitely no = 0

The following questions were asked for each proposed action.

S: Is the action socially acceptable?
T: Is the action technically feasible and potentially successful?

A: Does the jurisdiction have the administrative capability to successfully implement this action?
P: Is the action politically acceptable?
L: Does the jurisdiction have the legal authority to implement the action?
E: Is the action economically beneficial?
E: Will the project have an environmental impact that is either beneficial or neutral? (score “3” if positive and “2” if neutral)

Will the implemented action result in lives saved?
Will the implanted action result in a reduction of disaster damage?

The final scores are listed below in the analysis of each action. Not all actions have a STAPEE form. Those that were submitted are attached to this plan as Appendix C. The STAPLEE final score for each action, absent other considerations, such as a localized need for a project, determined the priority. Low priority action items were those that had a total score of between 0 and 24. Moderate priority actions were those scoring between 25 and 29. High priority actions scored 30 or above. A blank STAPLEE worksheet is shown in Figure 4.1

Figure 4.1. Blank STAPLEE Worksheet

XXXXXX COUNTY
MULTI-JURISDICTIONAL
LOCAL HAZARD MITIGATION PLAN

Action Title:	**Jurisdiction:**
Action ID:	

STAPLEE Criteria	Evaluation Rating Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0	Score
S: Is it Socially acceptable?		
T: Is it Technically feasible and potentially successful?		
A: Does the jurisdiction have the administrative capacity to execute this action?		
P: Is it Politically acceptable?		
L: Is there Legal authority to implement?		
E: Is it Economically beneficial?		
E: Will the project have either a neutral or positive impact on the natural environment? (score a 3 if positive impact, 2 if neutral impact)		
Will historic structures be saved or protected?		
Could it be implemented quickly?		
STAPLEE Score		

Mitigation Effectiveness Criteria	**Evaluation Rating**	**Score**
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives would be saved.	
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	
Mitigation Effectiveness Score		

Total Score (STAPLEE Score + Mitigation Effectiveness Score): _____

Priority Level: ☐High (30+ points) ☐Medium (25-29 points) ☐Low (less than 25 points)

Completed by (name/title/phone #): _____

The goals and actions the MPC created are consistent with the hazards identified in the plan. Each jurisdiction focused on the hazards identified with the highest probability and historic damage in their area but a common concern throughout the distract was preparing for severe thunderstorms and tornados. Final mitigation actions took the results of STAPLEE worksheets into consideration. Actions are organized by the goal statement that they fall under and worksheets for some of the continuing and new mitigation actions are located in Appendix C. Not all continuing actions have worksheets. The 2013 actions that have been continued to the 2018 plan have different actions numbers. The 2013 action number is identified on the action sheet by the new number. New actions are identified as such.

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.1.1:
(2013 Action 1.1.11)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Problematic road routes
Hazard(s) Addressed:	Dam Failure, Flood, Winter Weather
Action or Project	
Action/Project Number:	1.1.1
Name of Action or Project:	Emergency Access Routes
Action or Project Description:	Review emergency access routes and evacuation routes; mitigate any problem areas
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	Varies
Benefits:	Mitigate problematic routes
Plan for Implementation	
Responsible Organization/Department:	Road and Bridge
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Operations Plan
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.1.2:
(2013 Action 1.1.10)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Lack of marked safe areas
Hazard(s) Addressed:	Earthquake, Thunderstorm, Tornado
Action or Project	
Action/Project Number:	1.1.2
Name of Action or Project:	Safe Areas
Action or Project Description:	Assess existing public facilities for the location of suitable "safe areas." If available, these "safe areas" should be clearly marked and employees and visitors should be informed of their location in public facilities.
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	$0 - $500 for signage
Benefits:	Marked safe areas
Plan for Implementation	
Responsible Organization/Department:	Clinton County Health Department
Action/Project Priority:	Medium
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Operating Plan
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.1.3:
(2013 Action 1.1.2)

Action Worksheet	
Name of Jurisdiction:	Gower
Risk / Vulnerability	
Problem being Mitigated:	Unprepared public
Hazard(s) Addressed:	Flood, Thunderstorm, Winter Storm, Tornado
Action or Project	
Action/Project Number:	1.1.3
Name of Action or Project:	Weather Radios and Weather Phone Apps
Action or Project Description:	City will inform citizens about the importance of having and using a weather radio or a weather phone app.
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	None
Benefits:	Sufficient warning of impending disasters
Plan for Implementation	
Responsible Organization/Department:	Mayor
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Modified to include weather phone apps since that has become more popular

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.1.4:
(2013 Action 1.1.5)

Action Worksheet	
Name of Jurisdiction:	Lathrop
Risk / Vulnerability	
Problem being Mitigated:	Unknown location of citizens after a natural hazard event
Hazard(s) Addressed:	Earthquake, Thunderstorm, Winter Weather, Tornado, Fire
Action or Project	
Action/Project Number:	1.1.4
Name of Action or Project:	Address List
Action or Project Description:	Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after natural hazard event.
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	None
Benefits:	Improved and efficient communication and location of survivors
Plan for Implementation	
Responsible Organization/Department:	City Administrator, in coordination with the community center and churches
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	None
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.1.5:
(2013 Action 1.1.3)

Action Worksheet	
Name of Jurisdiction:	Lathrop School District
Risk / Vulnerability	
Problem being Mitigated:	Vulnerable students
Hazard(s) Addressed:	Thunderstorm, Tornado
Action or Project	
Action/Project Number:	1.1.6
Name of Action or Project:	Safe Room for Lathrop School District
Action or Project Description:	Submit notice of interest for a safe room
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	
Benefits:	Protect lives of Clinton County residents
Plan for Implementation	
Responsible Organization/Department:	School Board
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, HMGP safe room grant
Local Planning Mechanisms to be Used in Implementation, if any:	School Emergency Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	No funds – at the discussion stage on progressing on notice of interest. Action modified from "Encourage the incorporation and design of safe rooms in the construction of new public facilities like libraries, community centers, etc." to current form

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.1.6:
(2013 Action 1.1.10)

Action Worksheet	
Name of Jurisdiction:	Lathrop School District
Risk / Vulnerability	
Problem being Mitigated:	Lack of marked safe areas
Hazard(s) Addressed:	Earthquake, Thunderstorm, Tornado
Action or Project	
Action/Project Number:	1.1.6
Name of Action or Project:	Marked Safe Areas
Action or Project Description:	Assess existing public facilities for the location of suitable "safe areas." If available, these "safe areas" should be clearly marked and employees and visitors should be informed of their location.
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	$0 - $500 for signage
Benefits:	Marked safe areas
Plan for Implementation	
Responsible Organization/Department:	Superintendent
Action/Project Priority:	Medium
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Operating Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Continue to locate areas

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.1.7:
(2013 Action 1.1.2)

Action Worksheet	
Name of Jurisdiction:	Turney
Risk / Vulnerability	
Problem being Mitigated:	Unprepared public
Hazard(s) Addressed:	Flood, Thunderstorm, Winter Storm, Tornado
Action or Project	
Action/Project Number:	1.1.7
Name of Action or Project:	Weather Radios
Action or Project Description:	City will inform citizens about the importance of having and using a weather radio.
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	None
Benefits:	Sufficient warning of impending disasters
Plan for Implementation	
Responsible Organization/Department:	Mayor
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing In Progress
Report of Progress	

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.2.1:
(2013 Action 1.2.4)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Uninformed public
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	1.2.1
Name of Action or Project:	Electronic Media
Action or Project Description:	Use electronic media to alert residents of emergencies and to provide necessary information.
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	Unsure
Benefits:	Quickly inform public
Plan for Implementation	
Responsible Organization/Department:	Clinton County Emergency Management Director
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Operations Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Need to expand to new electronic media formats

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.2.2:
(New Action)

Action Worksheet	
Name of Jurisdiction:	Cameron
Risk / Vulnerability	
Problem being Mitigated:	Insufficient warning of impending disasters
Hazard(s) Addressed:	Thunderstorms, Tornado
Action or Project	
Action/Project Number:	1.2.2
Name of Action or Project:	Outdoor Warning Siren
Action or Project Description:	Submit notice of interest for acquiring an outdoor warning siren
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	Unsure
Benefits:	Provide sufficient warning of impending disasters
Plan for Implementation	
Responsible Organization/Department:	City Council
Action/Project Priority:	Medium
Timeline for Completion:	3 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	Funding source was not identified

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.2.3:
(New Action)

Action Worksheet	
Name of Jurisdiction:	Gower
Risk / Vulnerability	
Problem being Mitigated:	Insufficient warning of impending disasters
Hazard(s) Addressed:	Thunderstorms, Tornado
Action or Project	
Action/Project Number:	1.2.3
Name of Action or Project:	Outdoor Warning Siren
Action or Project Description:	Submit notice of interest for acquiring an outdoor warning siren
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	Unsure
Benefits:	Provide sufficient warning of impending disasters
Plan for Implementation	
Responsible Organization/Department:	Mayor
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	Location identified - north side of the city at the fire station

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.2.4:
(New Action)

Action Worksheet	
Name of Jurisdiction:	Gower
Risk / Vulnerability	
Problem being Mitigated:	Unprepared citizens
Hazard(s) Addressed:	Thunderstorms, Tornado
Action or Project	
Action/Project Number:	1.2.4
Name of Action or Project:	
Action or Project Description:	Coordinate with residents and businesses to stay informed on changing and dangerous weather by using current technology
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	Unsure
Benefits:	Sufficient warning of impending disasters
Plan for Implementation	
Responsible Organization/Department:	Mayor
Action/Project Priority:	High Priority
Timeline for Completion:	2 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.2.5:
(New action)

Action Worksheet	
Name of Jurisdiction:	Lathrop
Risk / Vulnerability	
Problem being Mitigated:	Vulnerable citizens
Hazard(s) Addressed:	Thunderstorms, Winter Weather
Action or Project	
Action/Project Number:	1.2.5
Name of Action or Project:	Outdoor Warning Siren
Action or Project Description:	Submit notice of interest for a grant for an outdoor warning siren.
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	Unsure
Benefits:	Sufficient warning of impending disasters
Plan for Implementation	
Responsible Organization/Department:	City Administrator
Action/Project Priority:	High
Timeline for Completion:	1 year
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	New Action
Report of Progress	Submitted the notice of interest during the updating process

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.2.6:
(2013 Action 1.2.2)

Action Worksheet	
Name of Jurisdiction:	Trimble
Risk / Vulnerability	
Problem being Mitigated:	Insufficient warning of impending disasters
Hazard(s) Addressed:	Thunderstorms, Tornado
Action or Project	
Action/Project Number:	1.2.6
Name of Action or Project:	Outdoor Warning Siren
Action or Project Description:	Submit notice of interest for an outdoor warning siren
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	Unsure
Benefits:	Provide sufficient warning of impending disasters
Plan for Implementation	
Responsible Organization/Department:	City Council
Action/Project Priority:	Medium
Timeline for Completion:	3 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	Funding source was not identified

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.2.7:
(New action)

Action Worksheet	
Name of Jurisdiction:	Turney
Risk / Vulnerability	
Problem being Mitigated:	Vulnerable citizens
Hazard(s) Addressed:	Thunderstorms, Winter Weather
Action or Project	
Action/Project Number:	1.2.7
Name of Action or Project:	Outdoor Warning Siren
Action or Project Description:	Submit notice of interest for a grant for an outdoor warning siren.
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	Unsure
Benefits:	Sufficient warning of impending disasters
Plan for Implementation	
Responsible Organization/Department:	City Council
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	New Action
Report of Progress	

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.3.1:
(2013 Action 1.3.1)

Action Worksheet	
Name of Jurisdiction:	Grayson
Risk / Vulnerability	
Problem being Mitigated:	Vulnerable Citizens
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	1.3.1
Name of Action or Project:	Assisting vulnerable citizens
Action or Project Description:	Develop a campaign for citizens to make a plan to assist elderly, disabled and other vulnerable friends or neighbors during a natural hazard.
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	Unsure
Benefits:	Most vulnerable citizens are identified and will be assisted
Plan for Implementation	
Responsible Organization/Department:	City Council
Action/Project Priority:	Medium
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.3.2:
(2013 Action 1.3.4)

Action Worksheet	
Name of Jurisdiction:	Lathrop
Risk / Vulnerability	
Problem being Mitigated:	Lack of power in an emergency
Hazard(s) Addressed:	Earthquake, Thunderstorm, Winter Weather, Tornado
Action or Project	
Action/Project Number:	1.3.2
Name of Action or Project:	Generator/Emergency Power
Action or Project Description:	Increase the number of facilities with generators/emergency power that can be used as shelters in the event of natural disasters.
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	Varies depending on the facility
Benefits:	Public and City has source of electricity after a natural disaster
Plan for Implementation	
Responsible Organization/Department:	City Administrator
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal and grants
Local Planning Mechanisms to be Used in Implementation, if any:	Comprehensive Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Generators have been added to the Community Center and Fire Station. Seeking to add a generator to the Police Station.

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.3.3:
(2013 Action 2.2.3)

Action Worksheet	
Name of Jurisdiction:	Lathrop
Risk / Vulnerability	
Problem being Mitigated:	Safe place for vulnerable citizens
Hazard(s) Addressed:	Thunderstorm and Tornado
Action or Project	
Action/Project Number:	1.3.3
Name of Action or Project:	Wind-Resistant Shelters at New Trailer Parks
Action or Project Description:	Require construction of a wind-resistant shelter with a capacity suitable to handle the expected population in any new trailer park, or park undergoing renovation or expansion.
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Varies on size of shelter
Benefits:	Protect vulnerable citizens
Plan for Implementation	
Responsible Organization/Department:	City Administrator
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Private, Grants (if shelter is also open to general public)
Local Planning Mechanisms to be Used in Implementation, if any:	Zoning Ordinance, Building Code, Site Plan Review
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.3.4
(2013 Action 1.3.1)

Action Worksheet	
Name of Jurisdiction:	Trimble
Risk / Vulnerability	
Problem being Mitigated:	Vulnerable citizens
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	1.3.4
Name of Action or Project:	Assisting Vulnerable Citizens
Action or Project Description:	Develop a campaign for citizens to make a plan to assist elderly, disabled and other vulnerable friends or neighbors during a natural hazard.
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	Unsure
Benefits:	Most vulnerable citizens are identified and will be assisted
Plan for Implementation	
Responsible Organization/Department:	City Council
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	No resources to get campaign started

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens

2018 Action 1.3.5
(2013 Action 1.3.1)

Action Worksheet	
Name of Jurisdiction:	Turney
Risk / Vulnerability	
Problem being Mitigated:	Vulnerable citizens
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	1.3.5
Name of Action or Project:	Assisting Vulnerable Citizens
Action or Project Description:	Develop a campaign for citizens to make a plan to assist elderly, disabled and other vulnerable friends or neighbors during a natural hazard.
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Estimated Cost:	Unsure
Benefits:	Most vulnerable citizens are identified and will be assisted
Plan for Implementation	
Responsible Organization/Department:	City Council
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	No resources to get campaign started

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.1.1:
(2013 Action 2.1.2)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Flooding
Hazard(s) Addressed:	Flood
Action or Project	
Action/Project Number:	2.1.1
Name of Action or Project:	NFIP Participation
Action or Project Description:	Adoption and enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs)
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Varies
Benefits:	Reduce losses from flooding
Plan for Implementation	
Responsible Organization/Department:	Flood Plain Administrator
Action/Project Priority:	High
Timeline for Completion:	5 year
Potential Fund Sources:	Local
Local Planning Mechanisms to be Used in Implementation, if any:	Land Use Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.1.2:
(2013 Action 2.1.2)

Action Worksheet	
Name of Jurisdiction:	Cameron
Risk / Vulnerability	
Problem being Mitigated:	Flooding
Hazard(s) Addressed:	Flood
Action or Project	
Action/Project Number:	2.1.2
Name of Action or Project:	NFIP Participation
Action or Project Description:	Adoption and enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs)
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Varies
Benefits:	Reduce losses from flooding
Plan for Implementation	
Responsible Organization/Department:	Emergency Management Director
Action/Project Priority:	High
Timeline for Completion:	5 year
Potential Fund Sources:	Local
Local Planning Mechanisms to be Used in Implementation, if any:	Land Use Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.1.3:
(2013 Action 2.1.2)

Action Worksheet	
Name of Jurisdiction:	Gower
Risk / Vulnerability	
Problem being Mitigated:	Flooding
Hazard(s) Addressed:	Flood
Action or Project	
Action/Project Number:	2.1.3
Name of Action or Project:	NFIP Participation
Action or Project Description:	Adoption and enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs)
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Varies
Benefits:	Reduce losses from flooding
Plan for Implementation	
Responsible Organization/Department:	City Code Administrator
Action/Project Priority:	High
Timeline for Completion:	5 year
Potential Fund Sources:	Local
Local Planning Mechanisms to be Used in Implementation, if any:	Land Use Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.1.4:
(2013 Action 2.1.2)

Action Worksheet	
Name of Jurisdiction:	Holt
Risk / Vulnerability	
Problem being Mitigated:	Flooding
Hazard(s) Addressed:	Flood
Action or Project	
Action/Project Number:	2.1.4
Name of Action or Project:	NFIP Participation
Action or Project Description:	Adoption and enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs)
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Varies
Benefits:	Reduce losses from flooding
Plan for Implementation	
Responsible Organization/Department:	City Council
Action/Project Priority:	High
Timeline for Completion:	5 year
Potential Fund Sources:	Local
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing In Progress
Report of Progress	

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.1.5:
(2013 Action 2.1.2)

Action Worksheet	
Name of Jurisdiction:	Lathrop
Risk / Vulnerability	
Problem being Mitigated:	Flooding
Hazard(s) Addressed:	Flood
Action or Project	
Action/Project Number:	2.1.5
Name of Action or Project:	NFIP Participation
Action or Project Description:	Adoption and enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs)
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Varies
Benefits:	Reduce losses from flooding
Plan for Implementation	
Responsible Organization/Department:	City Administrator
Action/Project Priority:	High
Timeline for Completion:	5 year
Potential Fund Sources:	Local
Local Planning Mechanisms to be Used in Implementation, if any:	Land Use Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.1.6:
(2013 Action 2.1.2)

Action Worksheet	
Name of Jurisdiction:	Plattsburg
Risk / Vulnerability	
Problem being Mitigated:	Flooding
Hazard(s) Addressed:	Flood
Action or Project	
Action/Project Number:	2.1.6
Name of Action or Project:	NFIP Participation
Action or Project Description:	Adoption and enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs)
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Varies
Benefits:	Reduce losses from flooding
Plan for Implementation	
Responsible Organization/Department:	City Code Administrator
Action/Project Priority:	High
Timeline for Completion:	5 year
Potential Fund Sources:	Local
Local Planning Mechanisms to be Used in Implementation, if any:	Land Use Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.1.7:
(2013 Action 2.1.2)

Action Worksheet	
Name of Jurisdiction:	Trimble
Risk / Vulnerability	
Problem being Mitigated:	Flooding
Hazard(s) Addressed:	Flood
Action or Project	
Action/Project Number:	2.1.7
Name of Action or Project:	NFIP Participation
Action or Project Description:	Adoption and enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs)
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Varies
Benefits:	Reduce losses from flooding
Plan for Implementation	
Responsible Organization/Department:	City Code Administrator
Action/Project Priority:	High
Timeline for Completion:	5 year
Potential Fund Sources:	Local
Local Planning Mechanisms to be Used in Implementation, if any:	Land Use Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.1.8:
(2013 Action 2.2.5)

Action Worksheet	
Name of Jurisdiction:	Turney
Risk / Vulnerability	
Problem being Mitigated:	Low water levels
Hazard(s) Addressed:	Drought
Action or Project	
Action/Project Number:	2.1.8
Name of Action or Project:	Water-Saving Measures
Action or Project Description:	Inform residents of water-saving measures that prioritize water use, particularly for emergency uses such as firefighting.
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Unsure
Benefits:	Decrease impact of natural hazards
Plan for Implementation	
Responsible Organization/Department:	City Council
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	Information to distribute not identified.

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.2.1:
(2013 Action 2.2.2)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Flooding and storm water
Hazard(s) Addressed:	Dam Failure, Flood, Thunderstorm
Action or Project	
Action/Project Number:	2.2.1
Name of Action or Project:	Storm Water / Watershed Management Plan
Action or Project Description:	Develop a countywide multi-jurisdiction comprehensive storm water / watershed management plan.
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Unknown
Benefits:	Managed storm water runoff and decreased erosion
Plan for Implementation	
Responsible Organization/Department:	Clinton County Zoning Department
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Grants
Local Planning Mechanisms to be Used in Implementation, if any:	Land Use Plan
Progress Report	
Action Status	Continuing Not Started
Report of Progress	In need of an external organization to assist in the process

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.2.2
(2013 Action 1.1.4)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Lack of buffer zones allows
Hazard(s) Addressed:	Dam Failure, Flood, Fire
Action or Project	
Action/Project Number:	2.2.2
Name of Action or Project:	Hazard buffer zones
Action or Project Description:	Incorporate hazard buffer zones into subdivision platting regulations.
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	None
Benefits:	Decreases costs of disaster if slower to spread to adjacent properties
Plan for Implementation	
Responsible Organization/Department:	Zoning Department
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Land Use Plan
Progress Report	
Action Status	Continued
Report of Progress	

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.3.1:
(2013 Action 2.3.4)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Economic vulnerability
Hazard(s) Addressed:	Earthquake, Flood, Thunderstorm, Winter Weather and Tornado
Action or Project	
Action/Project Number:	2.3.1
Name of Action or Project:	Backup Generators
Action or Project Description:	Add backup generators to critical facilities, including water distribution, wastewater treatment facilities and emergency shelters.
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Varies by facility
Benefits:	Increases county's economic resistance to disasters
Plan for Implementation	
Responsible Organization/Department:	Clinton County Emergency Management Director
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Operating Plan
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.3.2:
(2013 Action 2.3.4)

Action Worksheet	
Name of Jurisdiction:	Lathrop
Risk / Vulnerability	
Problem being Mitigated:	Economic vulnerability
Hazard(s) Addressed:	Earthquake, Flood, Thunderstorm, Winter Weather and Tornado
Action or Project	
Action/Project Number:	2.3.2
Name of Action or Project:	Backup Generators
Action or Project Description:	Add backup generators to critical facilities, including water distribution, wastewater treatment facilities and emergency shelters.
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Varies by facility
Benefits:	Increases county's economic resistance to disasters
Plan for Implementation	
Responsible Organization/Department:	City Administrator
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Have added generators to several critical facilities and plan to add more

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.3.3:
(2013 Action 2.3.1)

Action Worksheet	
Name of Jurisdiction:	Lathrop
Risk / Vulnerability	
Problem being Mitigated:	Unprepared commercial and industrial facilities
Hazard(s) Addressed:	Earthquake, Flood, Thunderstorm, Winter Storm, Tornado
Action or Project	
Action/Project Number:	2.3.3
Name of Action or Project:	
Action or Project Description:	Create up-to-date commercial and industrial disaster plans that are coordinated with community disaster plans.
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	None
Benefits:	Increase economic resistance to disasters
Plan for Implementation	
Responsible Organization/Department:	City Administrator and Lathrop Fire District
Action/Project Priority:	Medium
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Fire department has worked with local elevator and school systems. Will update to include new school buildings in fire plan.

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.3.4:
(2013 Action 2.2.3)

Action Worksheet	
Name of Jurisdiction:	Lathrop
Risk / Vulnerability	
Problem being Mitigated:	Communication break down
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	2.3.4
Name of Action or Project:	Emergency List
Action or Project Description:	Maintain emergency lists with names and phone numbers of plant managers and other large employers.
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	None
Benefits:	Increased communication with the business sector of the local economy
Plan for Implementation	
Responsible Organization/Department:	City Administrator
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Keep updating list and expanding methods of communication

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

2018 Action 2.3.5:
(2013 Action 2.3.5)

Action Worksheet	
Name of Jurisdiction:	Trimble
Risk / Vulnerability	
Problem being Mitigated:	Economic Vulnerability
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Flood, Thunderstorm, Winter Weather and Tornado
Action or Project	
Action/Project Number:	2.3.5
Name of Action or Project:	Backup Water System
Action or Project Description:	Develop plans for backup water systems for critical facilities
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Unknown
Benefits:	Increased economic resistance to disasters
Plan for Implementation	
Responsible Organization/Department:	Clinton County Public Water Supply District #1 and City Council
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

2018 Action 3.1.1:
(2013 Action 3.1.1)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Communication break down
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	3.1.1
Name of Action or Project:	Accessible list
Action or Project Description:	Maintain a publicly accessible list of names, positions, contact information, roles, and responsibilities for all public safety positions and departments.
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	None
Benefits:	Increase disaster mitigation management capability
Plan for Implementation	
Responsible Organization/Department:	Clinton County Emergency Management Director
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Operating Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	

2018 Action 3.1.2:
(2013 Action 3.1.2)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Gaps in county capabilities and resources to address a disaster
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	3.1.2
Name of Action or Project:	Mutual Aid Agreements
Action or Project Description:	Execute and maintain mutual aid agreements with all relevant agencies.
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	None
Benefits:	Increased capacity and availability of resources
Plan for Implementation	
Responsible Organization/Department:	Clinton County Emergency Management Director
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Operating Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Partially implemented

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.1.3:
(2013 Action 3.1.4)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Limited disaster mitigation management capability in local governments
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	3.1.3
Name of Action or Project:	Coordinate and Link
Action or Project Description:	Coordinate and link web sites for counties, municipalities, school districts, Local Emergency Planning Commission and emergency services.
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	Unknown
Benefits:	Increase disaster mitigation management capability in local governments
Plan for Implementation	
Responsible Organization/Department:	Clinton County Emergency Management Director
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.1.4:

(2013 Action 3.2.1)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Lack of access to records in the event of a natural disaster
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	3.1.4
Name of Action or Project:	Safeguard Records
Action or Project Description:	Continue to safeguard the most important government records in case of power outage or disaster, update plans as necessary.
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	Varies
Benefits:	Increase disaster mitigation management capability in local governments
Plan for Implementation	
Responsible Organization/Department:	County Technology Department/Consultant
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Implemented but will improve the process

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

<u>2018 Action 3.1.5:</u>

(2013 Action 3.1.3)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Inability to access GIS hazard information
Hazard(s) Addressed:	Dam, Earthquake, Flood, Thunderstorm, Winter Weather, Tornado
Action or Project	
Action/Project Number:	3.1.5
Name of Action or Project:	GIS hazard information availability
Action or Project Description:	Make all GIS hazard information available online to county and municipal permitting departments.
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	Unknown
Benefits:	Increase local disaster mitigation management capacity
Plan for Implementation	
Responsible Organization/Department:	Clinton County Zoning Department
Action/Project Priority:	Medium
Timeline for Completion:	4 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Operating Plan and Land Use Plan
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.1.6:
(2013 Action 3.2.3)

Action Worksheet	
Name of Jurisdiction:	Lathrop
Risk / Vulnerability	
Problem being Mitigated:	Limited disaster mitigation management capability in local governments
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	3.1.6
Name of Action or Project:	Coordinate and Link
Action or Project Description:	Coordinate and link web sites for counties, municipalities, school districts, Local Emergency Planning Commission and emergency services.
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	Unknown
Benefits:	Increase disaster mitigation management capability in local governments
Plan for Implementation	
Responsible Organization/Department:	City Administrator
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Need to update links and make information search easier

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.1.7:
(2013 Action 3.2.1)

Action Worksheet	
Name of Jurisdiction:	Lathrop
Risk / Vulnerability	
Problem being Mitigated:	Lack of access to records in the event of a natural disaster
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	3.1.7
Name of Action or Project:	Safeguard Records
Action or Project Description:	Continue to safeguard the most important government records in case of power outage or disaster, update plans as necessary.
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	Not known
Benefits:	Increase disaster mitigation management capability in local governments
Plan for Implementation	
Responsible Organization/Department:	City Administrator
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing In Progress
Report of Progress	

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.1.8:
(2013 Action 3.1.4)

Action Worksheet	
Name of Jurisdiction:	Lathrop
Risk / Vulnerability	
Problem being Mitigated:	Lack of information about emergency services
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	3.1.8
Name of Action or Project:	Website Links
Action or Project Description:	Coordinate and link web sites for counties, municipalities, school districts, Local Emergency Planning Commission and emergency services.
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	Unknown
Benefits:	Increase disaster mitigation capability
Plan for Implementation	
Responsible Organization/Department:	City Administrator
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.1.9:
(2013 Action 3.1.1)

Action Worksheet	
Name of Jurisdiction:	Lathrop School District
Risk / Vulnerability	
Problem being Mitigated:	Communication break down
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	3.1.9
Name of Action or Project:	Accessible list
Action or Project Description:	Maintain a publicly accessible list of names, positions, contact information, roles, and responsibilities for all public safety positions and departments.
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	None
Benefits:	Increase disaster mitigation management capability
Plan for Implementation	
Responsible Organization/Department:	Superintendent
Action/Project Priority:	High
Timeline for Completion:	1 year
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	School Emergency Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.1.10:
(2013 Action 3.1.4)

Action Worksheet	
Name of Jurisdiction:	Lathrop School District
Risk / Vulnerability	
Problem being Mitigated:	Lack of information about emergency services
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	3.1.10
Name of Action or Project:	Website Links
Action or Project Description:	Coordinate and link web sites for counties, municipalities, school districts, Local Emergency Planning Commission and emergency services.
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	Unknown
Benefits:	Increase disaster mitigation capability
Plan for Implementation	
Responsible Organization/Department:	Superintendent
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	School Emergency Plan
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.1.11:
(2013 Action 3.2.1)

Action Worksheet	
Name of Jurisdiction:	Plattsburg
Risk / Vulnerability	
Problem being Mitigated:	Lack of access to records in the event of a natural disaster
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	3.1.11
Name of Action or Project:	Safeguard Records
Action or Project Description:	Continue to safeguard the most important government records in case of power outage or disaster, update plans as necessary.
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	Varies
Benefits:	Increase disaster mitigation management capability in local governments
Plan for Implementation	
Responsible Organization/Department:	City Administrator
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Implemented but will improve the process

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.1.12:
(2013 Action 3.2.4)

Action Worksheet	
Name of Jurisdiction:	Turney
Risk / Vulnerability	
Problem being Mitigated:	Vulnerable infrastructure
Hazard(s) Addressed:	Earthquake, Fire, Flood, Heat Wave, Thunderstorm, Winter Weather, Tornado
Action or Project	
Action/Project Number:	3.1.12
Name of Action or Project:	Upgrades and retrofits
Action or Project Description:	Review, prioritize, institute and monitor needed upgrades or retrofits for critical buildings and infrastructures, such as the city barn.
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	Will vary by building
Benefits:	Strengthen critical infrastructure
Plan for Implementation	
Responsible Organization/Department:	City Council Chairman
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.2.1:
(2013 Action 3.2.4)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Vulnerable infrastructure
Hazard(s) Addressed:	Earthquake, Flood, Thunderstorm, Winter Weather, Tornado, Fire
Action or Project	
Action/Project Number:	3.2.1
Name of Action or Project:	Upgrades or retrofits for critical structures
Action or Project Description:	Review, prioritize, institute and monitor needed upgrades or retrofits for critical buildings and infrastructures
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	Varies depending on upgrade or retrofit
Benefits:	Strengthened infrastructure
Plan for Implementation	
Responsible Organization/Department:	Clinton County Emergency Management Director
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Plan
Progress Report	
Action Status	Continuing, In Progress
Report of Progress	Partially completed

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.2.2
(2013 Action 2.3.5)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Economic Vulnerability
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Flood, Thunderstorm, Winter Weather and Tornado
Action or Project	
Action/Project Number:	3.2.2
Name of Action or Project:	Backup Water System
Action or Project Description:	Develop plans for backup water systems for critical facilities
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Estimated Cost:	Unknown
Benefits:	Increased economic resistance to disasters
Plan for Implementation	
Responsible Organization/Department:	Clinton County Emergency Management Director
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.2.3:
(2013 Action 3.2.4)

Action Worksheet	
Name of Jurisdiction:	Lathrop
Risk / Vulnerability	
Problem being Mitigated:	Vulnerable infrastructure
Hazard(s) Addressed:	Earthquake, Flood, Thunderstorm, Winter Weather, Tornado, Fire
Action or Project	
Action/Project Number:	3.2.3
Name of Action or Project:	Upgrades or retrofits for critical structures
Action or Project Description:	Review, prioritize, institute and monitor needed upgrades or retrofits for critical buildings and infrastructures
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	Varies depending on upgrade or retrofit
Benefits:	Strengthened infrastructure
Plan for Implementation	
Responsible Organization/Department:	City Administrator, City Council and Lathrop Fire District
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	Local Emergency Plan
Progress Report	
Action Status	Continuing, In Progress
Report of Progress	Continue to upgrade water district, waste water district, storm siren and generators as needed and as funding is available

Goal 3: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

2018 Action 3.2.4:
(2013 Action 3.2.1)

Action Worksheet	
Name of Jurisdiction:	Turney
Risk / Vulnerability	
Problem being Mitigated:	Inability to access records and files
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	3.2.4
Name of Action or Project:	Safeguarding records/files
Action or Project Description:	Safeguard the most important government records and files in case of disaster
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Estimated Cost:	Unsure
Benefits:	Increase disaster
Plan for Implementation	
Responsible Organization/Department:	City Council Chairman
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	The records are paper files and not entered in a computer system

Goal 4: Ensure Access to Information About Hazard Preparation and Recovery.

2018 Action 4.1.1:
(2013 Action 4.1.3)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Uninformed/unprepared citizens
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	4.1.1
Name of Action or Project:	Disaster preparedness for children
Action or Project Description:	Educate grade school-age children in disaster preparedness and how to survive disasters.
Applicable Goal Statement:	Ensure Access to Information About Hazard Preparation and Recovery
Estimated Cost:	Unsure
Benefits:	Increased knowledge among citizens about disaster safety
Plan for Implementation	
Responsible Organization/Department:	Clinton County Emergency Management Director
Action/Project Priority:	High
Timeline for Completion:	1 year
Potential Fund Sources:	Internal, Private, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Partially completed

Goal 4: Ensure Access to Information About Hazard Preparation and Recovery.

2018 Action 4.1.2
(2013 Action 4.1.2)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Unable to access hazard maps
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	4.1.2
Name of Action or Project:	Access to Hazard Maps
Action or Project Description:	Publish detailed hazard maps on all city and county websites and provide paper copies to the public
Applicable Goal Statement:	Ensure Access to Information About Hazard Preparation and Recovery
Estimated Cost:	Unsure
Benefits:	Increased knowledge among citizens about disaster safety
Plan for Implementation	
Responsible Organization/Department:	Clinton County Emergency Management Director
Action/Project Priority:	Medium
Timeline for Completion:	3 years
Potential Fund Sources:	Internal, Private
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 4: Ensure Access to Information About Hazard Preparation and Recovery.

2018 Action 4.1.3:
(2013 Action 2.1.3)

Action Worksheet	
Name of Jurisdiction:	Clinton County
Risk / Vulnerability	
Problem being Mitigated:	Unaware citizens living in/near inundation zones
Hazard(s) Addressed:	Dam Failure and Flood
Action or Project	
Action/Project Number:	4.1.3
Name of Action or Project:	Inundation Zone Awareness
Action or Project Description:	Continue to educate inform dam owners and citizens living near the inundation zones of dams about the need to properly maintain and upgrade these structures, particularly those that are more than 50 years old.
Applicable Goal Statement:	Ensure Access to Information About Hazard Preparation and Recovery
Estimated Cost:	Unsure
Benefits:	Informed dam owners and citizens
Plan for Implementation	
Responsible Organization/Department:	Clinton County Emergency Management Director
Action/Project Priority:	Medium
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Land Use Plan, Local Emergency Operations Plan
Progress Report	
Action Status	Continuing Not Started
Report of Progress	

Goal 4: Ensure Access to Information About Hazard Preparation and Recovery.

2018 Action 4.1.4:
(2013 Action 4.1.3)

Action Worksheet	
Name of Jurisdiction:	Cameron School District
Risk / Vulnerability	
Problem being Mitigated:	Children not knowing what to do during a natural disaster
Hazard(s) Addressed:	All
Action or Project	
Action/Project Number:	4.1.4
Name of Action or Project:	Preparedness
Action or Project Description:	Educate grade school-age children in disaster preparedness and how to survive disasters.
Applicable Goal Statement:	Ensure Access to Information About Hazard Preparation and Recovery
Estimated Cost:	Unsure
Benefits:	Children will be prepared in the event of a natural disaster
Plan for Implementation	
Responsible Organization/Department:	Superintendent
Action/Project Priority:	High
Timeline for Completion:	1 year
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	School Emergency Plan
Progress Report	
Action Status	Continuing In Progress
Report of Progress	Will continue to expand and improve education for disaster preparedness

5 PLAN MAINTENANCE PROCESS

This chapter provides an overview of the overall strategy for plan maintenance and outlines the method and schedule for monitoring, updating and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

5.1 Monitoring, Evaluating, and Updating the Plan

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

5.1.1 Responsibility for Plan Maintenance

The Mitigation Planning Committee (MPC) is not a standing committee. Responsibility for maintenance will reside with the individual jurisdictions for monitoring, evaluation and maintenance. Maintenance activities for the participating jurisdictions, including school and special districts, may involve:

- Meet annually, and after a disaster event, to monitor and evaluate the implementation of the plan;
- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high priority, low- or no-cost recommended actions;
- Maintain vigilant monitoring of multi-objective, cost-share, and other funding opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;

- Report on plan progress and recommended changes to the County Commissioners and governing bodies of participating jurisdictions; and
- Inform and solicit input from the public.

It's the MPC representative's primary duty to see the plan successfully carried out and to report to the community's governing boards and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, hearing stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information in areas accessible to the public.

5.1.2 Plan Maintenance Schedule

The Clinton County Emergency Management Director (EMD) will be responsible for initiating the plan review at the LEPC meeting every other year. For the other jurisdictions, their MPC representative will be responsible for initiating reviews.

In coordination with all participating jurisdictions, a five year written update of the plan will be submitted to the Missouri State Emergency Management Agency (SEMA) and FEMA Region VII per Requirement §201.6(c)(4)(i) of the Disaster Mitigation Act of 2000, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

5.1.3 Plan Maintenance Process

Progress on the proposed actions can be monitored by evaluating changes in vulnerabilities identified in the plan. The MPC (or other designated responsible entity) during the annual meeting should review changes in vulnerability identified as follows:

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

Future 5-year updates to this plan will include the following activities:

- Consideration of changes in vulnerability due to action implementation,
- Documentation of success stories where mitigation efforts have proven effective,
- Documentation of unsuccessful mitigation actions and why the actions were not effective,
- Documentation of previously overlooked hazard events that may have occurred since the previous plan approval,
- Incorporation of new data or studies with information on hazard risks,
- Incorporation of new capabilities or changes in capabilities,
- Incorporation of growth data and changes to inventories, and
- Incorporation of ideas for new actions and changes in action prioritization.

In order to best evaluate any changes in vulnerability as a result of plan implementation, the participating jurisdictions will adopt the following process:

- Each proposed action in the plan identified an individual, office, or agency responsible for

action implementation. This entity will track and report on an annual basis to the jurisdictional MPC (or designated responsible entity) member on action status. The entity will provide input on whether the action as implemented meets the defined objectives and is likely to be successful in reducing risk.

- If the action does not meet identified objectives, the jurisdictional MPC (or designated responsible entity) member will determine necessary remedial action, making any required modifications to the plan.

Changes will be made to the plan to remedy actions that have failed or are not considered feasible. Feasibility will be determined after a review of action consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring of this plan. Updating of the plan will be accomplished by written changes and submissions, as the (MPC or designated responsible entity) deems appropriate and necessary. Changes will be approved by the Clinton County Commissioners and the governing boards of the other participating jurisdictions.

5.2 Incorporation into Existing Planning Mechanisms

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

Where possible, plan participants, including schools, will use existing plans and/or programs to implement hazard mitigation actions. Those existing plans and programs were described in Chapter 2 of this plan. Based on the capability assessments of the participating jurisdictions, communities in Clinton County will continue to plan and implement programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through the following plans:

- Comprehensive plans of participating jurisdictions
- Ordinances of participating jurisdictions
- Local Emergency Operations Plan
- Capital improvement plans and budgets
- Other community plans
- School District Emergency Plans

The MPC (or designated responsible entity) members involved in updating these existing planning mechanisms will be responsible for integrating the findings and actions of the mitigation plan, as appropriate. The MPC (or designated responsible entity) is also responsible for monitoring this integration and incorporation of the appropriate information into the five-year update of the multi-jurisdictional hazard mitigation plan.

Additionally, the Clinton County EMD will provide the updated mitigation strategy with current status of each mitigation action to the county commission as well as all mayors, city clerks, and school district superintendents as appropriate. The EMD will request that the mitigation strategy be incorporated, where appropriate, in other planning mechanisms.

Error! Reference source not found. below lists the planning mechanisms by jurisdiction into which the Hazard Mitigation Plan will be integrated.

Table 1.1 Changes Made in Plan Update

Jurisdiction	Planning Mechanisms	Integration Process for Previous Plan	Integration Process for Current Plan
Clinton County	Land Use Plan, Zoning Ordinance, Critical Facilities Plan, Local Emergency Operation Plan	Unknown	Land Use Plan, Zoning Ordinance, Critical Facilities Plan, Local Emergency Operation Plan
Cameron	Comprehensive Plan, Economic Development Plan, Land Use Plan, Site Plan Review	Unknown	Comprehensive Plan, Economic Development Plan, Land Use Plan, Site Plan Review
Grayson	None	None	None
Gower	Land Use Plan, Zoning Ordinance, Subdivision Ordinance	Unknown	Land Use Plan, Zoning Ordinance, Subdivision Ordinance
Lathrop	Comprehensive Plan, Zoning Ordinance, Building Code, Floodplain Ordinance, Subdivision Ordinance	Unknown	Comprehensive Plan, Zoning Ordinance, Building Code, Floodplain Ordinance, Subdivision Ordinance
Holt	None	Unknown	Unknown
Plattsburg	Comprehensive Plan, Land Use Plan, Zoning Ordinance, Building Code, Subdivision Ordinance, Site Plan Review	Unknown	Comprehensive Plan, Land Use Plan, Zoning Ordinance, Building Code, Subdivision Ordinance, Site Plan Review
Trimble	Site Plan Review	Unknown	Site Plan Review
Turney	None	None	None
Cameron School District	School Emergency Plan	School Emergency Plan	School Emergency Plan
Clinton School District	School Emergency Plan	School Emergency Plan	School Emergency Plan
East Buchanan School District	School Emergency Plan	School Emergency Plan	School Emergency Plan
Lathrop School District	School Emergency Plan	School Emergency Plan	School Emergency Plan

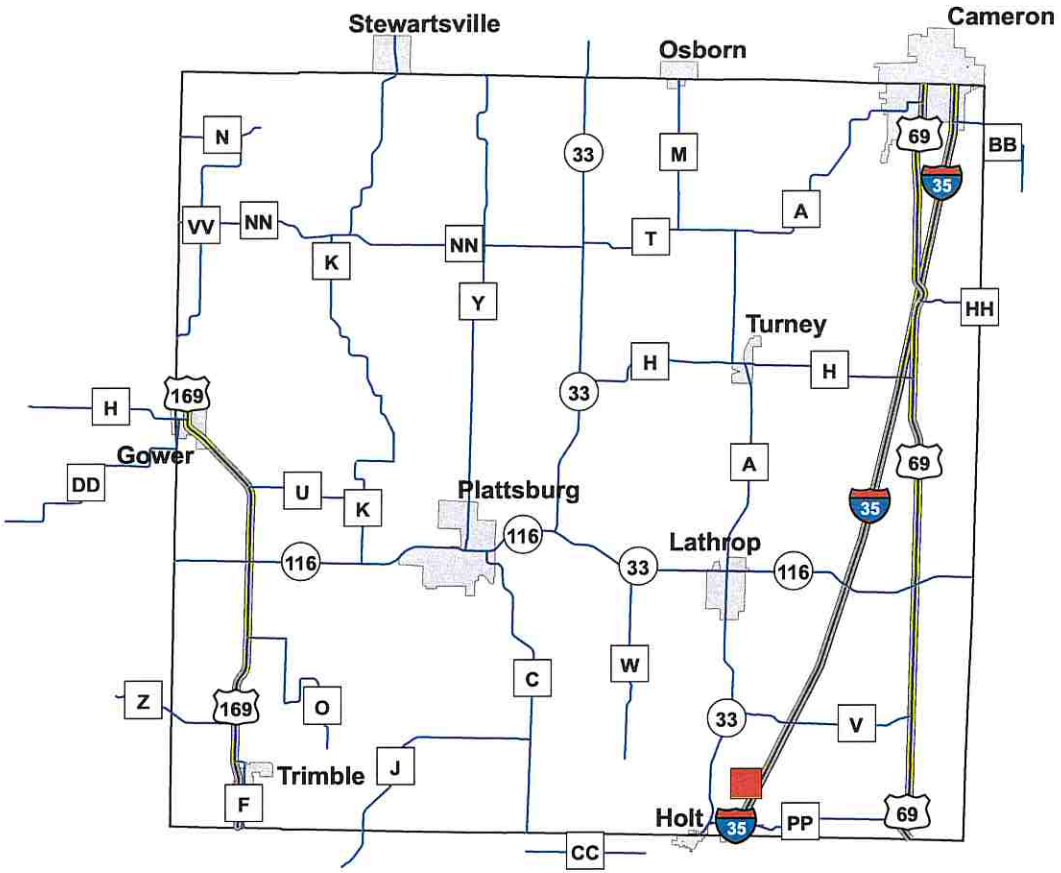
5.3 Continued Public Involvement

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

The hazard mitigation plan update process provides an opportunity to publicize success stories resulting from the plan's implementation and seek additional public comment. Information about the reviews will be posted in the local newspaper as well as on the Clinton County website following each review of the mitigation plan. When the MPC reconvenes for the five-year update, it will coordinate with all stakeholders participating in the planning process. Included in this group will be those who joined the MPC after the initial effort, to update and revise the plan. Public notices will be posted and public participation will be actively solicited, at a minimum, through available website postings and press releases to local media outlets, primarily newspapers.

Appendix A: Dam Inundation Zones and Inspection Reports

Lake Arrowhead Dam
Breach Inundation Map



Clinton County, Missouri
CLINTON_MO11016

Note: Actual areas inundated will depend on the actual dam failure criteria and may differ from the areas shown. Due to limitations, methods, assumptions, and procedures used to develop the inundation area, the map should only be used for evacuation and emergency purposes.

Missouri
Department of
Natural Resourc

Water Resources Cente
P.O. Box 176
Jefferson City, MO 652

Explanation Sheet

Project:
Lake Arrowhead Dam Breach Analysis

Drawing Title:
Explanation Sheet **1 of 1**

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Project ID: CLINTON_MO11016

Explanation of Maps

The following maps indicate the areas which are predicted to be inundated during the occurance of a sunny day breach of the dam. The pool elevation at failure is assumed to be at the emergency spillway crest elevation or at the crest of the dam in the absence of an emergency spillway.

Use of Maps

The following maps provide a baseline for evaluation of existing emergency action plans and environmental hazards downstream of the regulated structure.

Definition of Terms

Pool Elevation- Water level in the reservoir.

Dam Crest- The lowest elevation measured along the dam crest.

Spillway Crest- The lowest elevation measured along the crest of the spillway.

Arrival Time- Elapsed time between the breach initiation and the time that water levels first begin to rise at any given point.

Assumed Conditions of Flooding

The pool elevation at failure is assumed to be at the emergency spillway crest elevation or at the crest of the dam in the absence of an emergency spillway. The assumed overtopping erodes a section of the dam resulting in a dangerous and quick release of water. For the hydraulic analysis flow initiation is required and therefore a baseflow of water has been included in the analysis.

Dam Facts

ID: MO_11016

County: Clinton

Location: S19, T54 N, R30 W

Height of Dam: 51'

Tributary: Muddy Fork

Lake Area: 87 acres

Max Storage Capacity: 3200 ac-ft

Breach Parameters (Froehlich, 1995)

Side slopes: 1.4:1

Bottom width: 116'

Bottom elevation: 905'

Breach formation time: 0.84 hr

Pool Elevation at Failure: 943.11'

Pool Volume at Failure: 3200 ac-ft

Downstream Crossings

Rt PP
SE 200th St
Shanks Rd
190th St
I-35
Bishop Rd
172nd St
Raymond Hall Rd
MO Rt 92
Jesse James Farm Rd
140th St
134th St

NOTE: LiDAR Elevation data unavailable for Clinton County.
Analysis was completed with 10 meter Digital Elevation Model

Date of Aerial Photo: August 18, 200

Storage Areas
Cross Sections
Municipal Boundaries

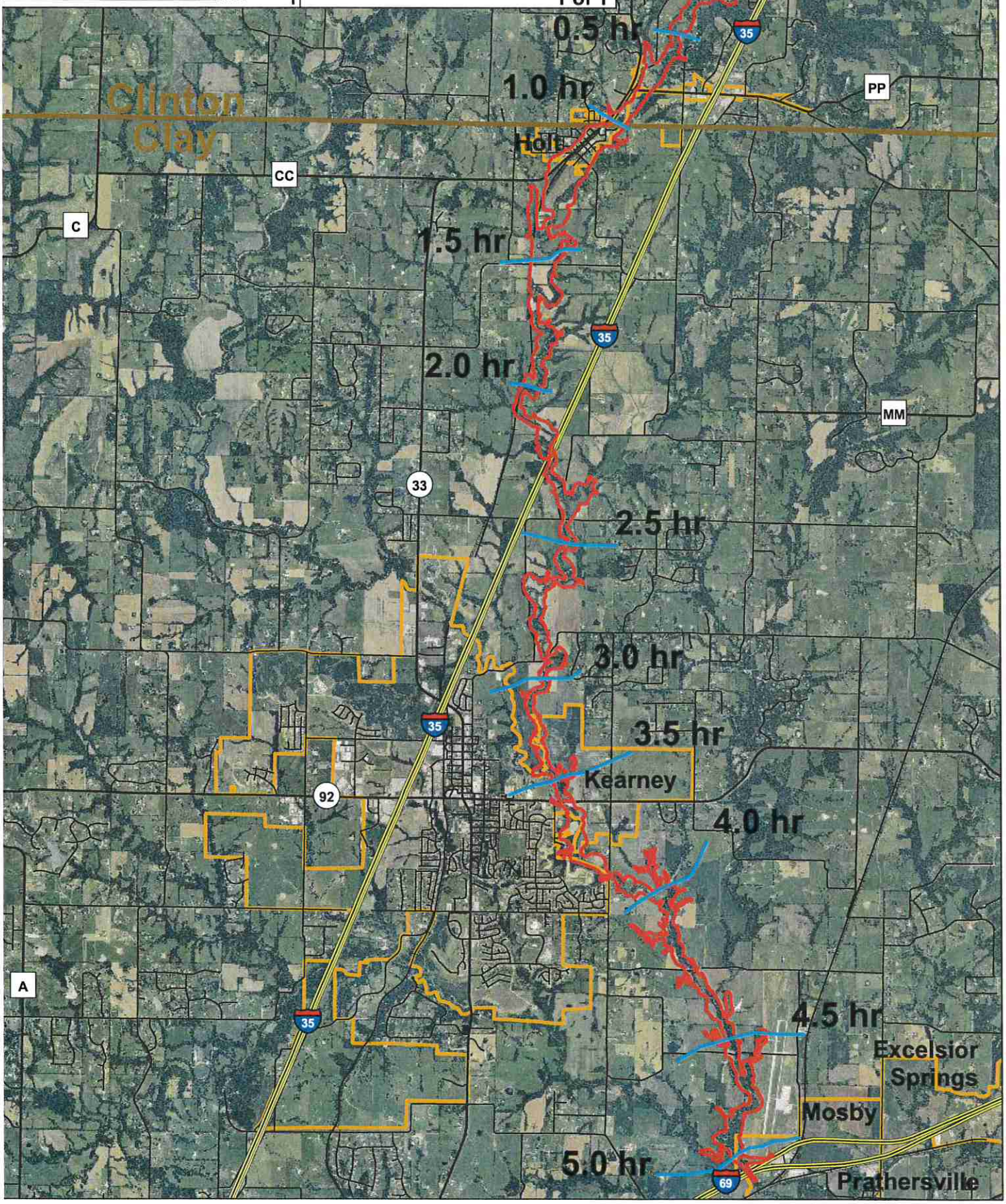
0.5 1 2 Miles

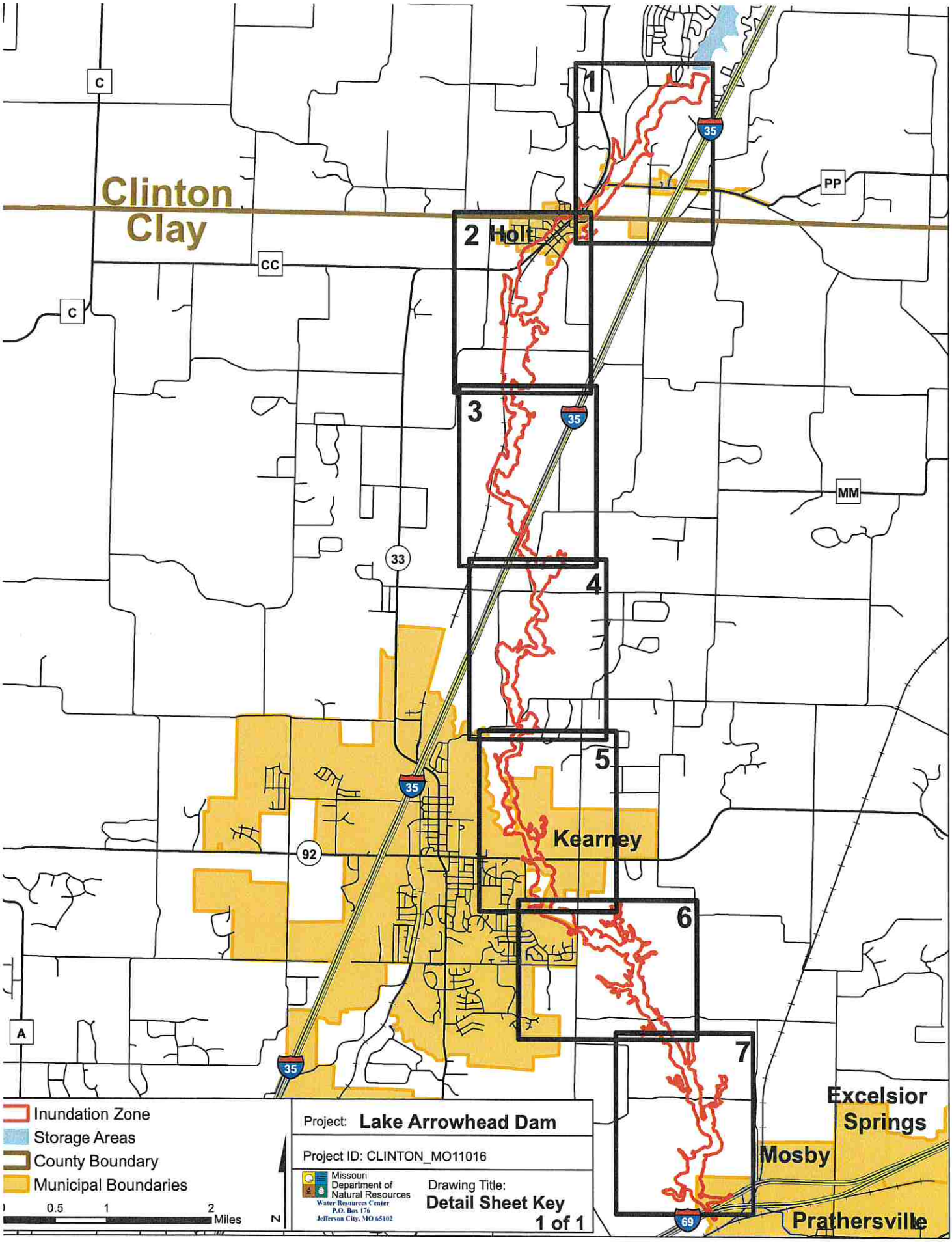
N

Project ID: CLINTON_MO11016

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title:
Flood Arrival Times
1 of 1




Clinton
Clay
Holt
Kearney
Excelsior Springs
Mosby
Prathersville
1
2
3
4
5
6
7
C
CC
PP
MM
A
33
35
92
69
Inundation Zone
Storage Areas
County Boundary
Municipal Boundaries
0.5
1
2
Miles
N
Project: Lake Arrowhead Dam
Project ID: CLINTON_MO11016
Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102
Drawing Title:
Detail Sheet Key
1 of 1

Storage Areas
Municipal Boundaries

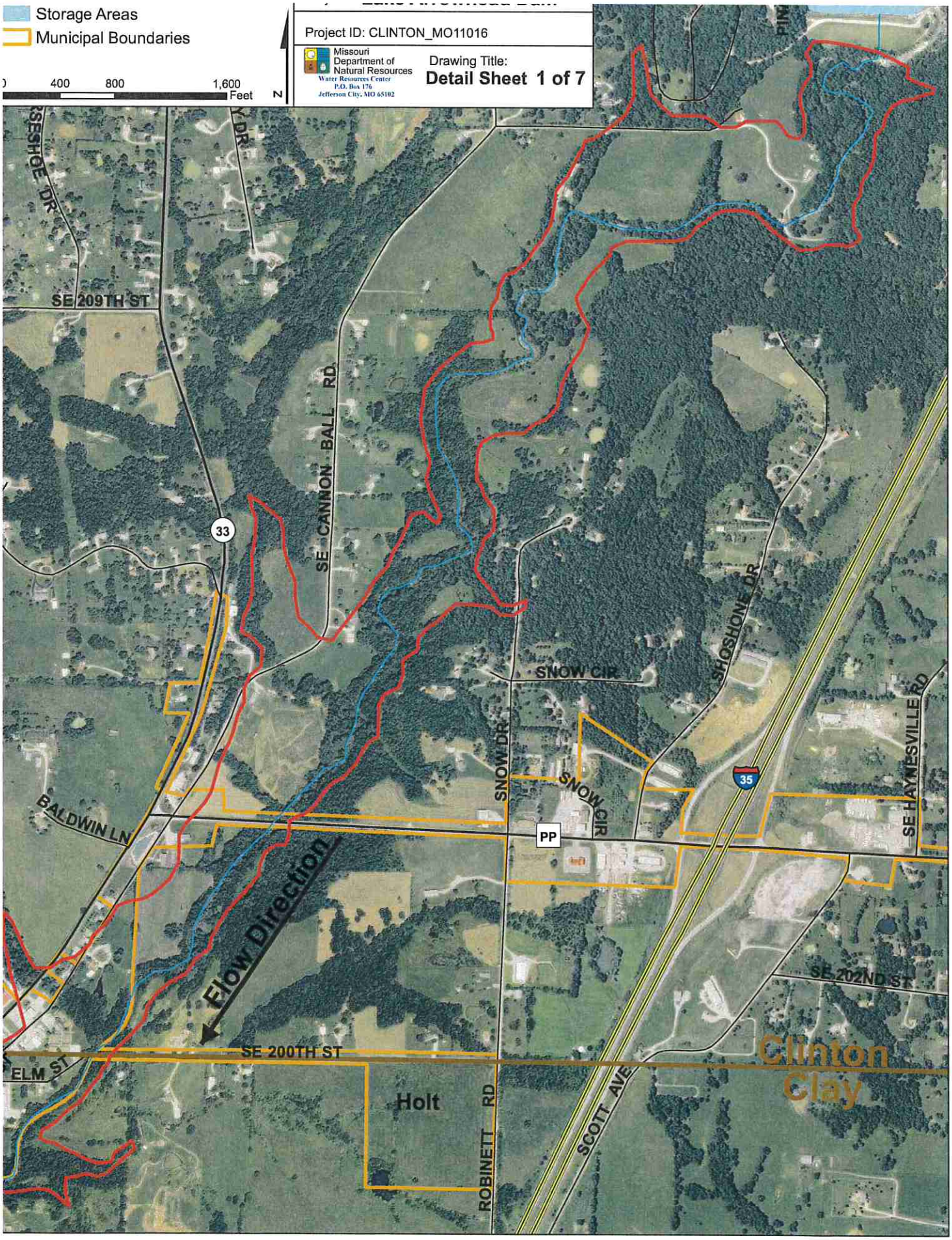
0 400 800 1,600 Feet

N

Project ID: CLINTON_MO11016

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title:
Detail Sheet 1 of 7



Municipal Boundaries

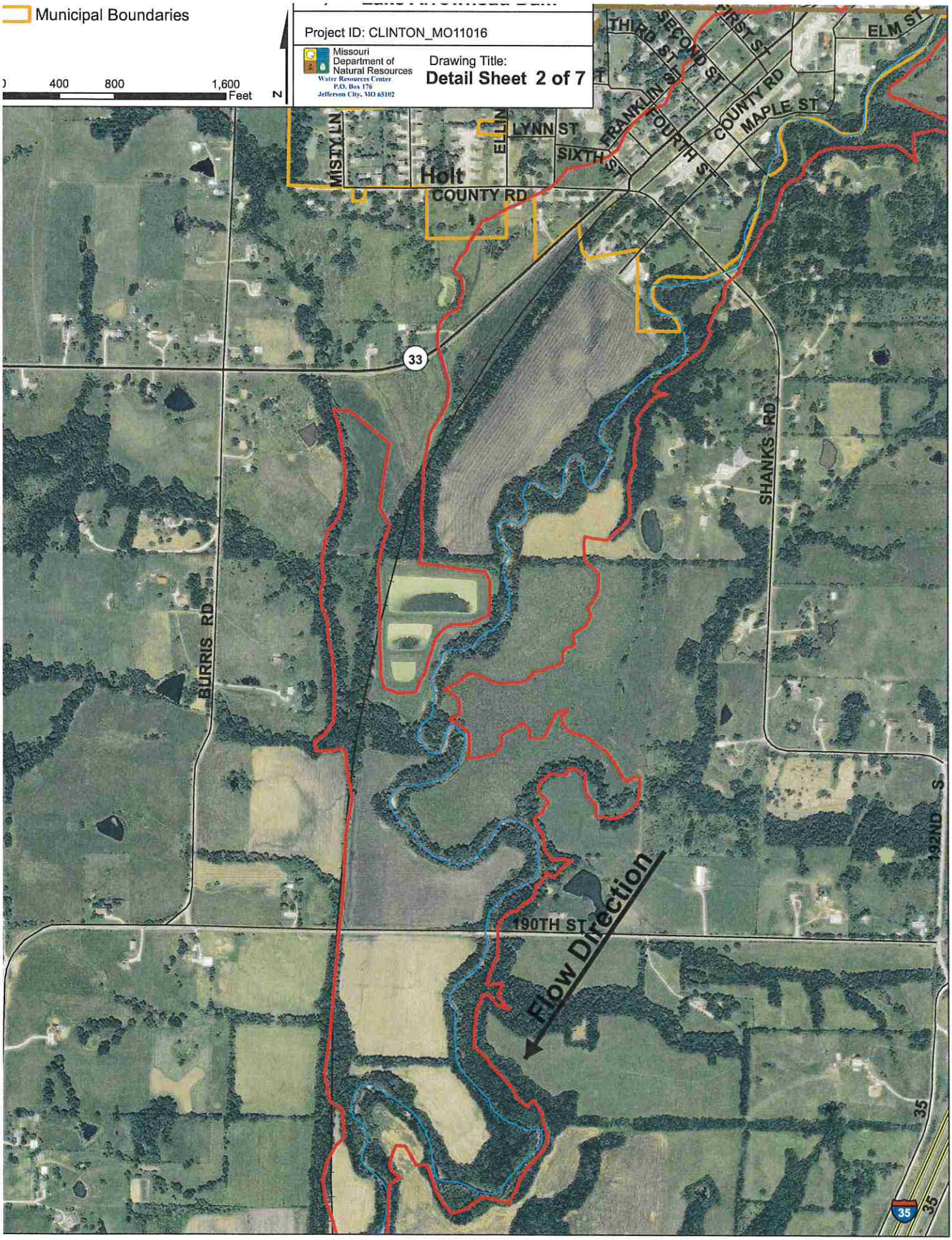
0 400 800 1,600 Feet

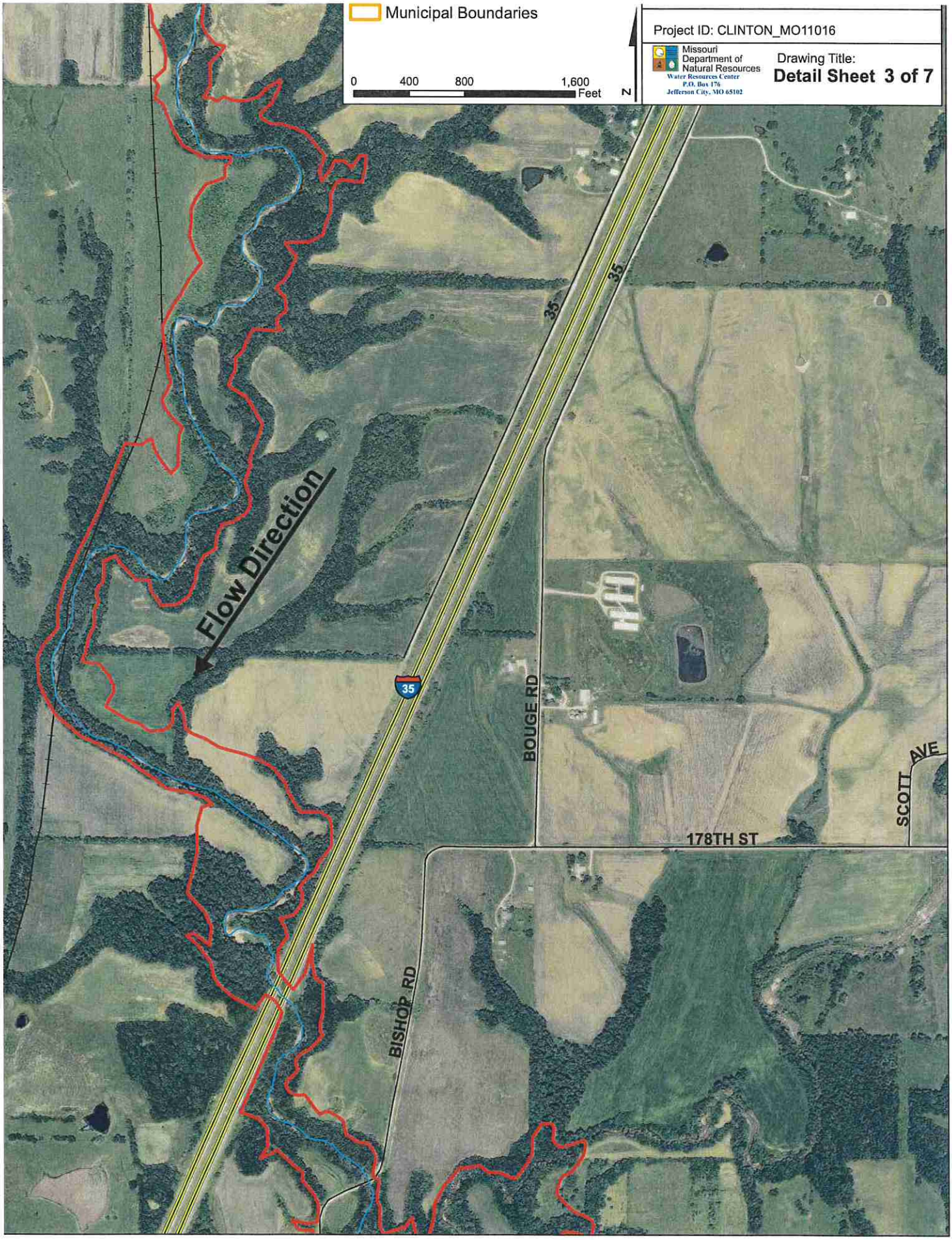
N

Project ID: CLINTON_MO11016

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title:
Detail Sheet 2 of 7




Municipal Boundaries
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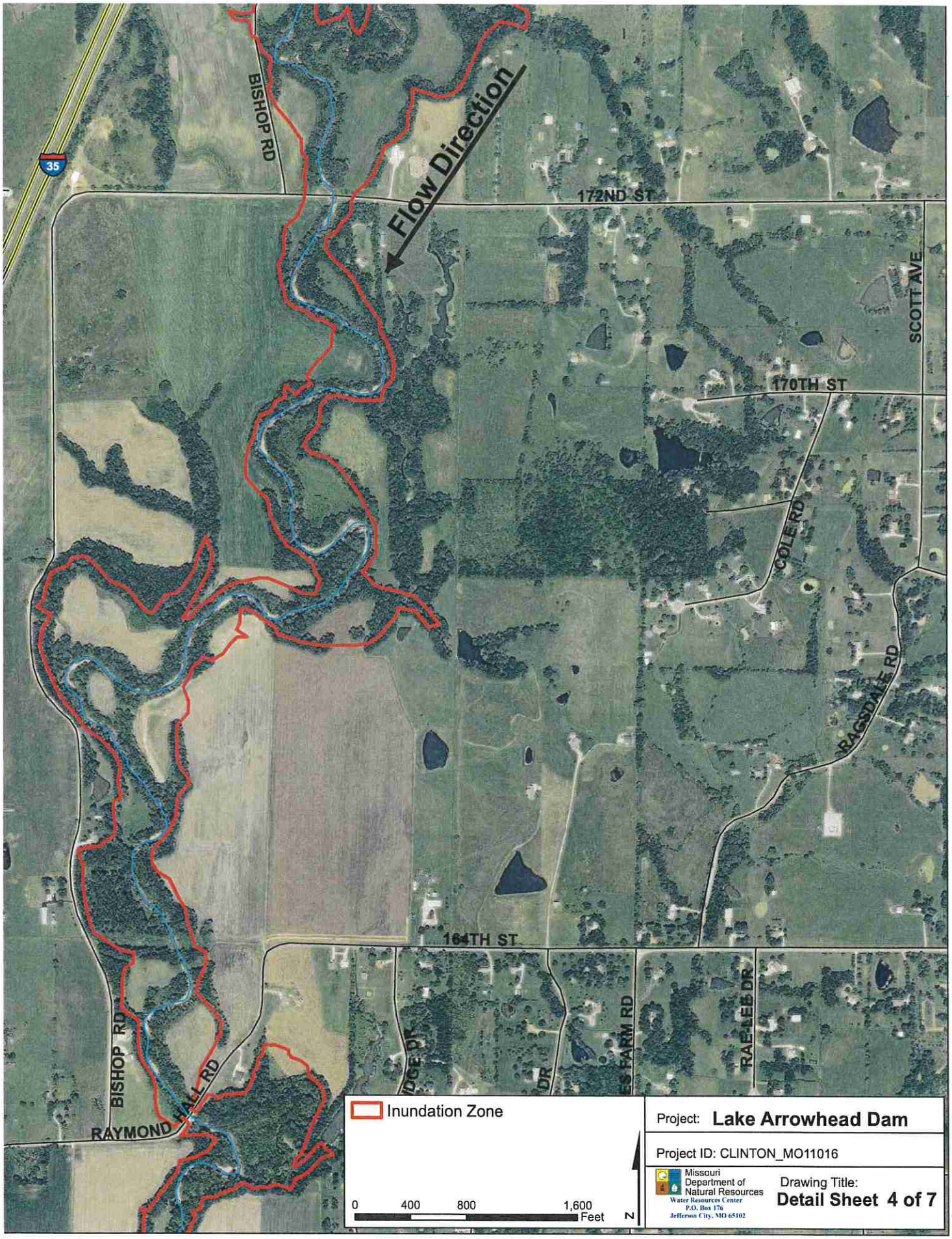
400
800
1,600
Feet
N
Project ID: CLINTON_MO11016
Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102
Drawing Title:
Detail Sheet 3 of 7
Flow Direction
35
35
35
BOUGE RD
178TH ST
SCOTT AVE
BISHOP RD

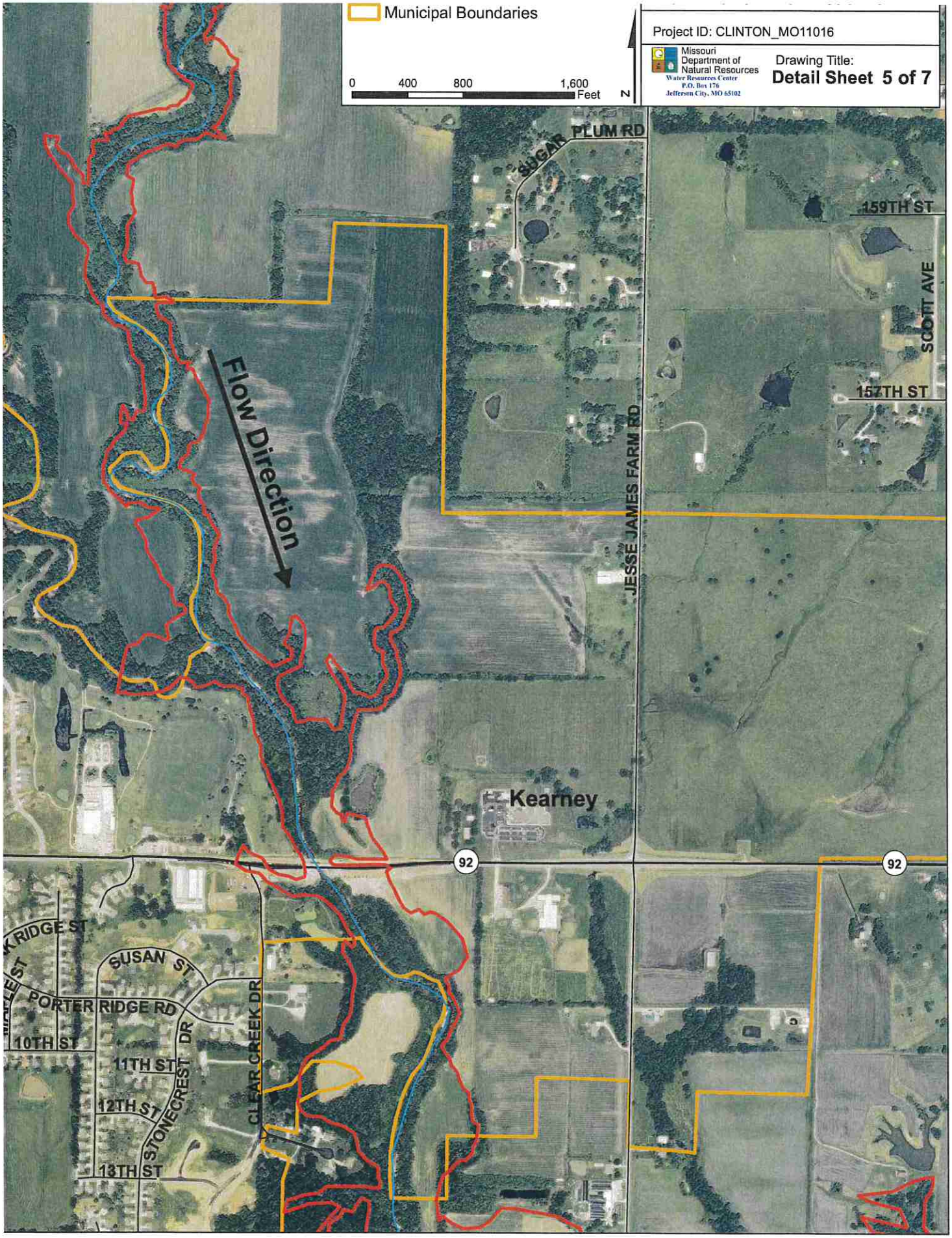


Project: **Lake Arrowhead Dam**

Project ID: CLINTON_MO11016

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title:
Detail Sheet 4 of 7


Municipal Boundaries
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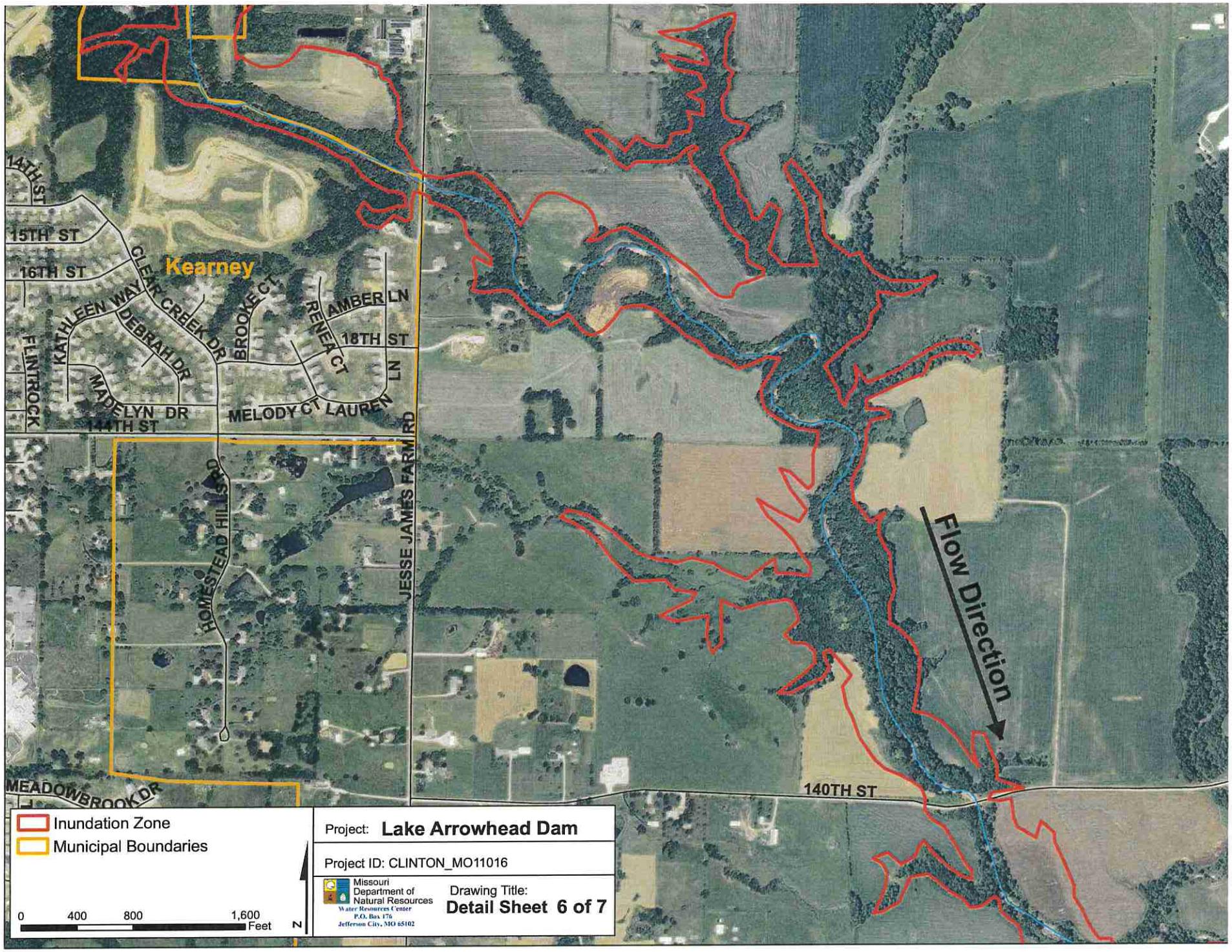
800
1,600
Feet
N
Project ID: CLINTON_MO11016
Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102
Drawing Title:
Detail Sheet 5 of 7
SUGAR PLUM RD
159TH ST
SCOTT AVE
157TH ST
JESSE JAMES FARM RD
Flow Direction
Kearney
92
92
SUSAN ST
PORTER RIDGE RD
10TH ST
11TH ST
12TH ST
13TH ST
STONECREST DR
CLEAR CREEK DR


14TH ST
15TH ST
16TH ST
Kearney
CLEAR CREEK DR
KATHLEEN WAY
DEBRAH DR
FLINTROCK
BROOKE CT
RENEA CT
AMBER LN
18TH ST
MADELYN DR
144TH ST
MELODY CT
LAUREN LN
HOMESTEAD HILLS RD
JESSE JAMES FARM RD
MEADOWBROOK DR
140TH ST
Flow Direction
Inundation Zone
Municipal Boundaries
0 400 800 1,600 Feet
N
Project: Lake Arrowhead Dam
Project ID: CLINTON_MO11016
Missouri Department of Natural Resources
Water Resources Center
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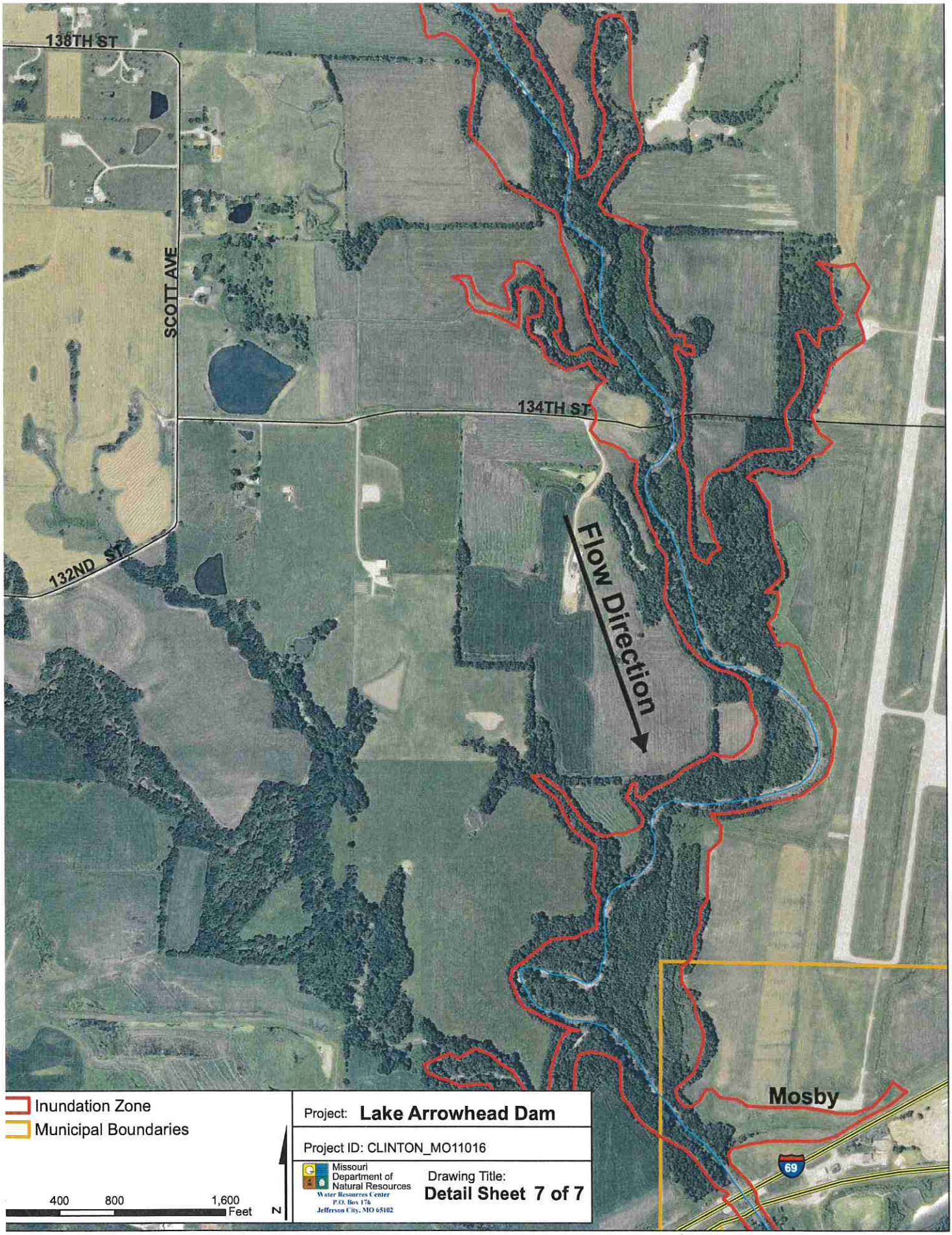
Jefferson City, MO 65102
Drawing Title:
Detail Sheet 6 of 7

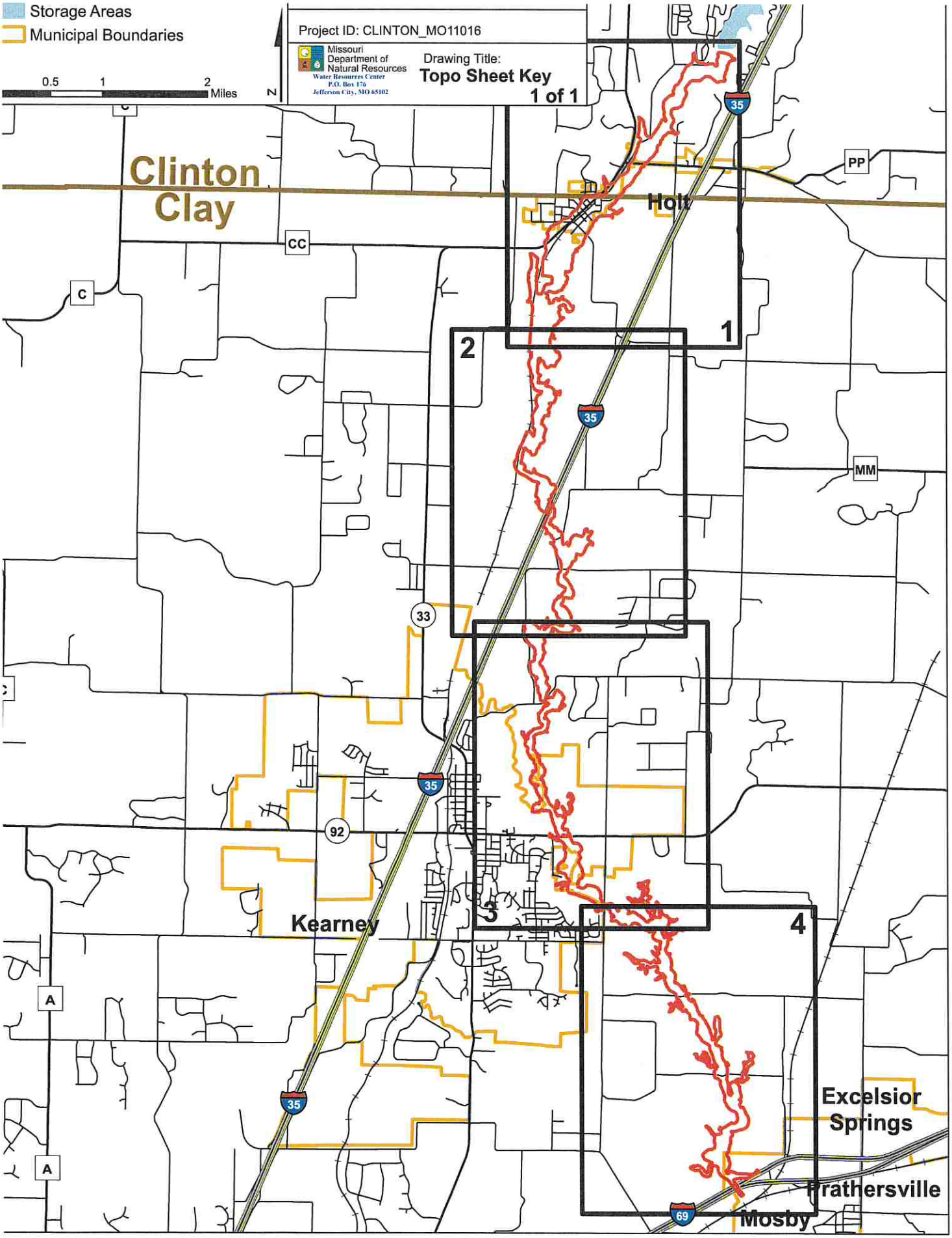


Project: **Lake Arrowhead Dam**

Project ID: CLINTON_MO11016

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title:
Detail Sheet 7 of 7


Storage Areas
Municipal Boundaries
0.5
1
2
Miles
N
Project ID: CLINTON_MO11016
Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102
Drawing Title:
Topo Sheet Key
1 of 1
Clinton
Clay
Holt
Kearney
Excelsior Springs
Prathersville
Mosby
1
2
3
4
35
33
92
69
CC
C
PP
MM
A

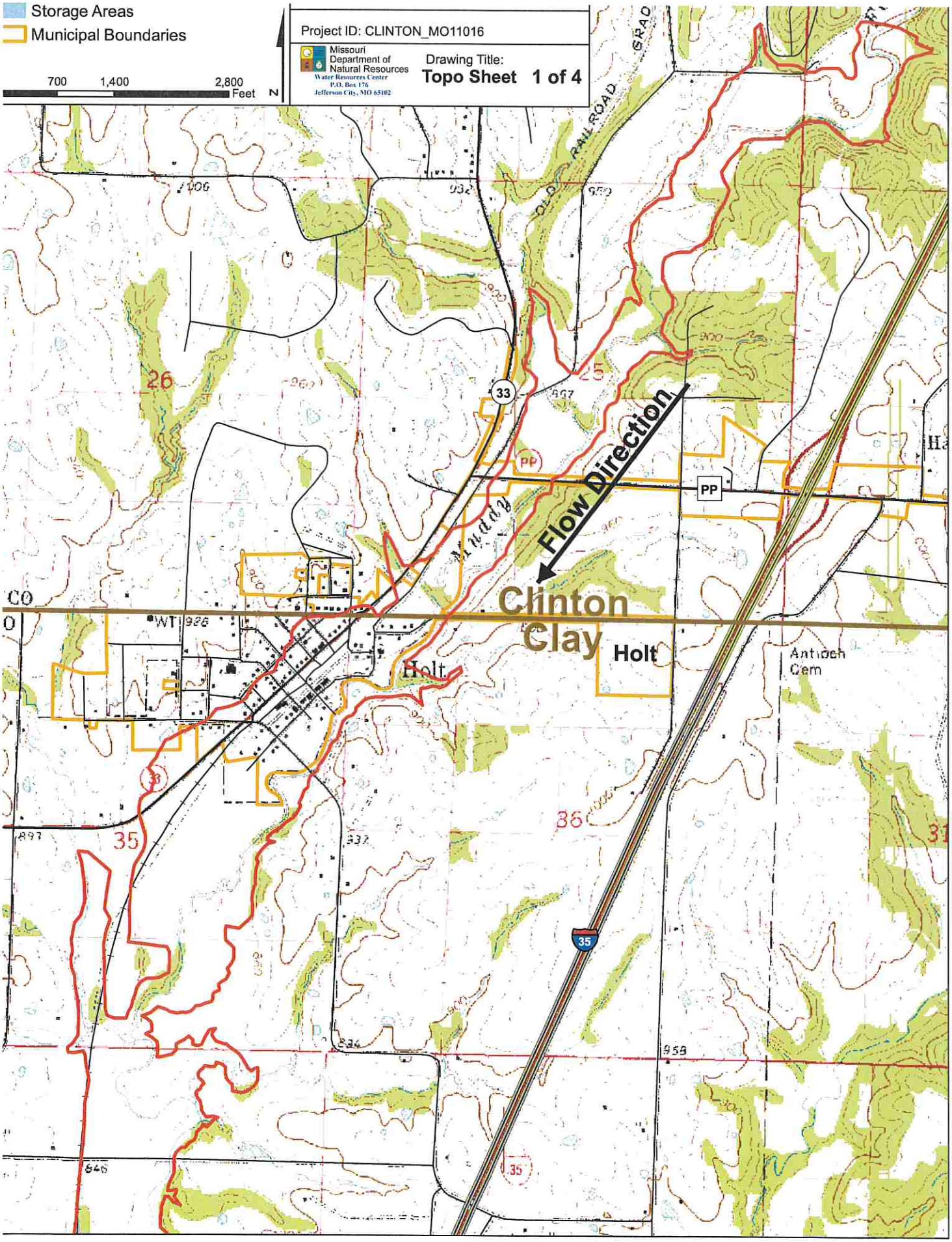
Storage Areas
Municipal Boundaries

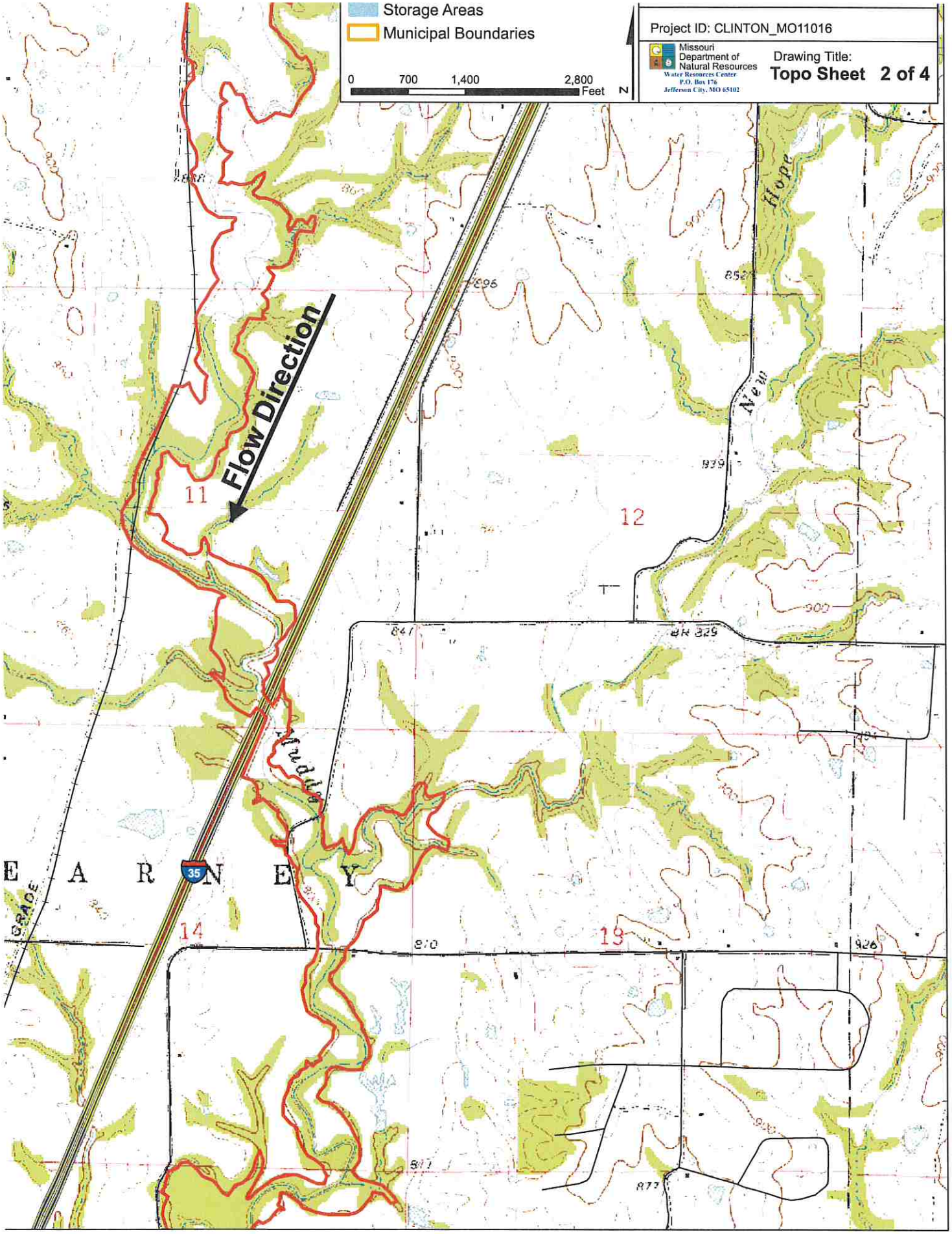
700 1,400 2,800 Feet N

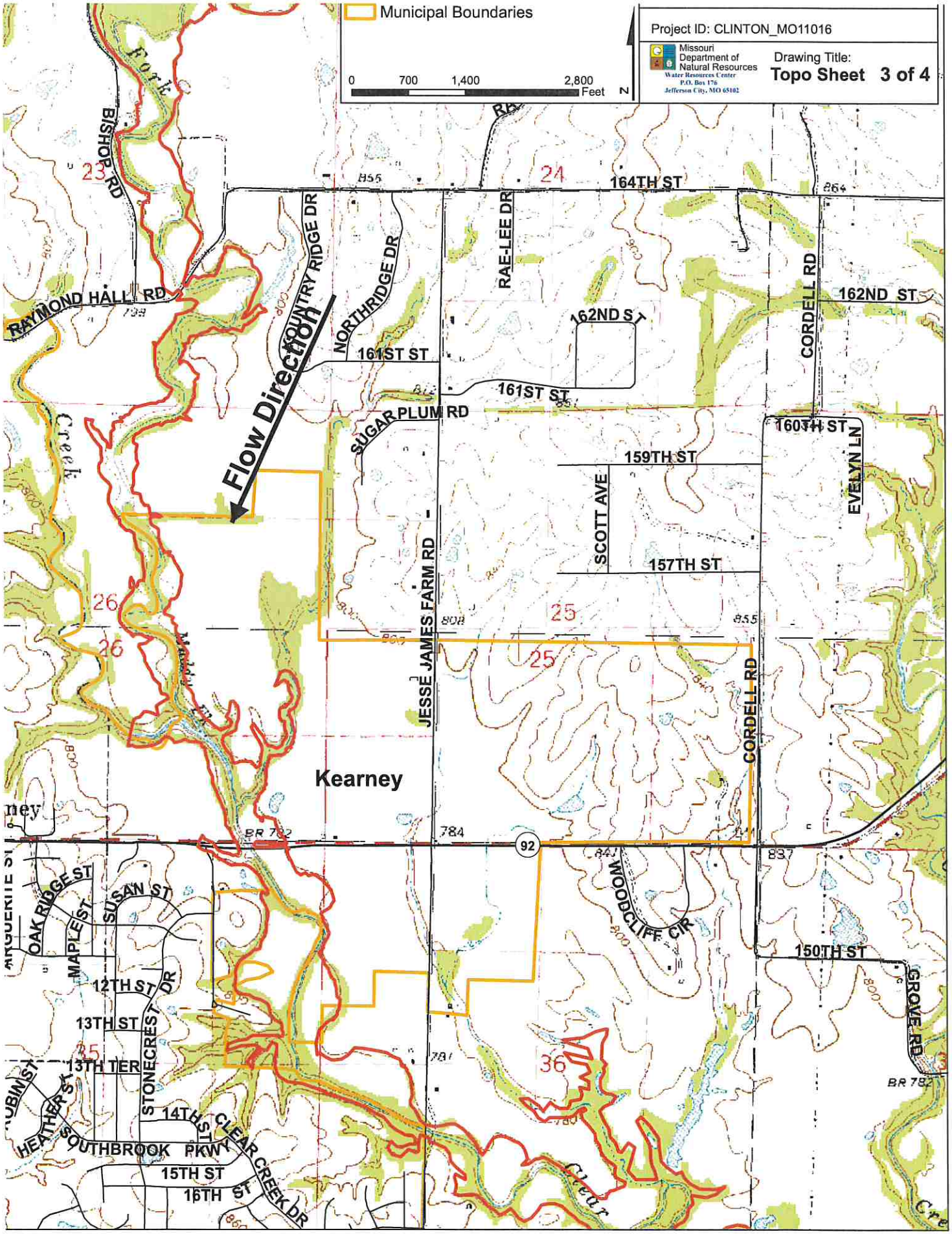
Project ID: CLINTON_MO11016

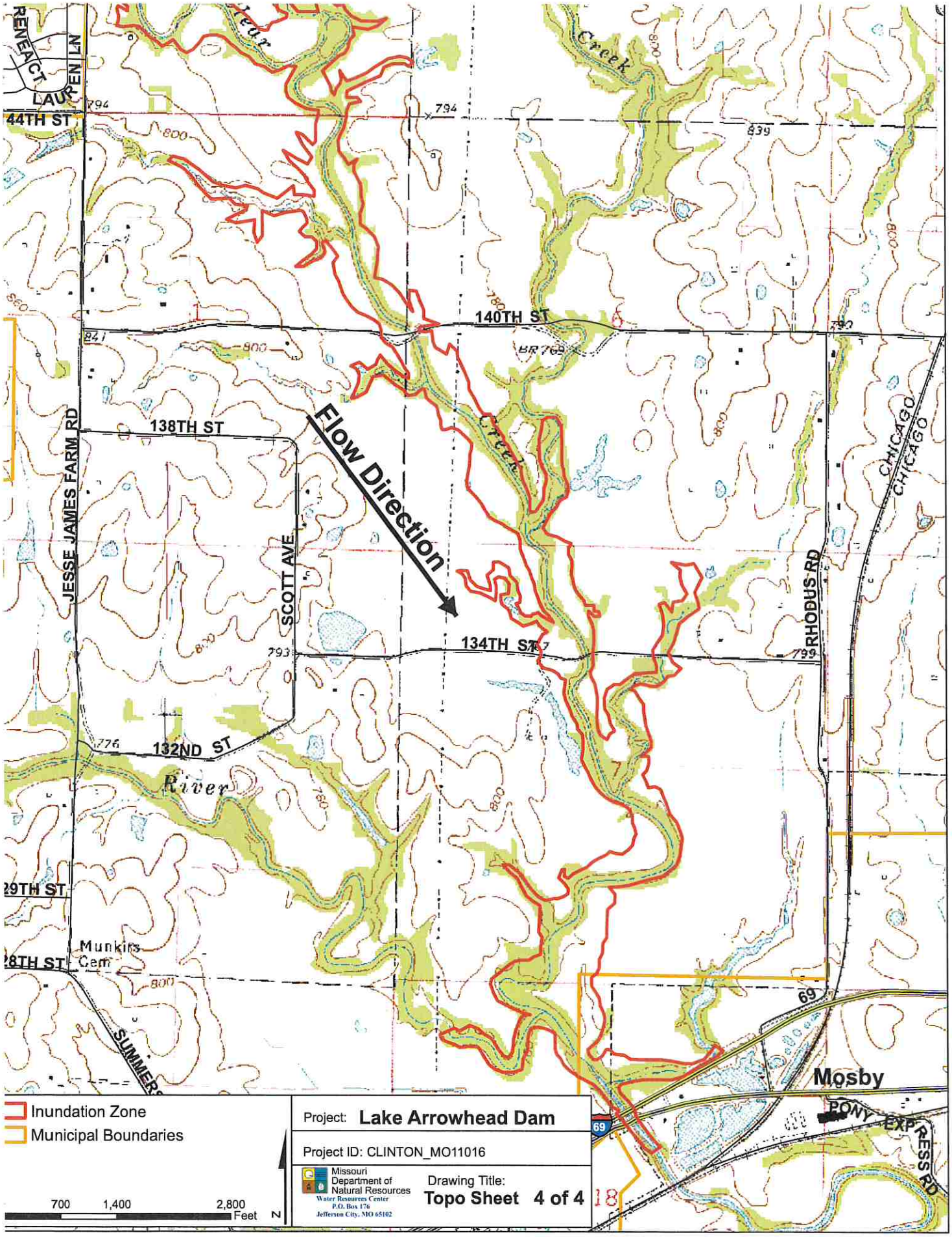
Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title:
Topo Sheet 1 of 4




Storage Areas
Municipal Boundaries
0 700 1,400 2,800 Feet
N
Project ID: CLINTON_MO11016
Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102
Drawing Title:
Topo Sheet 2 of 4
Flow Direction
11
12
13
14
Hope
New
Middle
E A R N E Y
35
GRADE
BR 329
896
852
839
900
841
810
926
877


Municipal Boundaries
0 700 1,400 2,800 Feet
N
Project ID: CLINTON_MO11016
Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102
Drawing Title:
Topo Sheet 3 of 4
Flow Direction
Kearney
164TH ST
162ND ST
161ST ST
159TH ST
157TH ST
160TH ST
150TH ST
BISHOP RD
RAYMOND HALL RD
COUNTRY RIDGE DR
NORTHRIDGE DR
RAE-LEE DR
CORDELL RD
SUGAR PLUM RD
SCOTT AVE
EVELYN LN
JESSE JAMES FARM RD
WOODCLIFF CIR
GROVE RD
OAK RIDGE ST
MAPLE ST
SUSAN ST
12TH ST
13TH ST
13TH TER
STONECREST DR
14TH ST
CLEAR CREEK DR
SOUTHBROOK PKWY
15TH ST
16TH ST
HEATHER ST
92
24
23
25
26
36


RENEACT
LAUREN LN
44TH ST
140TH ST
138TH ST
134TH ST
132ND ST
29TH ST
28TH ST
JESSE JAMES FARM RD
SCOTT AVE
RHODUS RD
CHICAGO
Flow Direction
Creek
River
Munkirs Cem
SUMMERS
69
Mosby
PONY EXPRESS RD
Inundation Zone
Municipal Boundaries
700
1,400
2,800
Feet
N
Project: Lake Arrowhead Dam
Project ID: CLINTON_MO11016
Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102
Drawing Title:
Topo Sheet 4 of 4

STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Harry D. Bozoian, Director
DEPARTMENT OF NATURAL RESOURCES
dnr.mo.gov
573/368-2175

November 1, 2016

Lake Arrowhead Property Owners Association
C/O Mr. Andrew W. Shaw
711 Southbrook Parkway
Kearney, Missouri 64060

RE: Lake Arrowhead Dam (MO 11016) Clinton County

Dear Mr. Shaw:

As a result of an inspection of the Lake Arrowhead Dam on October 25, 2016, I am pleased to inform you that Registration Permit R-235 has been renewed and is enclosed for your use. The term of the permit will be two years from the expiration date of the last registration permit issued for the dam and will expire on January 30, 2019. Prior to the permit expiring, the dam will be reinspected by the Dam and Reservoir Safety Program at no cost to you. The permit is being renewed for two years based on the downstream environmental zone classification.

Please refer to the enclosed inspection report for additional information on the inspection. If you have any questions, please feel free to contact Glenn Lloyd at (573) 368-2175.

Thanks for your cooperation in renewing this permit.

Sincerely,

MISSOURI GEOLOGICAL SURVEY

Ryan P. Stack, P.E.
Chief Engineer
Dam & Reservoir Safety Program

RPS/clb
Enclosure

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DAM AND RESERVOIR SAFETY COUNCIL

REGISTRATION PERMIT

Pursuant to Chapters 236.400 through 236.500 of the Revised Statutes of Missouri and the rules established by the Dam and Reservoir Safety Council, and on the basis of an inspection by the Department of Natural Resources for the Lake Arrowhead Dam, Clinton County, all of which are made a part hereof by reference, **PERMISSION IS HEREBY GRANTED** to Lake Arrowhead Property Owners Association, hereafter known as the permittee, whose address for the purpose of notices and other communications pertaining to this permit is 711 Southbrook Parkway; Kearney, Missouri 64060, which address is subject to change by written notice from the permittee, **TO OPERATE** said dam and reservoir located in Section 19, Township 54 North, Range 30 West, having identification number of MO 11016, a dam height of 51 feet, a principal spillway elevation of 928.2 feet (UTM NAD 83 Zone 15N GEO ID 12A), a minimum crest elevation of 943.2 feet (UTM NAD 83 Zone 15N GEO ID 12A), a reservoir area of 108 acres at the water storage elevation and approximate UTM Coordinates of 4,370,200 Meters North and 386,700 Meters East, Zone 15, subject to the following provisions:

GENERAL PROVISIONS:

1. No liability shall be imposed upon or incurred by the State of Missouri and/or the Dam and Reservoir Safety Council, or any of their officers, agents, employees, and members, officially or personally, on account of the granting hereof or on account of any damage to any person or property resulting from any act or omission of the permittee or any of its agents, employees, or contractors, or closed corporations or successors relating to any matter hereunder. This permit shall not be construed as estopping or limiting any legal claim or right of action of the state against the permittee, its agents, employees or contractors for any damages or injury resulting from any such act or omission by them or for violation of or failure to comply with the provisions of the permit or applicable provisions of law.

2. The permittee shall comply with all Federal, State and local laws and regulations, and shall obtain such other permits as may be required.

3. In cases where the doing by the permittee of anything authorized by this permit shall involve the taking, using or damaging of any property rights or interest of any other person or persons, or of any publicly owned lands or improvements thereon or interests therein, it is the sole responsibility of the permittee, before proceeding therewith, to obtain the written consent of all persons, agencies, or authorities concerned, and to acquire all property, rights and interests necessary therefore, including flood easements or permissions for all properties which may be inundated by the dam on a temporary or permanent basis in the upstream impoundment area below the top of dam elevation.

4. The permittee shall notify the Dam and Reservoir Safety Council in writing upon the sale or other transfer of interest in the dam or reservoir.

5. Based on conditions existing at the time of issuing this permit, the Downstream Environment Zone is Class I.

6. The permittee shall not alter, enlarge, reduce, repair or remove the dam, reservoir or appurtenances without first obtaining a construction permit from the Dam and Reservoir Safety Council.

7. The permittee shall immediately notify in writing, the Chief Engineer of any conditions relating to structural stability of and seepage through the dam discovered during the term of this permit which differs from those conditions identified in the renewal inspection summary.

8. The terms and provisions of this permit shall extend to and bind the successors in authority of the Dam and Reservoir Safety Council and the legally assigned successors in interest of the permittee.

9. Maintenance of the dam and reservoir herein permitted shall be the responsibility of the permittee.

10. The term of this permit shall be two (2) years from the expiration date of the last registration permit issued for the dam and will expire on January 30, 2019. The permittee shall apply for renewal not less than sixty (60) days prior to this expiration date.

Executed at Rolla, Missouri on this 1st day of November, 2016

DAM & RESERVOIR SAFETY COUNCIL

By _____
Chief Engineer
Dam and Reservoir Safety Program

DEPARTMENT OF NATURAL RESOURCES
DAM & RESERVOIR SAFETY PROGRAM
DAM INSPECTION REPORT

DATE: *October 31, 2016*

COVER SHEET

NAME OF DAM: *Lake Arrowhead Dam* **I.D. # :** *MO11016*

LOCATION: County: *Clinton* *Section: 19, Twp. 54 N, Rge. 30 W*

OWNER: *Lake Arrowhead Property Owners Association*	
ADDRESS: *C/O Andrew Shaw*	
711 Southbrook Parkway	
CITY/STATE/ZIP: *Kearney, Missouri 64060*	
TELEPHONE: *816-903-0419, 816-694-5075 cell*	

PERMIT #	HAZARD CLASS	TYPE OF DAM
R-235	CLASS I	EARTHFILL

TYPE OF SPILLWAY (s) **Principal** *Open channel on the left abutment*
Emergency *None*

☒ **I hereby certify that the** *Lake Arrowhead Dam* **was inspected on** *October 25, 2016* **in accordance with RSMO 236.400 through RSMO 236.500.**

☒ **I hereby certify that the** *Lake Arrowhead Dam* **did not have any observed defects that required correction at the time of the inspection.**

☒ **Judgement of Slope Stability – The embankment and appurtenant structures appeared to be in good overall condition at the time of the inspection, with no indications of slope instability or excessive seepage.**

☐ **Defects were found that will have to be corrected prior to the permit being renewed.**

STATION	ELEVATION (FT)	COMMENTS
TBM	943.0	Temporary benchmark-yellow nail in utility pole on left abutment near crest
PS	928.2	Principal spillway crest
Dam	943.2	Dam crest low point
WL	928.3	Water level on day of inspection

Elevations are in feet and based on UTM NAD 83 Zone 15N GEOID12A

STATE OF MISSOURI
GLENN DEWAYNE LLOYD
NUMBER E-28021
REGISTERED PROFESSIONAL ENGINEER

INSPECTING ENGINEER
Glenn Lloyd P.E.

Inspection Checklist

NAME OF DAM:	Lake Arrowhead Dam	INSPECTION DATE: 10/25/2016
ID #: MO 11016	COUNTY: Clinton	HAZARD CLASS: 1

HAZARD CLASSIFICATION: ☒ Unchanged ☐ Changed

Item	Condition*	Comments
1. Vegetation	N.P.	Great job.
2. Seepage	N.P.	
3. Principal Spillway	O.R.	Cut and remove the trees growing in the spillway channel.
4. Emergency Spillway	N.A.	
5. Embankment	N.P.	
6. Reservoir Area	N.P.	
7. Lake Drain Gates or Valves	N.A.	
8. Spillway Outlet Channels	N.P.	
9. Embankment Drain Outlets	N.A.	
10. Riprap	O.R.	Institute a plan to systemically cut and remove the vegetation growing in the riprap. Spraying an appropriate herbicide may be beneficial.

*N.P. = No observable problem; M.R. = Maintenance Required; D.O. = Defect Observed; E.C = Emergency Condition; O.R. = Observation Required; N.A. = Not Applicable

Required Freeboard	Available Freeboard
14.4 feet	15.0 feet

RECOMMENDATION:

☒ **Permit is being renewed**

☐ **Permit is not being renewed**

Photographs of MO11016 on October 25, 2016

Upstream face and crest

Downstream face

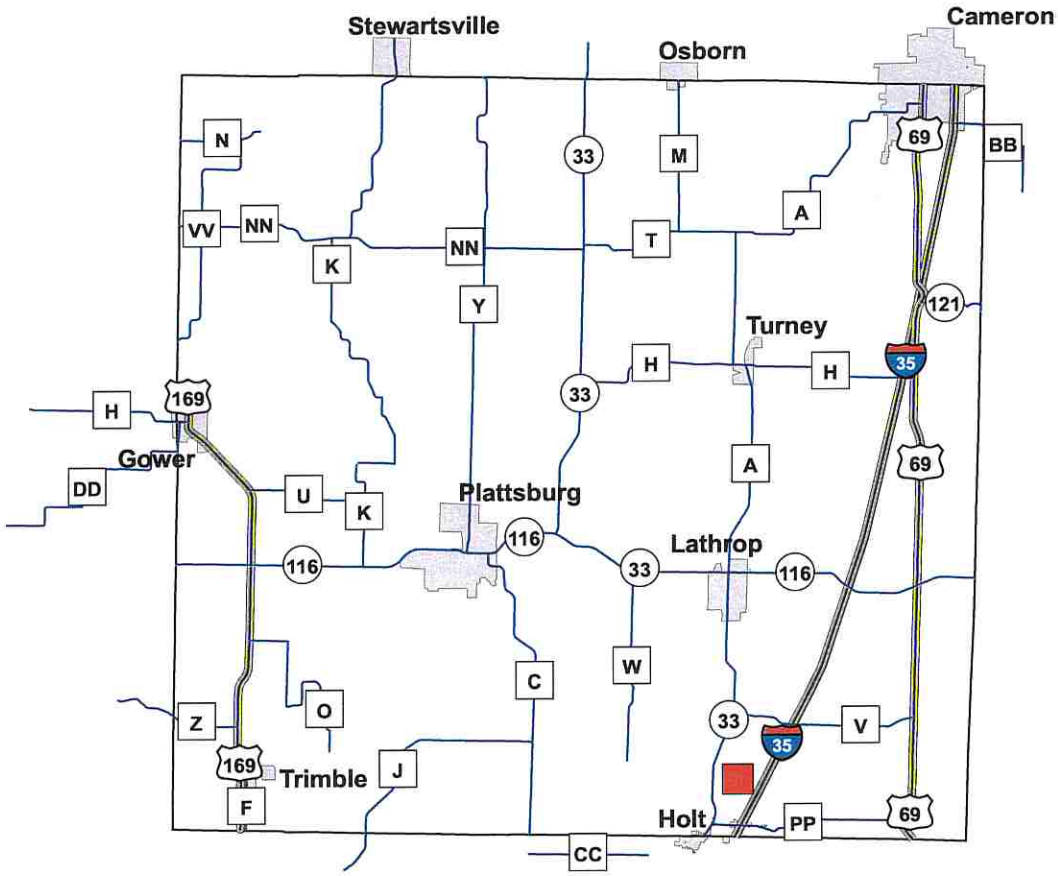
Principal spillway crest

Tress in spillway channel (to be removed)

Vegetation in riprap

Trees near toe of dam

Spring Lake Dam
Breach Inundation Map



Clinton County, Missouri
CLINTON_MO11122

Note: Actual areas inundated will depend on the actual dam failure criteria and may differ from the areas shown. Due to limitations, methods, assumptions, and procedures used to develop the inundation area, the map should only be used for evacuation and emergency purposes.

Missouri
Department of
Natural Resource

Water Resources Cente
P.O. Box 176
Jefferson City, MO 652

Explanation Sheet

Project:	Spring Lake Dam Breach Analysis
Drawing Title:	Explanation Sheet 1 of 1
Missouri Department of Natural Resources, Water Resources Center, P.O. Box 176, Jefferson City, MO 65102	Project ID: CLINTON_MO11122

Explanation of Maps

The following maps indicate the areas which are predicted to be inundated during the occurance of a sunny day breach of the dam. The pool elevation at failure is assumed to be at the emergency spillway crest elevation or at the crest of the dam in the absence of an emergency spillway.

Use of Maps

The following maps provide a baseline for evaluation of existing emergency action plans and environmental hazards downstream of the regulated structure.

Definition of Terms

Pool Elevation- Water level in the reservoir.

Dam Crest- The lowest elevation measured along the dam crest.

Spillway Crest- The lowest elevation measured along the crest of the spillway.

Arrival Time- Elapsed time between the breach initiation and the time that water levels first begin to rise at any given point.

Assumed Conditions of Flooding

The pool elevation at failure is assumed to be at the emergency spillway crest elevation or at the crest of the dam in the absence of an emergency spillway. The assumed overtopping erodes a section of the dam resulting in a dangerous and quick release of water. For the hydraulic analysis flow initiation is required and therefore a baseflow of water has been included in the analysis.

Dam Facts

ID: MO_11122

County: Clinton

Location: S24, T54 N, R31 W

Height of Dam: 45'

Tributary: Unnamed trib. to Muddy Fork

Lake Area: 13.5 acres

Max Storage Capacity: 330 ac-ft

Breach Parameters (Froehlich, 1995)

Side slopes: 1.4:1

Bottom width: 17.5'

Bottom elevation: 923'

Breach formation time: 0.21 hr

Pool Elevation at Failure: 964'

Pool Volume at Failure: 250 ac-ft

Downstream Crossings

Mohawk Dr

SE 210th St

Rt PP

SE 200th St

Shanks Rd

NOTE: LiDAR Elevation data unavailable for Clinton County. Analysis was completed with 10 meter Digital Elevation Model

Date of Aerial Photo: August 27, 200

Reservoir
County Boundary
Cross Sections

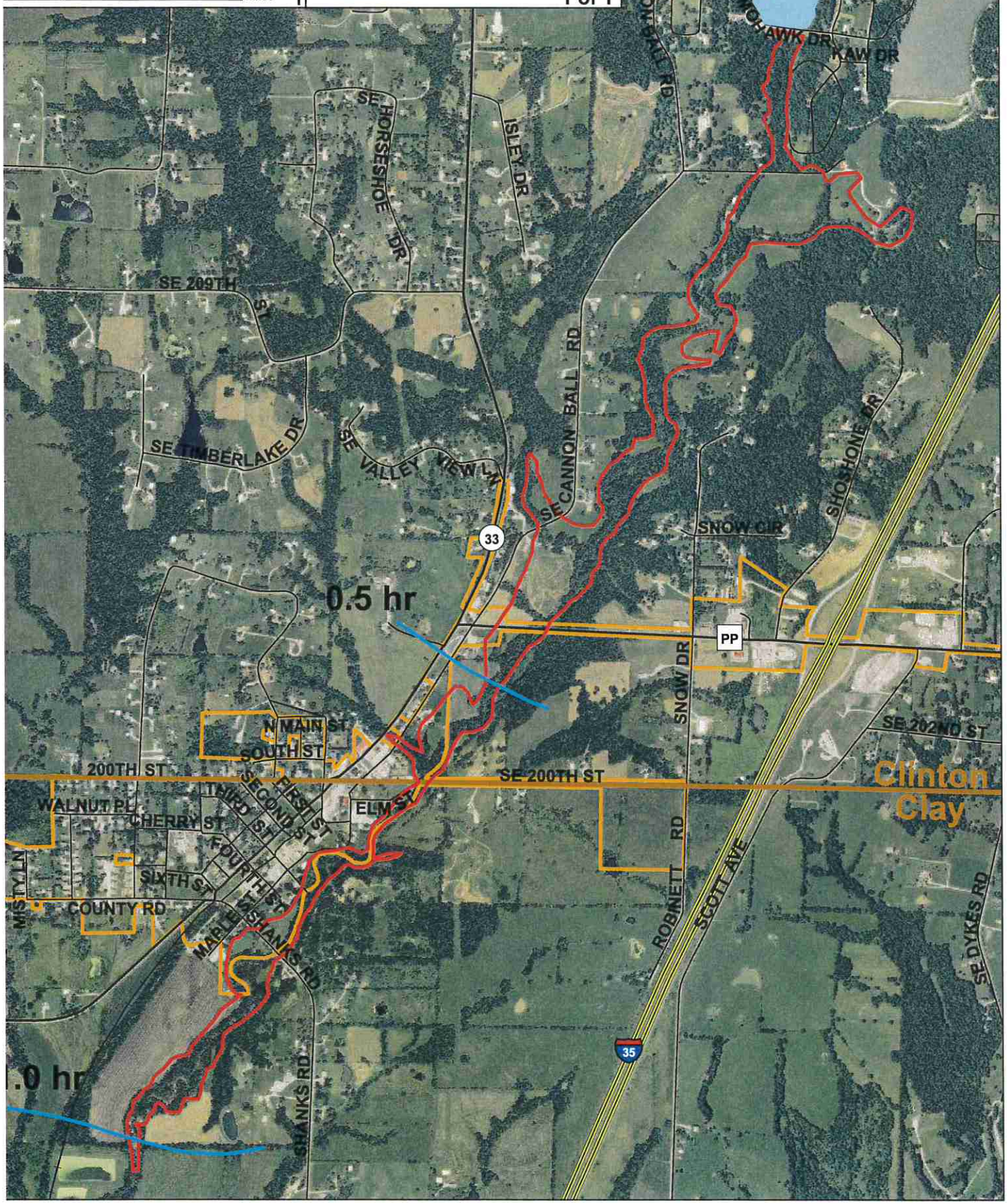
0.125 0.25 0.5 Miles N

Project: Spring Lake Dam

Project ID: CLINTON_MO11122

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title:
Flood Arrival Times
1 of 1



Reservoir

250 500 1,000 Feet

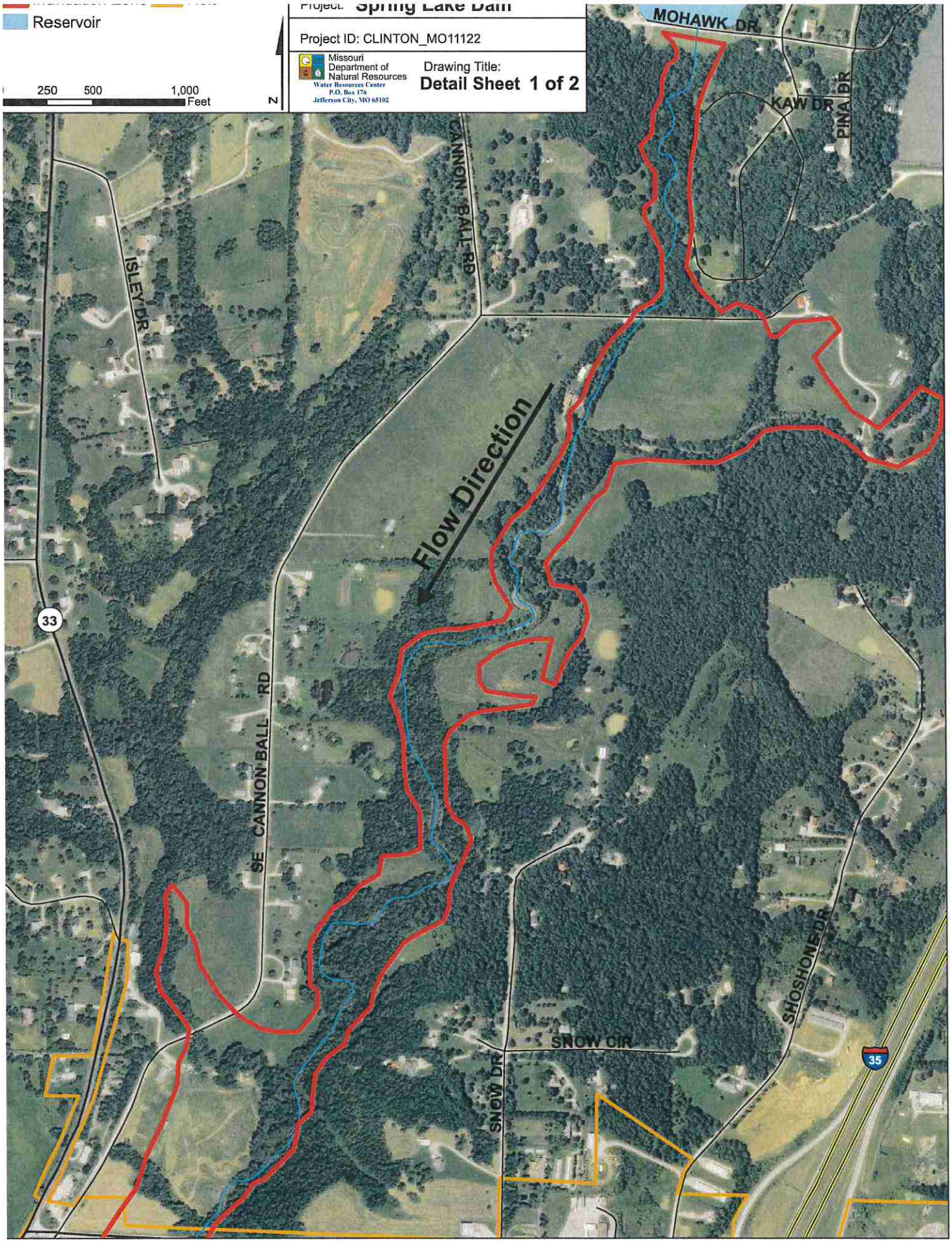
N

Project: Spring Lake Dam

Project ID: CLINTON_MO11122

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title:
Detail Sheet 1 of 2



Holt

250 500 1,000 Feet

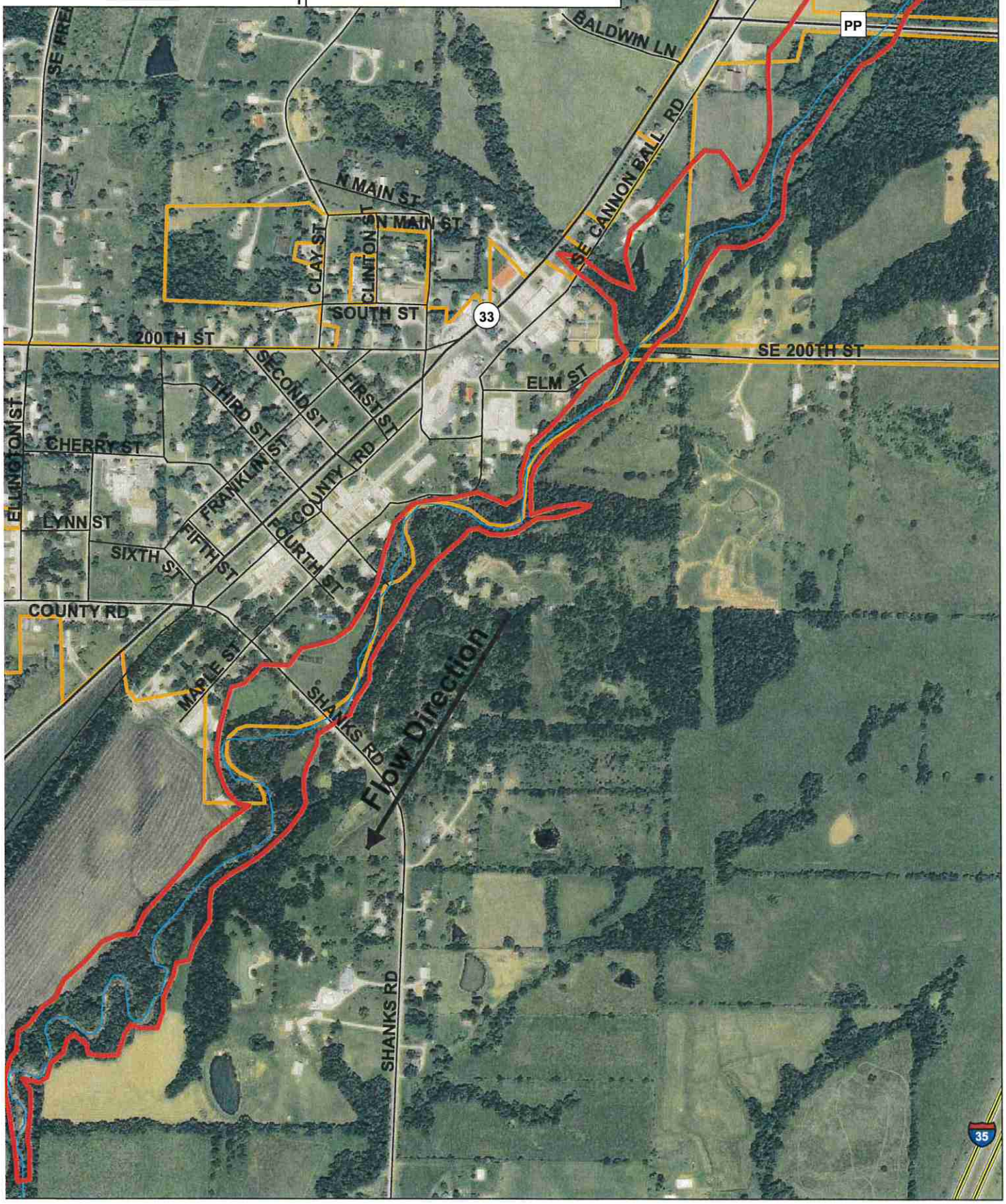
N

Project: Spring Lake Dam

Project ID: CLINTON_MO11122

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title:
Detail Sheet 2 of 2



Reservoir
County Boundary

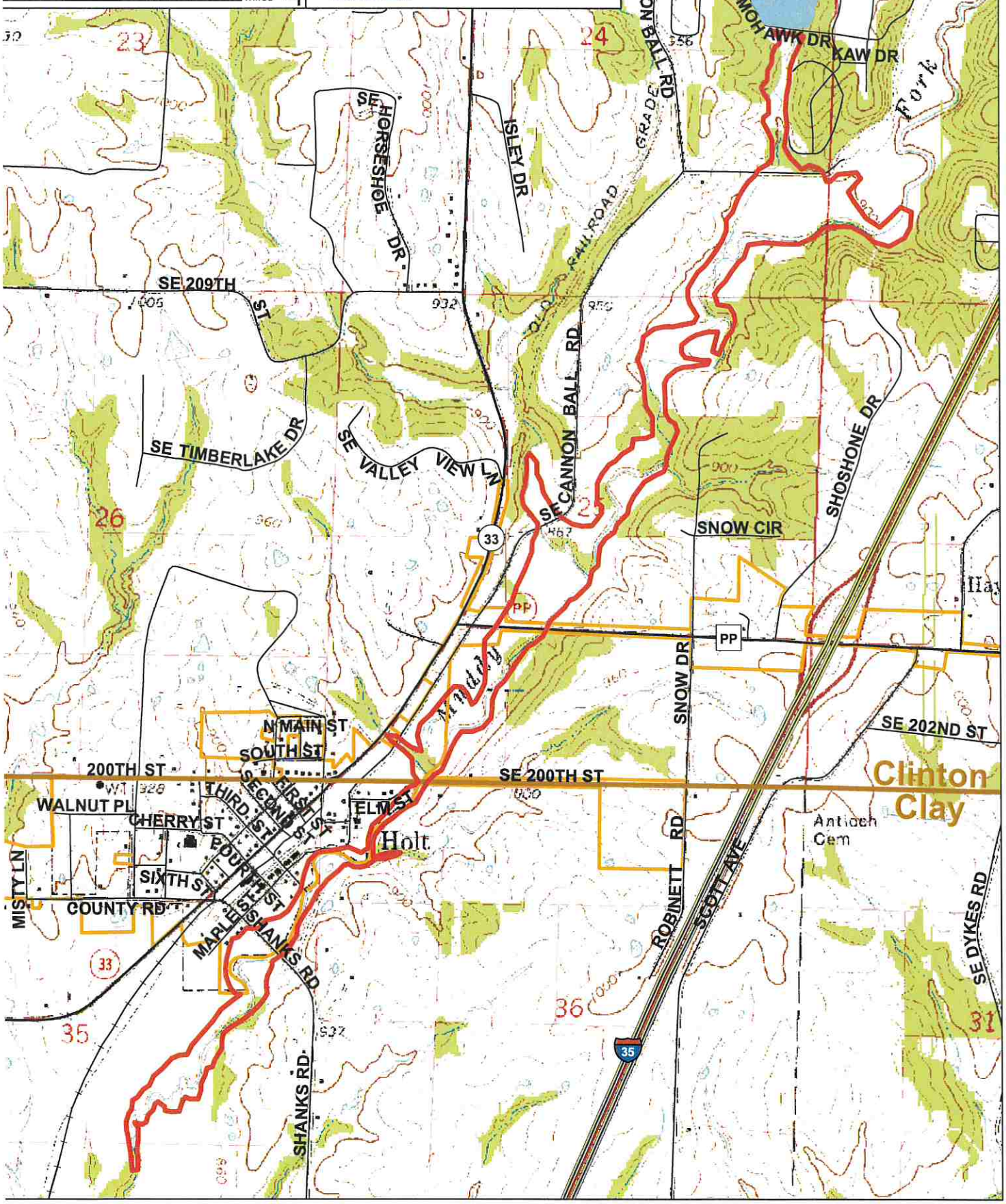
0.125 0.25 0.5 Miles N

Project: Spring Lake Dam

Project ID: CLINTON_MO11122

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title: **Topo Map** 1 of 1



Jeremiah W. (Jay) Nixon, Governor • Harry D. Bozoian, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

dnr.mo.gov

573/368-2175

November 1, 2016

Lake Arrowhead Trustees
C/O Mr. Andrew Shaw
711 Southbrook Parkway
Kearney, Missouri 64060

RE: Spring Lake Dam (MO 11122) Clinton County

Dear Mr. Shaw:

As a result of an inspection of the Spring Lake Dam on October 25, 2016, I am pleased to inform you that Registration Permit R-390 has been renewed and is enclosed for your use. The term of the permit will be two years from the expiration date of the last registration permit issued for the dam and will expire on January 30, 2019. At that time, the dam will be reinspected by the Dam and Reservoir Safety Program at no cost to you. The permit is being renewed for two years based on the downstream environmental zone classification.

Please refer to the enclosed inspection report for additional information on the inspection. If you have any questions or need further assistance, please feel free to contact Glenn Lloyd at (573) 368-2175.

Thanks for your cooperation in renewing this permit.

Sincerely,

MISSOURI GEOLOGICAL SURVEY

Ryan P. Stack, P.E.
Chief Engineer
Dam & Reservoir Safety Program

RPS/clb
Enclosure

Registration Permit No. R-390
Renewed November 1, 2016

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DAM AND RESERVOIR SAFETY COUNCIL

REGISTRATION PERMIT

Pursuant to Chapters 236.400 through 236.500 of the Revised Statutes of Missouri and the rules established by the Dam and Reservoir Safety Council, and on the basis of an inspection by the Department of Natural Resources for the Spring Lake Dam, Clinton County, all of which are made a part hereof by reference, **PERMISSION IS HEREBY GRANTED** to Lake Arrowhead Trustees, hereafter known as the permittee, whose address for the purpose of notices and other communications pertaining to this permit 711 Southbrook Parkway; Kearney, Missouri 64060, which address is subject to change by written notice from the permittee, **TO OPERATE** said dam and reservoir located in Section 24, Township 54 North, Range 31 West, having identification number of MO 11122, a dam height of 45 feet, a principal spillway elevation of 960.7 feet (UTM NAD 83 Zone 15N GEO ID 12A), an emergency spillway elevation of 964.2 feet (UTM NAD 83 Zone 15N GEO ID 12A), a minimum crest elevation of 965.9 feet (UTM NAD 83 Zone 15N GEO ID 12A), a reservoir area of 12 acres at the water storage elevation and approximate UTM Coordinates of 4,370,480 Meters North and 386,300 Meters East, Zone 15, subject to the following provisions:

GENERAL PROVISIONS:

1. No liability shall be imposed upon or incurred by the State of Missouri and/or the Dam and Reservoir Safety Council, or any of their officers, agents, employees, and members, officially or personally, on account of the granting hereof or on account of any damage to any person or property resulting from any act or omission of the permittee or any of its agents, employees, or contractors, or closed corporations or successors relating to any matter hereunder. This permit shall not be construed as estopping or limiting any legal claim or right of action of the state against the permittee, its agents, employees or contractors for any damages or injury resulting from any such act or omission by them or for violation of or failure to comply with the provisions of the permit or applicable provisions of law.

2. The permittee shall comply with all Federal, State and local laws and regulations, and shall obtain such other permits as may be required.

3. In cases where the doing by the permittee of anything authorized by this permit shall involve the taking, using or damaging of any property rights or interest of any other person or persons, or of any publicly owned lands or improvements thereon or interests therein, it is the sole responsibility of the permittee, before proceeding therewith, to obtain the written consent of all persons, agencies, or authorities concerned, and to acquire all property, rights and interests necessary therefore, including flood easements or permissions for all properties which may be inundated by the dam on a temporary or permanent basis in the upstream impoundment area below the top of dam elevation.

4. The permittee shall notify the Dam and Reservoir Safety Council in writing upon the sale or other transfer of interest in the dam or reservoir.

5. Based on conditions existing at the time of issuing this permit, the Downstream Environment Zone is Class I.

6. The permittee shall not alter, enlarge, reduce, repair or remove the dam, reservoir or appurtenances without first obtaining a construction permit from the Dam and Reservoir Safety Council.

7. The permittee shall immediately notify in writing, the Chief Engineer of any conditions relating to structural stability of and seepage through the dam discovered during the term of this permit which differs from those conditions identified in the renewal inspection summary.

8. The terms and provisions of this permit shall extend to and bind the successors in authority of the Dam and Reservoir Safety Council and the legally assigned successors in interest of the permittee.

9. Maintenance of the dam and reservoir herein permitted shall be the responsibility of the permittee.

10. The term of this permit shall be two (2) years from the expiration date of the last registration permit issued for the dam and will expire on January 30, 2019. The permittee shall apply for renewal not less than sixty (60) days prior to this expiration date.

Executed at Rolla, Missouri on this 1st day of November, 2016

DAM & RESERVOIR SAFETY COUNCIL

By _____
Chief Engineer
Dam and Reservoir Safety Program

DEPARTMENT OF NATURAL RESOURCES
DAM & RESERVOIR SAFETY PROGRAM
DAM INSPECTION REPORT

DATE: *October 31, 2016*

COVER SHEET

NAME OF DAM: *Spring Lake Dam* **I.D. # :** *MO11122*

LOCATION: County: *Clinton* *Section: 24, Twp. 54 N, Rge. 31 W*

OWNER: *Lake Arrowhead Trustees*	
ADDRESS: *C/O Andrew Shaw*	
711 Southbrook Parkway	
CITY/STATE/ZIP: *Kearney, Missouri 64060*	
TELEPHONE: *816-903-0419, 816-694-5075 cell*	

PERMIT #	HAZARD CLASS	TYPE OF DAM
R-390	CLASS I	EARTHFILL

TYPE OF SPILLWAY (s) **Principal** *Two 24 inch diameter corrugated metal pipes on right abutment*
Emergency *Open channel on right abutment*

☒ **I hereby certify that the** *Spring Lake Dam* **was inspected on** *October 25, 2016* **in accordance with RSMO 236.400 through RSMO 236.500.**

☒ **I hereby certify that the** *Spring Lake Dam* **did not have any observed defects that required correction at the time of the inspection.**

☒ **Judgement of Slope Stability – The embankment and appurtenant structures appeared to be in good overall condition at the time of the inspection, with no indications of slope instability or excessive seepage.**

☐ **Defects were found that will have to be corrected prior to the permit being renewed.**

STATION	ELEVATION (FT)	COMMENTS
TBM	965.6	Temporary benchmark-spike in utility pole on right abutment
PS	960.7	Principal spillway invert, right pipe
ES	964.2	Emergency spillway crest (road over principal spillway pipes)
Dam	965.9	Dam crest low point
WL	960.8	Water level on day of inspection

Elevations are in feet and based on UTM NAD Zone 15N GEOID12A

STATE OF MISSOURI GLENN DELOUGE LLOYD JR. NUMBER REGISTERED PROFESSIONAL ENGINEER

INSPECTING ENGINEER
Glenn Lloyd, P.E.

Inspection Checklist

NAME OF DAM:	Spring Lake Dam	INSPECTION DATE: October 25, 2016
ID #: MO 11122	COUNTY: Clinton	HAZARD CLASS: 1

HAZARD CLASSIFICATION: ☒ Unchanged ☐ Changed

Item	Condition*	Comments
1. Vegetation	N.P.	
2. Seepage	N.P.	
3. Principal Spillway	N.P.	
4. Emergency Spillway	N.P.	
5. Embankment	N.P.	
6. Reservoir Area	N.P.	
7. Lake Drain Gates or Valves	N.A.	
8. Spillway Outlet Channels	N.P.	
9. Embankment Drain Outlets	N.A.	
10. Riprap	O.R.	The vegetation in the riprap will need to be addressed before the next inspection.

*N.P. = No observable problem; M.R. = Maintenance Required; D.O. = Defect Observed; E.C = Emergency Condition; O.R. = Observation Required; N.A. = Not Applicable

Required Freeboard	Available Freeboard
4.2 feet	5.2 feet

RECOMMENDATION:

☒ **Permit is being renewed**

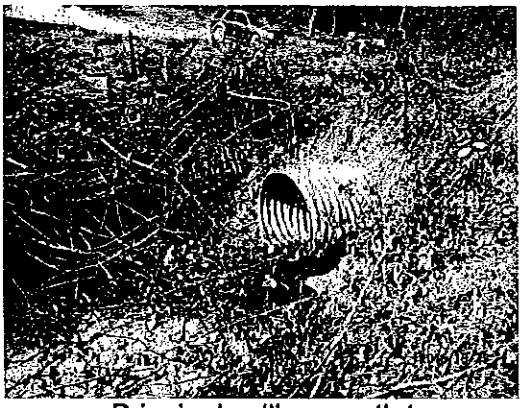
☐ **Permit is not being renewed**

Photographs of MO11122 on October 25, 2016

Upstream face

Downstream face

Principal spillway inlet

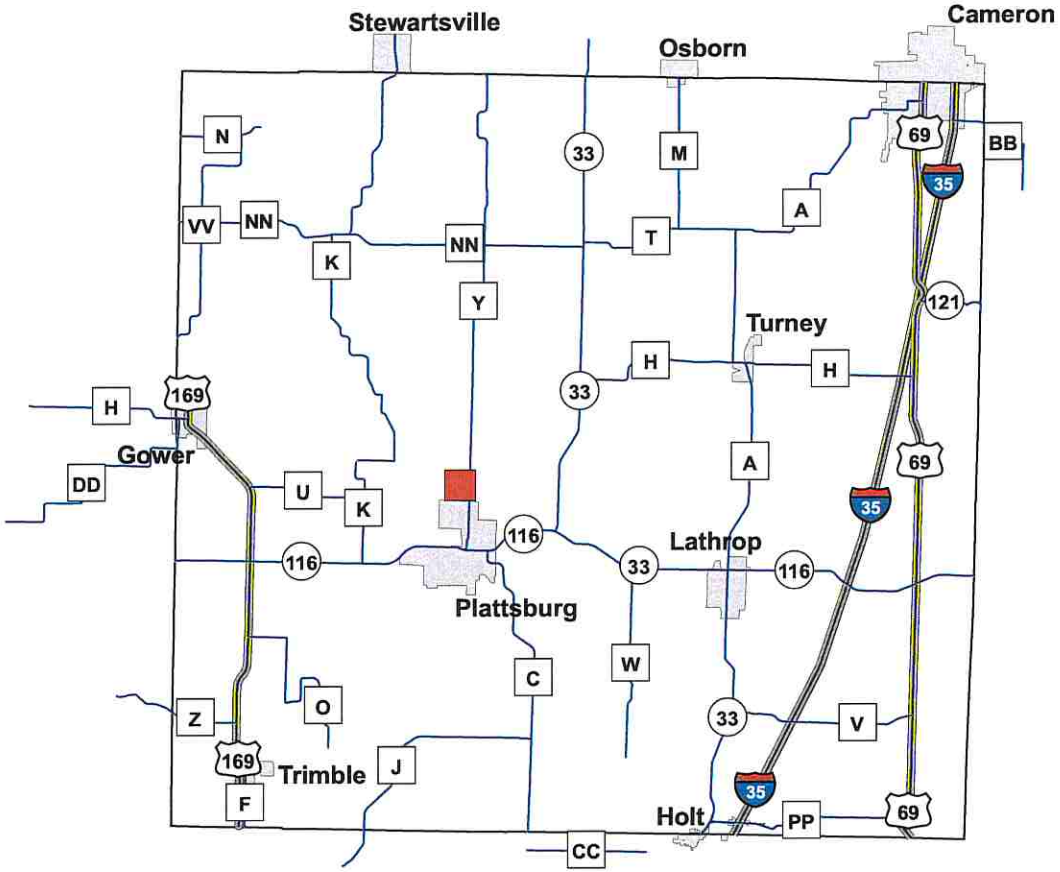


Principal spillway outlet

Right end of wall and emergency spillway crest

Inside of pipe

Six Mile Lane Lake Dam
Breach Inundation Map



Clinton County, Missouri
CLINTON_MO10266

Note: Actual areas inundated will depend on the actual dam failure criteria and may differ from the areas shown. Due to limitations, methods, assumptions, and procedures used to develop the inundation area, the map should only be used for evacuation and emergency purposes.

Missouri
Department of
Natural Resourc

Water Resources Cente
P.O. Box 176
Jefferson City, MO 652

Explanation Sheet

Project:
Six Mile Lane Lake Dam Breach Analysis

Drawing Title:
Explanation Sheet **1 of 1**

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Project ID: CLINTON_MO10266

Explanation of Maps

The following maps indicate the areas which are predicted to be inundated during the occurance of a sunny day breach of the dam. The pool elevation at failure is assumed to be at the emergency spillway crest elevation or at the crest of the dam in the absence of an emergency spillway.

Use of Maps

The following maps provide a baseline for evaluation of existing emergency action plans and environmental hazards downstream of the regulated structure.

Definition of Terms

Pool Elevation- Water level in the reservoir.

Dam Crest- The lowest elevation measured along the dam crest.

Spillway Crest- The lowest elevation measured along the crest of the spillway.

Arrival Time- Elapsed time between the breach initiation and the time that water levels first begin to rise at any given point.

Assumed Conditions of Flooding

The pool elevation at failure is assumed to be at the emergency spillway crest elevation or at the crest of the dam in the absence of an emergency spillway. The assumed overtopping erodes a section of the dam resulting in a dangerous and quick release of water. For the hydraulic analysis flow initiation is required and therefore a baseflow of water has been included in the analysis.

Dam Facts

ID: MO_10266

County: Clinton

Location: S11, T55 N, R32 W

Height of Dam: 37'

Tributary: Reservoir Branch of Horse Fork

Lake Area: 50 acres

Max Storage Capacity: 865 ac-ft

Breach Parameters (Froehlich, 1995)

Side slopes: 1.4:1

Bottom width: 52.25'

Bottom elevation: 957.5'

Breach formation time: 0.41 hr

Pool Elevation at Failure: 983.94'

Pool Volume at Failure: 660 ac-ft

Downstream Crossings

Rt Y

NW Reservoir Rd

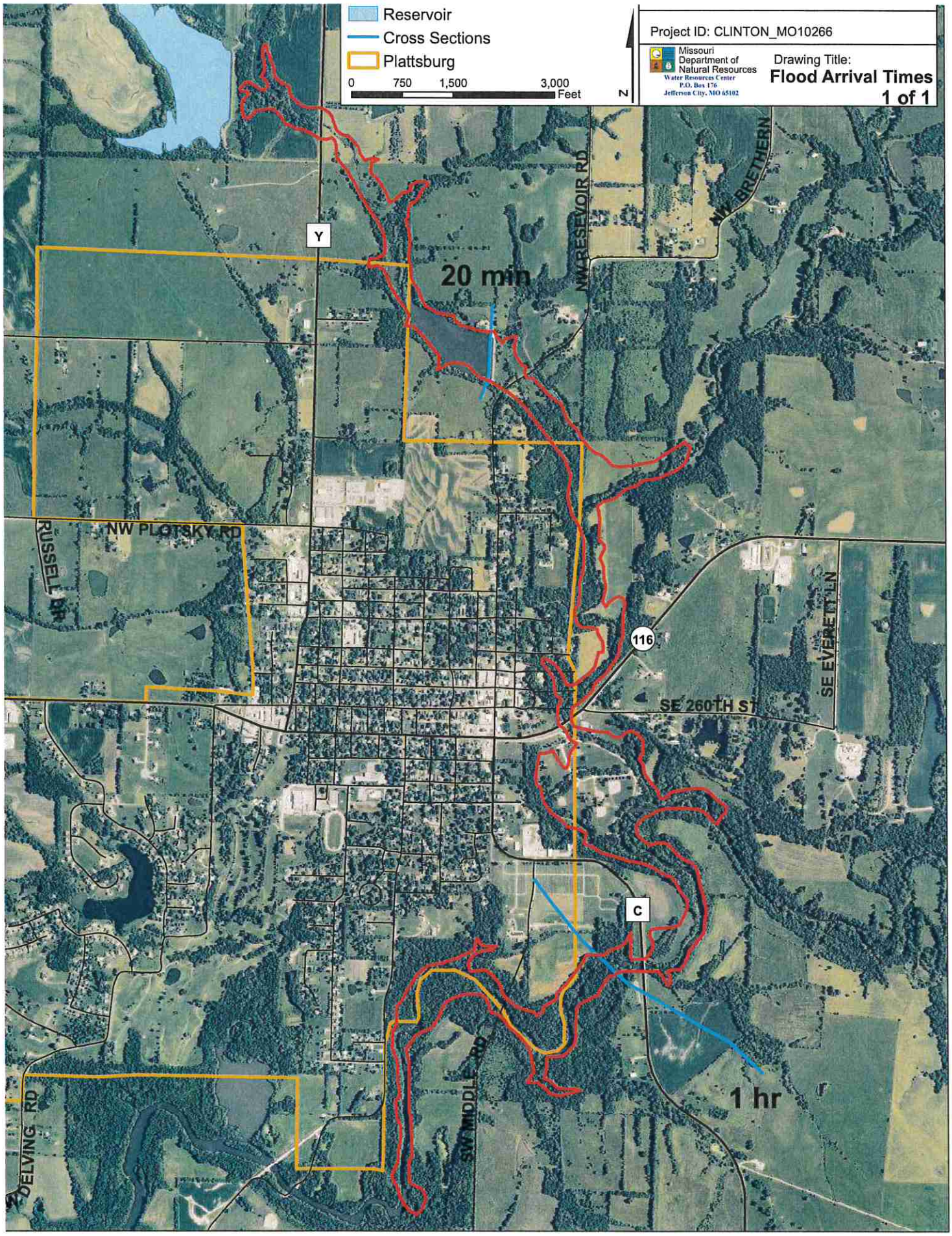
HWY 116

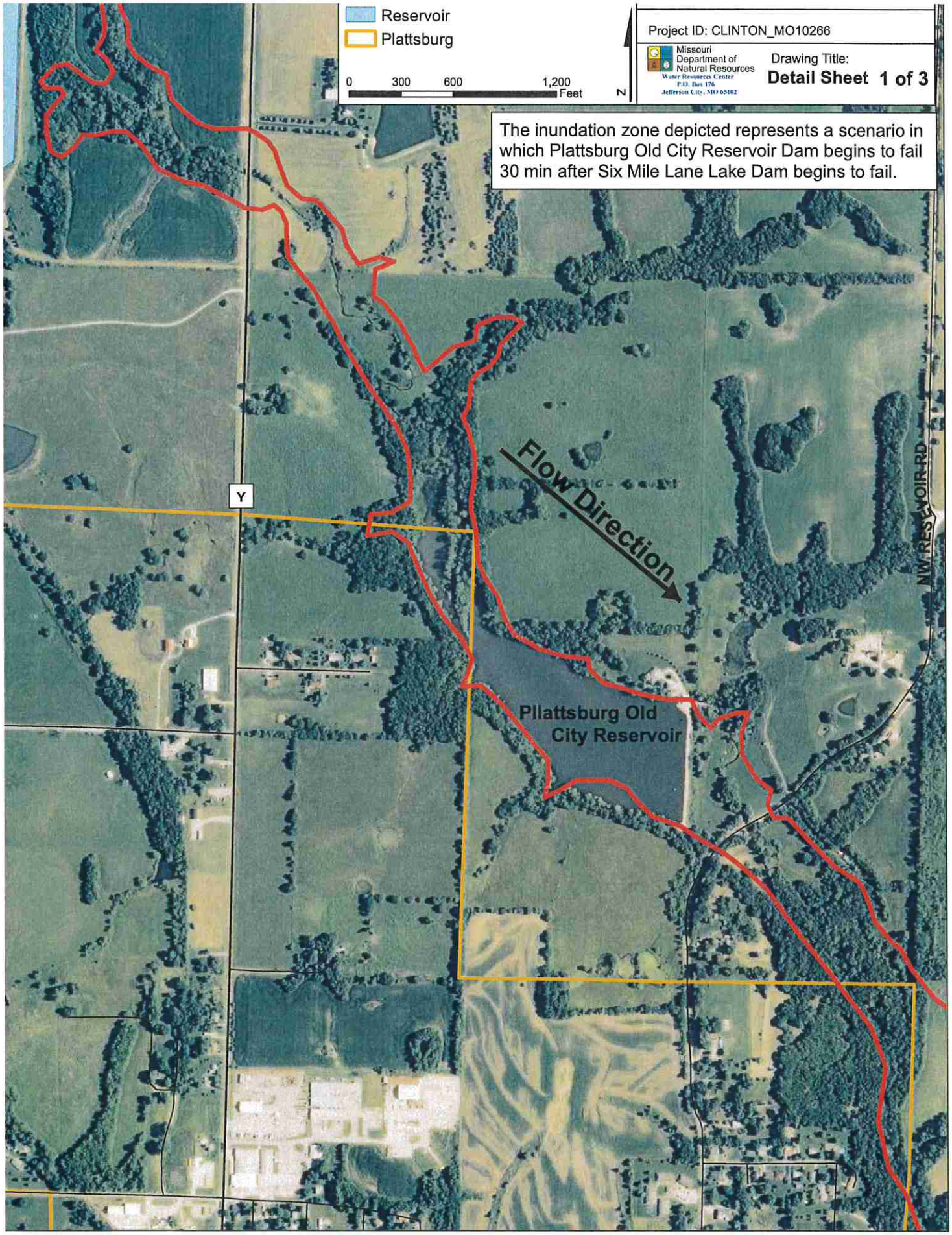
Rt C

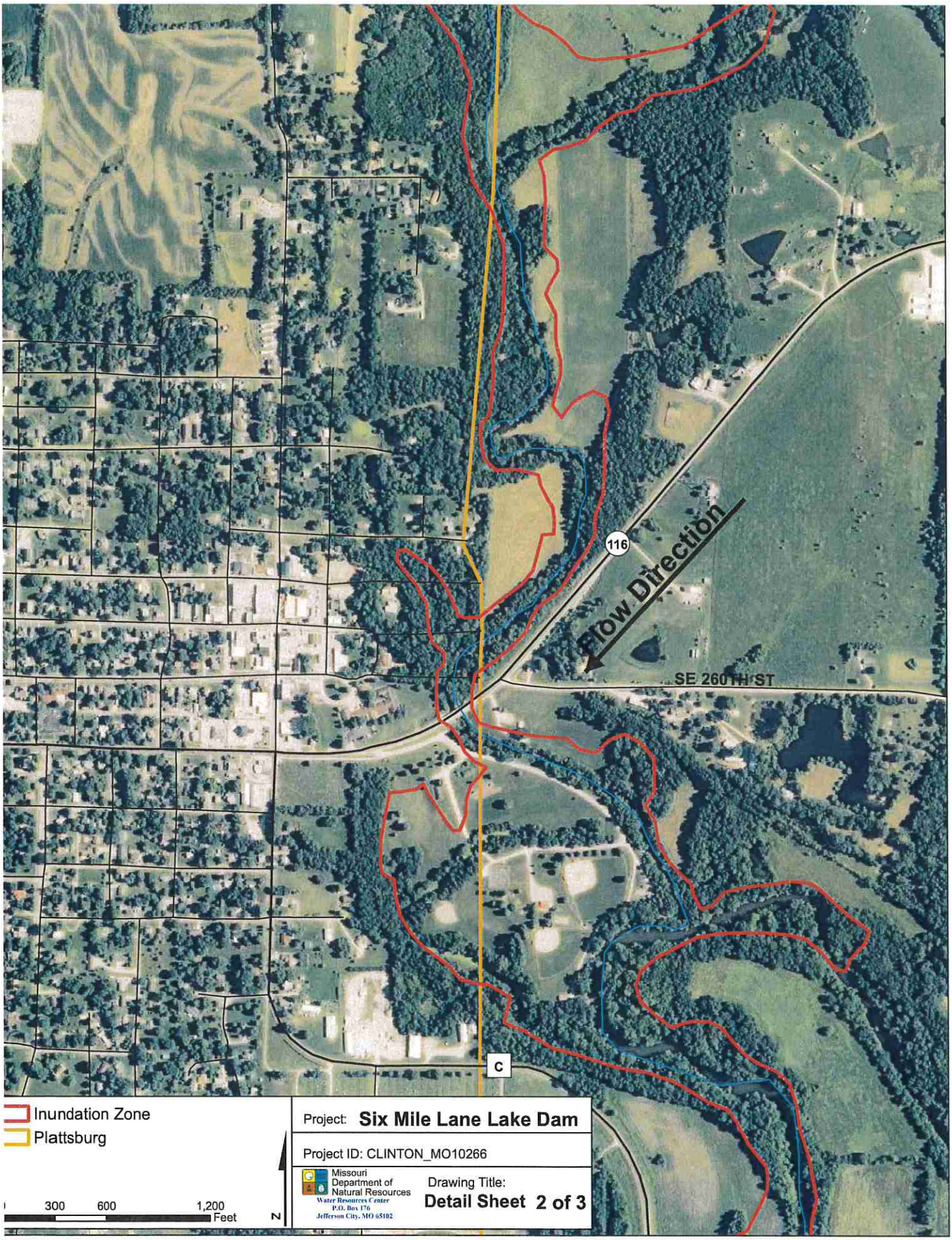
SW Middle Rd

NOTE: LiDAR Elevation data unavailable for Clinton County.
Analysis was completed with 10 meter Digital Elevation Model

Date of Aerial Photo: 2


Reservoir
Cross Sections
Plattsburg
0 750 1,500 3,000 Feet
N
Project ID: CLINTON_MO10266
Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102
Drawing Title:
Flood Arrival Times
1 of 1
20 min
1 hr
Y
C
116
NW RESERVOIR RD
NW BRETHERN
NW PLOTSKY RD
RUSSELL DR
SE 260TH ST
SE EVERETT LN
SW MIDDLE RD
DELVING RD


Reservoir
Plattsburg
0 300 600 1,200 Feet
N
Project ID: CLINTON_MO10266
Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102
Drawing Title:
Detail Sheet 1 of 3
The inundation zone depicted represents a scenario in which Plattsburg Old City Reservoir Dam begins to fail 30 min after Six Mile Lane Lake Dam begins to fail.
Flow Direction
Y
NW RESERVOIR RD
Pllattsburg Old City Reservoir

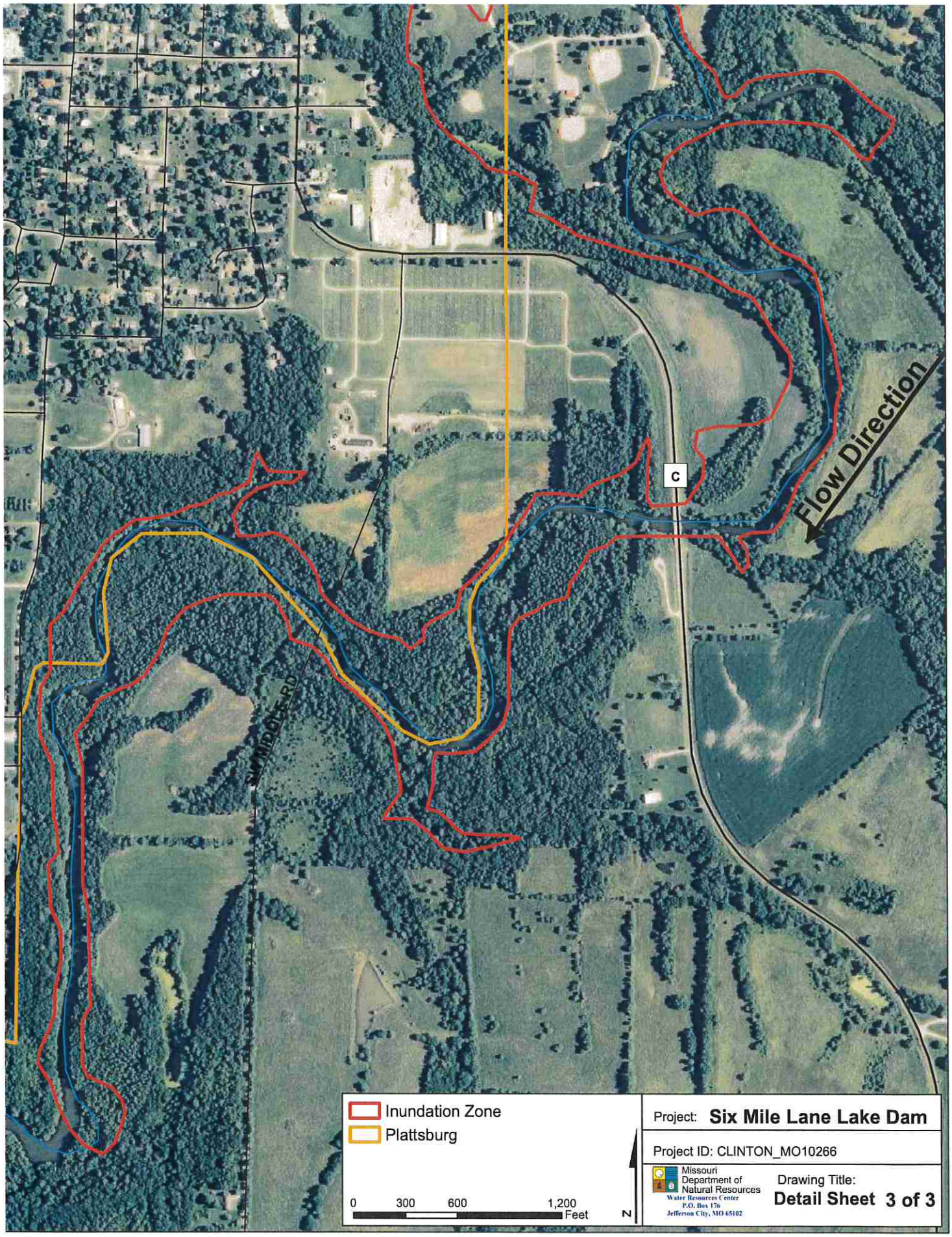


Project: **Six Mile Lane Lake Dam**

Project ID: CLINTON_MO10266

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title:
Detail Sheet 2 of 3

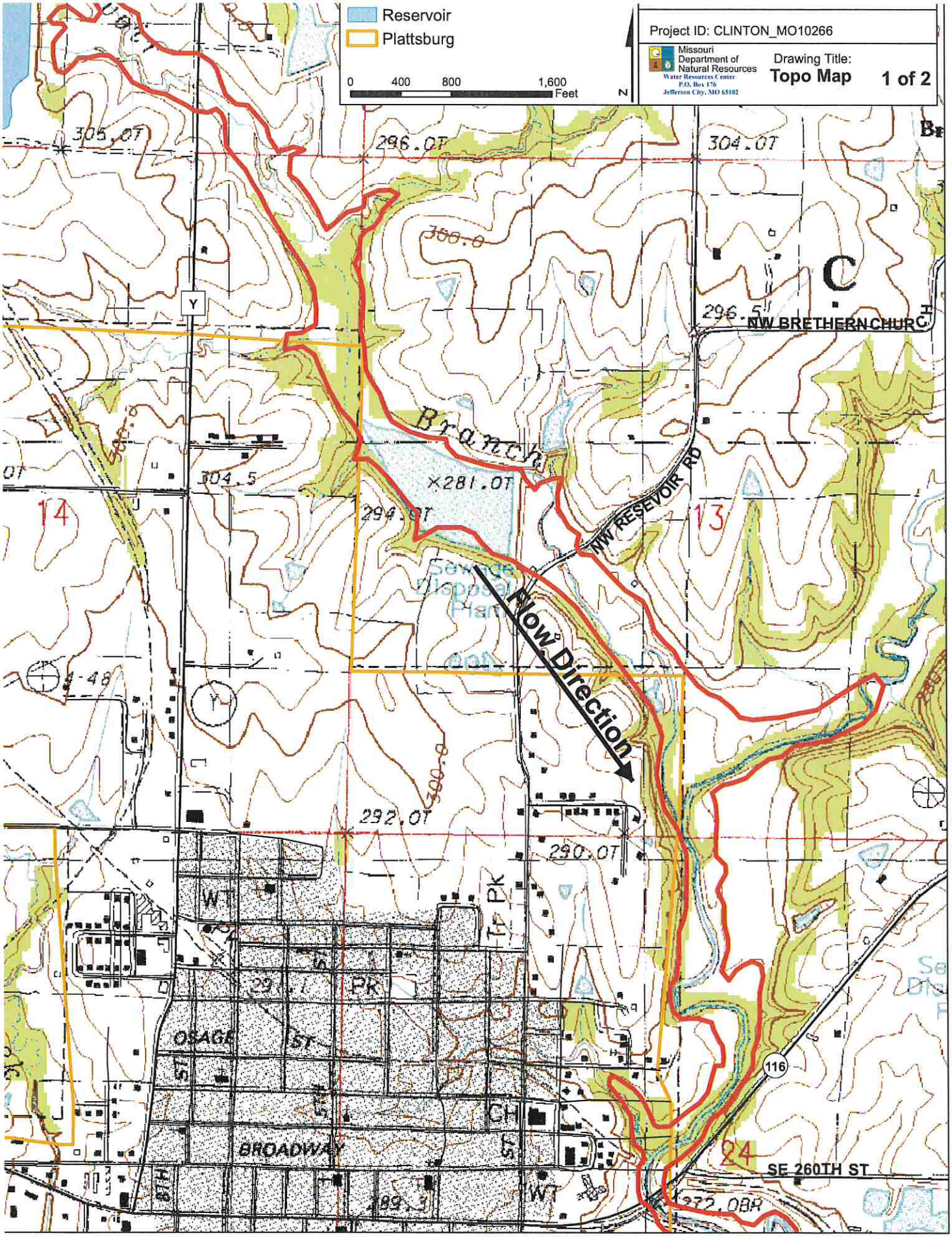


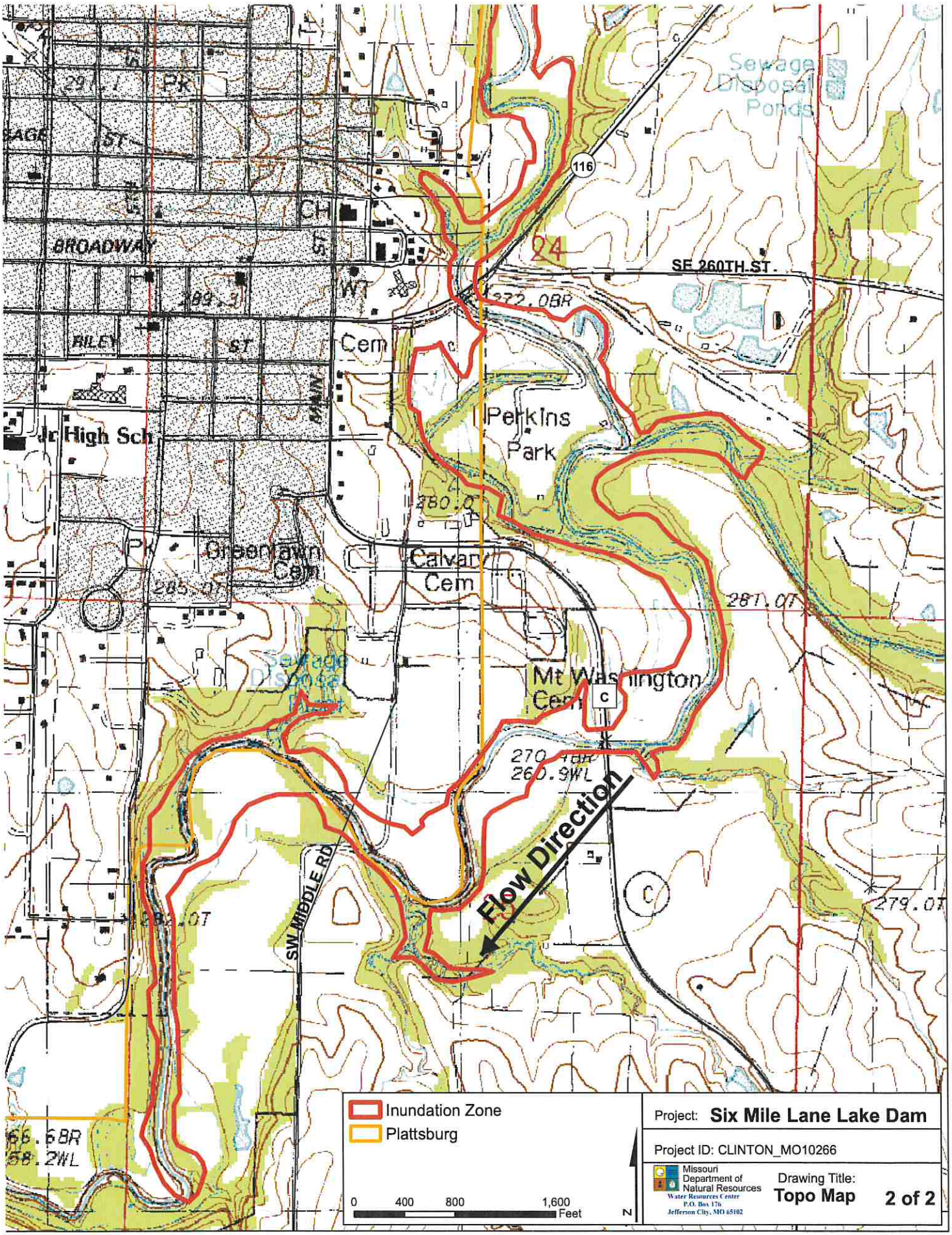
Project: **Six Mile Lane Lake Dam**

Project ID: CLINTON_MO10266

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title:
Detail Sheet 3 of 3


Reservoir
Plattsburg
0 400 800 1,600 Feet
N
Project ID: CLINTON_MO10266
Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102
Drawing Title:
Topo Map
1 of 2
305.0T
296.0T
304.0T
300.0
C
296.5
NW BRETHERN CHURCH
Branch
304.5
281.0T
294.0T
NW RESEVOIR RD
14
13
Flow Direction
292.0T
290.0T
OSAGE ST
BROADWAY
116
24
SE 260TH ST
272.0BR



Project: **Six Mile Lane Lake Dam**

Project ID: CLINTON_MO10266

Missouri Department of Natural Resources
Water Resources Center
P.O. Box 176
Jefferson City, MO 65102

Drawing Title: **Topo Map**

2 of 2

STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

June 9, 2016

Plattsburg Blasters & Casters, Inc.
C/O Cathy & Lane Bond
6206 Coral Ridge Road
Houston, Texas 77069

RE: Six Mile Lane Lake Dam (MO10266) Clinton County

Dear Mr. & Ms. Bond:

As a result of an inspection of the Six Mile Lane Lake Dam on May 27, 2016, I am pleased to inform you that Registration Permit R-107 has been renewed and is enclosed for your use. The term of the permit will be three years from the expiration date of the last registration permit issued for the dam and will expire on June 26, 2019. At that time, the dam will be reinspected by the Dam and Reservoir Safety Program at no cost to you. The permit is being renewed for three years based on the downstream environmental zone classification.

Please refer to the enclosed inspection report for additional information on the inspection. If you have any questions, please feel free to contact Paul Simon at (573) 368-2175.

Thanks for your cooperation in renewing this permit.

Sincerely,

MISSOURI GEOLOGICAL SURVEY

Ryan P. Stack, P.E.
Chief Engineer
Dam and Reservoir Safety Program

RPS/clb
Enclosure

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DAM AND RESERVOIR SAFETY COUNCIL

REGISTRATION PERMIT

Pursuant to Chapters 236.400 through 236.500 of the Revised Statutes of Missouri and the rules established by the Dam and Reservoir Safety Council, and on the basis of an inspection by the Department of Natural Resources for the Six Mile Lake Dam, Clinton County, all of which are made a part hereof by reference, **PERMISSION IS HEREBY GRANTED** to the Plattsburg Casters & Blasters, hereafter known as the permittee, whose address for the purpose of notices and other communications pertaining to this permit is C/O Mr. & Ms. Lane Bond; 6206 Coral Ridge Road; Houston, TX 77069, which address is subject to change by written notice from the permittee, **TO OPERATE** said dam and reservoir located in Section 11, Township 55 North, Range 32 West, having identification number of MO 10266, a dam height of 37 feet, a principal spillway elevation of 981.3 feet (UTM NAD83 zone 15N GEOID12A), an emergency spillway-right elevation of 983.6 feet (UTM NAD83 zone 15N GEOID12A), an emergency spillway-left elevation of 983.7 feet (UTM NAD83 zone 15N GEOID12A), a minimum crest elevation of 988.0 feet (UTM NAD83 zone 15N GEOID12A), a reservoir area of 55 acres at the water storage elevation and approximate UTM Coordinates of 4,370,480 Meters North and 386,300 Meters East, Zone 15, subject to the following provisions:

GENERAL PROVISIONS:

1. No liability shall be imposed upon or incurred by the State of Missouri and/or the Dam and Reservoir Safety Council, or any of their officers, agents, employees, and members, officially or personally, on account of the granting hereof or on account of any damage to any person or property resulting from any act or omission of the permittee or any of its agents, employees, or contractors, or closed corporations or successors relating to any matter hereunder. This permit shall not be construed as estopping or limiting any legal claim or right of action of the state against the permittee, its agents, employees or contractors for any damages or injury resulting from any such act or omission by them or for violation of or failure to comply with the provisions of the permit or applicable provisions of law.

2. The permittee shall comply with all Federal, State and local laws and regulations, and shall obtain such other permits as may be required.

3. In cases where the doing by the permittee of anything authorized by this permit shall involve the taking, using or damaging of any property rights or interest of any other person or persons, or of any publicly owned lands or improvements thereon or interests therein, it is the sole responsibility of the permittee, before proceeding therewith, to obtain the written consent of all persons, agencies, or authorities concerned, and to acquire all property, rights and interests necessary therefore, including flood easements or permissions for all properties which may be inundated by the dam on a temporary or permanent basis in the upstream impoundment area below the top of dam elevation.

4. The permittee shall notify the Dam and Reservoir Safety Council in writing upon the sale or other transfer of interest in the dam or reservoir.

5. Based on conditions existing at the time of issuing this permit, the Downstream Environment Zone is Class II. Future development is in the vicinity of the dam and flood plain below the dam may result in a change in classification. This change will necessitate hydraulic and structural upgrading of the dam so the dam is in compliance with the rules and regulations of the Missouri Dam and Reservoir Safety Council. Permittee or its representative, successors or assigns shall perform any such upgrading upon a change in classification and upon a notification from the Missouri Dam and Reservoir Safety Council.

6. The permittee shall not alter, enlarge, reduce, repair or remove the dam, reservoir or appurtenances without first obtaining a construction permit from the Dam and Reservoir Safety Council.

7. The permittee shall immediately notify in writing, the Chief Engineer of any conditions relating to structural stability of and seepage through the dam discovered during the term of this permit which differs from those conditions identified in the renewal inspection summary.

8. The terms and provisions of this permit shall extend to and bind the successors in authority of the Dam and Reservoir Safety Council and the legally assigned successors in interest of the permittee.

9. Maintenance of the dam and reservoir herein permitted shall be the responsibility of the permittee.

10. The term of this permit shall be three (3) years from the expiration date of the last registration permit issued for the dam and will expire on June 26, 2019. The permittee shall apply for renewal not less than sixty (60) days prior to this expiration date.

Executed at Rolla, Missouri on this 9th day of June, 2016

DAM & RESERVOIR SAFETY COUNCIL

By _____
Chief Engineer
Dam and Reservoir Safety Program

DEPARTMENT OF NATURAL RESOURCES
DAM & RESERVOIR SAFETY PROGRAM
DAM INSPECTION REPORT

DATE: *June 8, 2016*

COVER SHEET

NAME OF DAM: *Six Mile Lane Lake Dam* I.D. # : *MO10266*

LOCATION: County: *Clinton* *Section: 11, Twp. 55 N, Rge. 32 W*

OWNER: *Plattsburg Blasters And Casters, Inc.*	
C/O Cathy And Lane Bond	
ADDRESS: *6206 Coral Ridge Road*	
CITY/STATE/ZIP: *Houston, Texas 77069*	
TELEPHONE: *816-565-0888 or 816-726-5461*	

PERMIT #	HAZARD CLASS	TYPE OF DAM
R-107	CLASS II	EARTHFILL

TYPE OF SPILLWAY (s) Principal *6-foot by 6-foot concrete drop inlet with 54-inch**
Emergency *Open channels on left and right abutments*

☒ I hereby certify that the *Six Mile Lane Lake Dam* was inspected on *May 27, 2016* in accordance with RSMO 236.400 through RSMO 236.500.

☒ I hereby certify that the *Six Mile Lane Lake Dam* did not have any observed defects that required correction at the time of the inspection.

☒ Judgement of Slope Stability – The embankment and appurtenant structures appeared to be in good overall condition at the time of the inspection, with no indications of slope instability or excessive seepage.

☐ Defects were found that will have to be corrected prior to the permit being renewed.

STATION	ELEVATION	COMMENTS
PS	981.3	Principal spillway crest (estimated)
ES-Right	983.6	Emergency spillway (right side)
ES-Left	983.7	Emergency spillway (left side)
Dam	988.0	Minimum crest of dam
WL	981.6	Water surface

Elevations are in feet and are based on UTM NAD83 Zone 15N Geoid12A.

**corrugated metal pipe outlet*

STATE OF MISSOURI
Paul R Simon
Number
PE-2008019003
PROFESSIONAL ENGINEER

6/14/16

INSPECTING ENGINEER

Inspection Checklist

NAME OF DAM:	Six Mile Lane Lake Dam	INSPECTION DATE: May 27, 2016
ID #: MO 10266	COUNTY: Clinton	HAZARD CLASS: 2

HAZARD CLASSIFICATION: ☒ Unchanged ☐ Changed

Item	Condition*	Comments
1. Vegetation	M.R.	Remove the few cut trees from the embankment. Please have the grass cut before the next inspection so the embankment can be observed.
2. Seepage	N.P.	
3. Principal Spillway	N.P.	
4. Emergency Spillway	N.P.	
5. Embankment	N.P.	
6. Reservoir Area	N.P.	
7. Lake Drain Gates or Valves	N.A.	
8. Spillway Outlet Channels	N.P.	
9. Embankment Drain Outlets	N.A.	
10. Riprap	N.P.	

*N.P. = No observable problem; M.R. = Maintenance Required; D.O. = Defect Observed; E.C = Emergency Condition; O.R. = Observation Required; N.A. = Not Applicable

Required Freeboard	Available Freeboard
3.5 feet	6.7 feet

RECOMMENDATION:

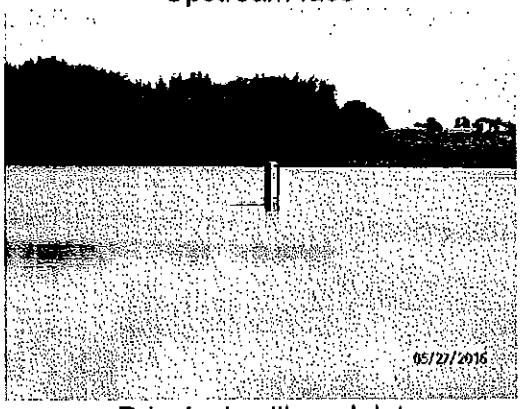
☒ **Permit is being renewed**

☐ **Permit is not being renewed**

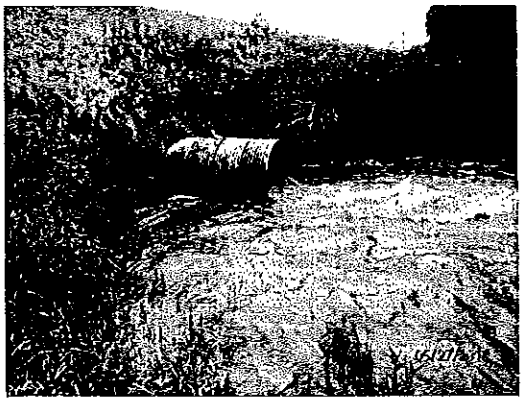
APPENDIX A: Photographs of MO10266 on May 27, 2016

Upstream face

Downstream face



Principal spillway inlet



Principal spillway outlet

Emergency spillway right abutment

Emergency spillway left abutment

Appendix B: Planning Process

Sign-in Sheet

Date: **Tuesday, July 18, 2017**
Time: **9:00 AM**
Location: **Clinton County Courthouse**

Name	Organization
Blair Shock	Clinton County (EMD)
Larry Cox	Clinton County (COMMISSIONER)
[illegible]	Clinton County (COMMISSIONER)
Gary McCrea	CLINTON COUNTY (COMMISSIONER)
Rebecca Thacker	mo-Kan

Clinton County HMP Jurisdiction Mailing List

Contact	Agency	Street Address	City, State, Zip
Wade Wilken, Jr.	Commissioner	207 N. Main Street	Plattsburg, MO 64477
Gary McCrea	Commissioner	207 N. Main Street	Plattsburg, MO 64477
Larry King	Commissioner	207 N. Main Street	Plattsburg, MO 64477
Beth Farwell	Planning and Zoning	207 N. Main Street	Plattsburg, MO 64477
Dr. Sandy Steggal	Clinton County R3 School Distric	800 Frost St	Plattsburg, MO 64477
Dr. Matt Robinson	Cameron R-I School District	423 N. Chestnut	Cameron, Missouri 64429
Chris Fine	Lathrop R-II School District	700 E. St.	Lathrop, MO 64465
Rick Bashor	Cameron Police Department	101 N Chestnut St	Cameron, MO 64429
Beckie Boyle	Plattsburg Chamber of Commerc	114 W Maple St	Plattsburg, MO 64477
Pam Ice	Cameron Chamber of Commerce	16 N Walnut St	Cameron, MO 64429
Brad Lawrence	Plattsburg Fire Protection Distric	105 Bush St	Plattsburg, MO 64477
Mike O'Donnell	Cameron Fire Department	101 N Chestnut St	Cameron, MO 64429
	Lathrop Fire Department	109 Pine St	Lathrop, MO 64465
	Cameron Regional Medical Cent	1600 E Evergreen St	Cameron, MO 64429
Sheriff Lary Fish	Clinton County Sheriff's Departm	207 N Main St #6	Plattsburg, MO 64477
Betty Dickinson	Clinton County Leader	102 E Maple St	Plattsburg, MO 64477
Graceanne Cook	Tri-County Ambulance	100 S State Hwy Y	Plattsburg, MO 64477
	Dekalb-Clinton Ambulance Dist	P O Box 501261 SE Offutt	Maysville, MO 64469
Roger King	Plattsburg Senior Center	113 N Main St	Plattsburg, MO 64477
Blair Shock	Clinton County Health Departme	106 Bush St	Plattsburg, MO 64477
Barbara O'Connor	Cameron City Clerk	205 N Main Street	Cameron, MO 64429
Gwen Ballou	Gower City Clerk	PO Box 408	Gower, MO 64454
Carroll Fisher		PO Box 408	Gower, MO 64454
Susie Freece	Lathrop City Clerk	707 Oak Street	Lathrop, MO 64465
Bob Burns	Lathrop City Administrator	707 Oak Street	Lathrop, MO 64465
Mickey Streeter	Plattsburg City Clerk	114 W. Maple Steet	Plattsburg, MO 64477
Catherine Stice	Trimble City Clerk	101 S. Fourth Street	Trimble, MO 64492
Greg Harris	Plattsburg City Administrator	114 W. Maple Steet	Plattsburg, MO 64477
Justin Hartzell	Director of Public Works	114 W. Maple Steet	Plattsburg, MO 64477
Paul Read	Gas Dept.	114 W. Maple Steet	Plattsburg, MO 64477
Ron Gorham	Waste Water Plant	114 W. Maple Steet	Plattsburg, MO 64477
Jeremy Zimmerman	Water Treatment Plant	114 W. Maple Steet	Plattsburg, MO 64477
Mark Gaugh	Cameron	205 N Main Street	Cameron, MO 64429
Chip Holman	Mayor	PO Box 408	Gower, MO 64454
Dean Langer	Lathrop Mayor	707 Oak Street	Lathrop, MO 64465
Jack Lizar	Trimble Mayor	101 S. Fourth Street	Trimble, MO 64492
Dave Schauer	Plattsburg Mayor	114 W. Maple Steet	Plattsburg, MO 64477
Dr. Mensching	East Buchanan School District	100 Smith Street	Gower, MO 64454
Chad Swindler		PO Box 21	Turney, MO 64493
Cindy Bingham	104 E. Jefferson		Trimble, MO 64492
Tim Wymes		205 N Main Street	Cameron, MO 64429
Tammy at Health Department also sends HMP invites to LEPC list			

Mo-Kan
An Economic & Community Development Organization

Subject: Clinton County Multi-Jurisdictional Hazard Mitigation Plan Update

On behalf of Clinton County, you are invited to the first of four planning meetings to update the Clinton County Multi-Jurisdictional Hazard Mitigation Plan. The existing plan, approved by FEMA in 2013, was developed in accordance with the Disaster Mitigation Act of 2000. To maintain eligibility for certain FEMA Hazard Mitigation Assistance grants, the Act requires jurisdictions to develop a plan to assess their risks to hazards and identify actions that can be taken in advance to reduce future losses. The law requires Hazard Mitigation Plans to be updated every five years. Your participation is a key element to the success of the plan update effort.

Clinton County Multi-Jurisdictional Hazard Mitigation Plan Update
Address: Clinton County Courthouse, 207 N. Main Street, Plattsburg, MO 64477
Date & Time: Tuesday, September 19, 2017, 1:00 pm

At the meeting, we will discuss the benefits of updating the hazard mitigation plan, the project schedule, and the hazards that affect Clinton County, such as tornadoes, floods, extreme temperatures, severe winter weather, and more. **Clinton County requests your assistance in forwarding this invitation to others in your jurisdiction.** Participants in the planning committee include, but are not limited to: emergency responders, county clerks, city clerks, elected officials, county and city employees, business partners, private-non-profit representatives, private industry and business, school principals, school superintendents and community volunteers.

To successfully complete this project and ensure your organization is eligible for FEMA hazard mitigation assistance funding, we need your participation and input. Jurisdictions (including county and city governments and public school districts) that do not participate in an approved Hazard Mitigation Plan are **not eligible** to apply for FEMA's Hazard Mitigation Assistance grants.

The Mo-Kan Regional Planning Council is the contact in developing this plan. Please confirm your attendance or provide contact information for your designated alternate by contacting me at (816) 233-3144 or rebecca@mo-kan.org by September 15.

Thank you,

Rebecca Thacker

Rebecca Thacker
Community Development Planner

224 North 7th Street
Saint Joseph, Missouri 64501
www.mo-kan.org
Phone: (816) 233-3144
Fax: (816) 233-8498

Sign-in Sheet

Date: **September 19, 2017**
Time: **1:00 PM**
Location: **Clinton County Courthouse**

Name	Organization
Laura McFadden	Lathrop Chamber
Sandra Utz	Plattsburg Chamber
Ron Gorhan	Plattsburg City
Jason Utz	MoDOT
Russ Hamilton	Cameron Christian church
Matt Robinson	Cameron School District
Dean Langner	Lathrop Mayor
Chris Fine	Lathrop School District
Bob Burns	City of Lathrop
DON MOORE	CLINTON COUNTY LEPC
Blair Shoale	Clinton Co EMA
Michael Booth	SEMA
Larry Fish	Clinton Co sheriff
ROBERT LOOPER	HOLT FIRE/EMS
Beth Farwell	Zoning

Sign-in Sheet

Date: **September 19, 2017**
Time: **1:00 PM**
Location: **Clinton County Courthouse**

Name	Organization
Debi Cradic	
Pamela Twa	CRMC
Sammy Clagg	Clinton Co

Mo-Kan
An Economic & Community Development Organization

Subject: Clinton County Multi-Jurisdictional Hazard Mitigation Plan Update

On behalf of Clinton County, you are invited to the second of four planning meetings to update the Clinton County Multi-Jurisdictional Hazard Mitigation Plan. To maintain eligibility for certain FEMA Hazard Mitigation Assistance grants, the Act requires jurisdictions to develop a plan to assess their risks to hazards and identify actions that can be taken in advance to reduce future losses. Your participation is a key element to the success of the plan update effort.

Clinton County Multi-Jurisdictional Hazard Mitigation Plan Update
Address: Clinton County Courthouse, 207 N. Main Street, Plattsburg, MO 64477
Date & Time: Tuesday, October 17, 2017, 1:00 pm

At the meeting we will discuss and evaluate actions from the last plan. Please bring the completed data questionnaire form to the meeting. **Clinton County requests your assistance in forwarding this invitation to others in your jurisdiction.** Participants in the planning committee include, but are not limited to: emergency responders, county clerks, city clerks, elected officials, county and city employees, business partners, private-non-profit representatives, private industry and business, school principals, school superintendents and community volunteers.

To successfully complete this project and ensure your organization is eligible for FEMA hazard mitigation assistance funding, we need your participation and input. Jurisdictions (including county and city governments and public school districts) that do not participate in an approved Hazard Mitigation Plan are **not eligible** to apply for FEMA's Hazard Mitigation Assistance grants.

Mo-Kan Regional Council is the contact in developing this plan. Please confirm your attendance or provide contact information for your designated alternate by contacting me at (816) 233-3144 or rebecca@mo-kan.org by October 13.

Thank you,

Rebecca Thacker

Rebecca Thacker
Community Development Planner

224 North 7th Street
Saint Joseph, Missouri 64501
www.mo-kan.org
Phone: (816) 233-3144
Fax: (816) 233-8498

Sign-in Sheet

Date: Tuesday, October 17, 2017
Time: 1:00 PM — PLANNING MTG # 2
Location: Clinton County Courthouse

Name	Organization	Email
Rebecca Thacker	Mo-Kan	rebecca@mo-kan.org
Tammy Clough	Clintonco	Tammy.Clough@clintoncomo.org
Dean Langner	Lathrop Mo.	Lathropmayor@gpm.net
Bob Burns	city of Lathrop	lathropcity@gpm.net
Gary McCrea	Clinton Co	MAGNUMFIVE@MSN.com
TPR Travis Gaston	MSHP	lance.newman@mshp.dps.mo.gov
Wade Wilken Jr	Clinton County	cccommcoc.clintoncomo.org
Sandra Utz	Plattsburg Chamber of Commerce	sandra.utz.18@gmail.com
Pamela Tuia	Cameron Regional Med Center	ptuia@cameronregional.org
Bob Dye	CITIZEN	rdye1950@yahoo.com
Ronald Gorham	Plattsburg	
RICK BASHOR	CAMERON	CHIEFPD100@CAMERONMO.COM
GReg Harris	Plattsburg	gharris@plattsburg-mo.gov
Blair Shack	Clinton County	blair.shack@clintoncomo.org
Kay Foster	Lathrop	kff1122@yahoo.com

Mo-Kan
An Economic & Community Development Organization

Subject: Clinton County Multi-Jurisdictional Hazard Mitigation Plan Update

On behalf of Clinton County, you are invited to the third of four planning meetings to update the Clinton County Multi-Jurisdictional Hazard Mitigation Plan. To maintain eligibility for certain FEMA Hazard Mitigation Assistance grants, jurisdictions are required to develop a plan to assess their risks to hazards and identify actions that can be taken in advance to reduce future losses. Your participation is a key element to the success of the plan update effort.

Clinton County Multi-Jurisdictional Hazard Mitigation Plan Update
Address: Clinton County Courthouse, 207 N. Main Street, Plattsburg, MO 64477
Date & Time: Tuesday, November 21, 2017, 1:00 pm

At the meeting we will discuss new mitigation actions for the updated plan. **If you are responsible for evaluating past actions, please bring them to the meeting**. Clinton County requests your assistance in forwarding this invitation to others. Participants in the planning committee include, but are not limited to: emergency responders, county clerks, city clerks, elected officials, county and city employees, business partners, private-non-profit representatives, private industry and business, school principals, school superintendents and community volunteers.

To successfully complete this project and ensure your organization is eligible for FEMA hazard mitigation assistance funding, we need your participation and input. Jurisdictions (including county and city governments and public school districts) that do not participate in an approved Hazard Mitigation Plan are **not eligible** to apply for FEMA's Hazard Mitigation Assistance grants.

Mo-Kan Regional Council is the contact in developing this plan. Please confirm your attendance or provide contact information for your designated alternate by contacting me at (816) 233-3144 or rebecca@mo-kan.org by November 16.

Thank you,

Rebecca Thacker

Rebecca Thacker
Community Development Planner

224 North 7th Street
Saint Joseph, Missouri 64501
www.mo-kan.org
Phone: (816) 233-3144
Fax: (816) 233-8498

Sign-in Sheet

Date: **Tuesday, November 21, 2017**
Time: **1:00 PM**
Location: **Clinton County Courthouse**

Name	Organization
DONALD B. MOORE	CLINTON COUNTY
Blair Strock	Clinton County
Greg Harris	Plattsburg
MIKE SHRYOCK	TRIMBLE
Dean Langner	Lathrop
Bradley V. Lawrence	Plattsburg Fire
Matt Robinson	Cameron School District
Timothy Wymes	City of Cameron
IRA FOGG	CLINTON CO. SHERIFF'S OFFICE
RICK BASHOR	CAMERON PD
Tammy Clough	Clinton Co

Mo-Kan
An Economic & Community Development Organization

Subject: Clinton County Multi-Jurisdictional Hazard Mitigation Plan Update

On behalf of Clinton County, you are invited to the fourth and final planning meeting to update the Clinton County Multi-Jurisdictional Hazard Mitigation Plan. To maintain eligibility for certain FEMA Hazard Mitigation Assistance grants, jurisdictions are required to develop a plan to assess their risks to hazards and identify actions that can be taken in advance to reduce future losses. Your participation is a key element to the success of the plan update effort.

Clinton County Multi-Jurisdictional Hazard Mitigation Plan Update
Address: Clinton County Courthouse, 207 N. Main Street, Plattsburg, MO 64477
Date & Time: Tuesday, January 16th, 2018, 1:00 pm

At the meeting we will focus on the public comment period and adoption process for the updated plan. **The data questionnaire form and evaluations of past actions should be submitted at the January 16th meeting.** If you have not received these forms or have any questions on how to complete them, please contact me.

Clinton County requests your assistance in forwarding this invitation to others. To successfully complete this project and ensure your organization is eligible for FEMA hazard mitigation assistance funding, we need your participation and input. Jurisdictions (including county and city governments and public school districts) that do not participate in an approved Hazard Mitigation Plan are **not eligible** to apply for FEMA's Hazard Mitigation Assistance grants.

Mo-Kan Regional Council is the contact in developing this plan. Please confirm your attendance or provide contact information for your designated alternate by contacting me at (816) 233-3144 or rebecca@mo-kan.org by January 12th.

Thank you,

Rebecca Thacker

Rebecca Thacker
Community Development Planner

224 North 7th Street
Saint Joseph, Missouri 64501
www.mo-kan.org
Phone: (816) 233-3144
Fax: (816) 233-8498

Sign-in Sheet

Date: **Tuesday, January 16, 2018**
Time: **1:00 PM**
Location: **Clinton County Courthouse**

Name	Email Address
Tammy Clough	tammy.Clough@Clintoncomo.org
Pamela Tuia	ptuia@cameronregional.org
Dean Lampner	lathropmayor@grm.net
Bob Burns	lathropcity@grm.net
RICK BASHOR	CHIEFPD100@CAMERONMO.COM
Blair Shock	blair.shock@clintoncomo.org

MEETING DATE July 18, 17

Clinton County LEPC
SIGN IN

12:15 pm TIME

NAME	ADDRESS	PHONE #	AGENCY	EMAIL
1 Tuia, Pamela			CRMC	
2 McFaddan, Laura			Lathrop Chamber	Just Odds No Ends @ gmail.com
3 Nancy K[illegible]	207 N. Main St		Clinton Co[illegible]	
4 Annette Bauer			Cameron Newspapers	editor@mycameronnews.com
5 [illegible]	207 N. Main St		Cl. Coun Co[illegible]	ccccunnoclamcmg
6 Dan Hegeman	613 Atchison St. St. Joseph	816 387-6206	KCP&L	dan.hegeman@kcpl.com
7 Lou Proctor			Red Cross	
8 Danny Kincaid	278 E. Third St. Cameron, MO 64429	816-288-9013	Dancomp Computers	danny@mydancomp.com
9 Joe Wellington			GPD	JWellington@GPDWARD.org
10 Chip Holman	Gower, MO	816-244-0267	City of Gower	Chip.holman@gowerfpd.us
11 Nicole Smith	100 North St. Lathrop MO 64465	816-724-1920	MoDOT	Nicole.Smith@modot.mo.gov
12 Tim Porter	Lathrop	816-528-3712	MO DOT	timmy.porter@modot.mo.gov
13 Rogers Looper			Holt Fire/EMS	RLooper@HOLTFIRE.ORG

(over)

MEETING DATE July 18, 17 **Clinton County LEPC** **12:15 pm TIME**

SIGN IN

NAME	ADDRESS	PHONE #	AGENCY	EMAIL
1 Gary McCrea			Clinton Co	
2 Rebecca Thacker			mo-KAN	rebecca@mo-kan.org
3 AJ. CARREL			CCSO	
4 IRA FOGG			CCSO	
5 Blair Shocke			Clinton Co	
6 RICK BASHOR			CPD	
7 DON MOORE			CLINTON CTY	
8 Jenny Clay			Clinton Co	
9 Becky Dunlap			MSHP	
10 Debi Cradic				
11 Sabri Esmahan				
12				
13				

July 18, 17

Clinton Co LEPC

12:15 pm

PAUL POTTIER	P.O. Box 170 GOWER, MO	816 424-6483	GOWER CONVALESCENT CENTER	PPOTTIER@HOTMAIL.COM
Bob Burns	city of Lathrop	816 740 4251		lathropcity@gmm.net

MEETING DATE 9-19-17

Clinton County LEPC
SIGN IN

12:15 pm TIME

E	ADDRESS	PHONE #	AGENCY	EMAIL
tude Wilkins Sr	202 N. Main St	816 539 2536	Clinton County	
ia, Pamela	CRMC	816 649 3813		
eura McFadden	Lathrop	816-590-5645		
indra Utz	P.O. Bx 22 Plattsburg	816-809-8023	Plattsburg Chamber	
ett Robinson	Cameron School District	816 632-1031		
ott Meyer	Cameron School District	816-797-5113		
ss Hamilton	318 N. Pine Cameron Cameron First Christian	660 663-5557	First Christian Church	
ky McCrea	Clinton Co		Commission	
chael Rinehart	MoDOT	816-271-6938	MoDOT	
Jason Utz	MoDOT			
Bob Burns	City of Lathrop	8167404251		
Pam Shrewsbury	FCC Lathrop	660 707 3869		
on Proctor	Red Cross		Red Cross	
ARK FECHNO	STATE FIRE MARSHAL	816 597 0722		

MEETING DATE 9-19-17

Clinton County LEPC
SIGN IN

12:15 pm TIME

E	ADDRESS	PHONE #	AGENCY	EMAIL
esa Oliver			MSHP	Teresa.Oliver@mshp.dps.mo.gov
aurd Curzens			Platte Valley	
chael Booth			SEMA	
ir [illegible]			Clinton Co	
H Brinton			RH Hazmat	
ter Looper			Holt Fire/EMS	
ry Fish			Clinton co sheriff	
on Moore			Clinton County	
becca Thacker			Mo-Kan	
ammy Clough				
hris Fure				
Cario				

MEETING DATE 9-17-2017 Clinton County LEPC 12:15 pm TIME

SIGN IN

E	ADDRESS	PHONE #	AGENCY	EMAIL
ean Langner	Lathrop Mo	816-582-0763	Mayor	LathropMayor@grm.net
ike Spady			MoKan	
ichelle Disanto			MoKan	

MEETING DATE Oct 17, 17

Clinton County LEPC
SIGN IN

12:15 pm TIM

	NAME	ADDRESS	PHONE #	AGENCY	EMAIL
1	Teresa Oliver			MSHP	
2	Sandra Utz		Plattsburg	Chamber of Commerce	
3	Pamela Tuia			clmc	
4	Jason Utz			MODOT	
5	Larry K			County	
6	Josh Barker			East Buchanan C-1	barker@ebs.K12.mo.
7	Jenni Busby			EB Elem	busby@ebs.K12.mo.
8	David Erids			Lathrop fire	
9	Kyle Tapps			SiCo Amb	
10	Chip Hoffman			gower mayor	
11	Joe Wellington			gower PD	
12	Mike Edwards			Ameren mo	
13	Shana Brizuk.			CC Sheriff	

MEETING DATE Oct 17, 17

Clinton County LEPC
SIGN IN

12:15 pm TIM

	NAME	ADDRESS	PHONE #	AGENCY	EMAIL
1	Scott E. Meyer	423 N. Chestnut Cameron, Mo		Cameron School District	smeyer@cameronschoo
2	Donna Herman	20854 County Rd 386 St. Joseph, MO		MSHP	
3	Wade Wilkerson	204 N MAIN PBurg	816 5392536	Clinton County	
4	Bruce Fisher	Grain Valley, MO	816 807-4101	CASS EMA BVPS	bruce@bvpsonline.co
5	RICK BASHOR	CAMERON	816 632 6521	PD/SMD	
6	Blair Shock			Clinton Co	
7	Sammy Clough			Clinton Co	
8	Dean Longner	City of Lathrop Mo		City Lathrop	
9	Bob Burns	City of Lathrop	816 7404251	City Lathrop	
10	Gary McCord	Clinton County		Clinton CO	
11	Rebecca Thacker	mo-KAN		mo-KAN	
12	Travis Garton	MSHP 3525 N. Belt Hwy St. Joseph, Mo 64506	816 387-2345	MSHP	
13					

Mo-Kan
An Economic & Community Development Organization

Clinton County, MO
PRESS RELEASE

For Immediate Release

Contact: Rebecca Thacker
(816) 233-3144

CLINTON COUNTY HAZARD MITIGATION PLAN MEETING

Clinton County, MO – Clinton County is seeking public participation in updating the Clinton County Multi-Jurisdictional Hazard Mitigation Plan. The purpose of the plan is to mitigate the impact of hazards and to reduce the loss of life and property. The public can help by serving on the planning committee and/or by distributing information at public events.

The planning committee is comprised of representatives from Clinton County, the incorporated cities, public school districts, agencies, businesses and community volunteers. The second of four meetings will be held at 1:00 pm on Tuesday, October 17 at the Clinton County Courthouse, 207 N. Main Street, Plattsburg, MO 64477.

The plan update will address a comprehensive list of hazards – ranging from severe winter storms and floods to drought and tornados – and will assess the likely impacts of these hazards on communities and school districts in Clinton County. The committee will also update current strategies and identify additional activities to reduce the vulnerability of people and property for the impacts of hazards.

Tuesday's meeting will focus on updating the plan's goals and objectives. The planning committee will also begin updating the status of each hazard mitigation action that was included in the previous plan for Clinton County.

Feedback from the public will be incorporated into the draft plan, which will be available for public review and comment. Upon the formal adoption by each participating jurisdiction the plan will be presented to Missouri State Emergency Management Agency (SEMA) and Federal State Emergency Management Agency (FEMA) for approval. Jurisdictions that participate in updating the plan will remain eligible for hazard mitigation assistance grants.

Mo-Kan Regional Council is partnering with Clinton County to update the plan. For more information about participating in updating the plan and/or to RSVP to the upcoming meeting, contact Rebecca Thacker at Mo-Kan at (816) 233-3144 or rebecca@mo-kan.org.

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Mo-Kan
An Economic & Community Development Organization

Clinton County, MO
PRESS RELEASE

For Immediate Release

Contact: Rebecca Thacker
(816) 233-3144

CLINTON COUNTY HAZARD MITIGATION PLAN MEETING

Clinton County, MO – Clinton County is seeking public participation in updating the Clinton County Multi-jurisdictional Hazard Mitigation Plan. The purpose of the plan is to mitigate the impact of hazards and to reduce the loss of life and property. The public can help by serving on the planning committee and/or by distributing information at public events.

The planning committee will comprise of representatives from Clinton County, the incorporated cities, public school districts, agencies, businesses and community volunteers. The first of four meetings will be held at 1:00 pm on Tuesday, September 19 at the Clinton County Courthouse, 207 Main Street, Plattsburg, MO 64477.

The plan update will address a comprehensive list of hazards – ranging from severe winter storms and floods to drought and tornados – and will assess the likely impacts of these hazards on communities and school districts in Clinton County. The committee will also update current strategies and identify additional activities to reduce the vulnerability of people and property for the impacts of hazards.

Feedback from the public will be incorporated into the draft plan, which will be available for public review and comment. Upon the formal adoption by each participating jurisdiction the plan will be presented to Missouri State Emergency Management Agency (SEMA) and Federal State Emergency Management Agency (FEMA) for approval. Jurisdictions that participate in updating the plan will remain eligible for hazard mitigation assistance grants.

Mo-Kan Regional Council is partnering with Clinton County to update the plan. For more information about participating in updating the plan and/or to RSVP to the upcoming meeting, contact Rebecca Thacker at Mo-Kan at (816) 233-3144.

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Clinton County Hazard Mitigation Plan

CLINTON COUNTY – Clinton County is seeking public participation in updating the Clinton County Multi-Jurisdictional Hazard Mitigation Plan. The purpose of the plan is to mitigate the impact of hazards and to reduce the loss of life and property. The public can participate several different ways, including attending meetings, distributing emergency preparedness information at public events and taking a survey about natural and man-made disasters. The survey link is https://www.surveymonkey.com/r/RSZP29S.

The planning committee is comprised of representatives from Clinton County, the incorporated cities, public school districts, agencies, businesses and community volunteers. The third of four meetings will be held at 1:00 pm on Tuesday, November 21 at the Clinton County Courthouse, 207 N. Main Street, Plattsburg, MO 64477.

The plan update will address a comprehensive list of hazards – ranging from severe winter storms and floods to drought and tornados – and will assess the likely impacts of these hazards on communities and school districts in Clinton County. The committee will also update current strategies and identify additional activities to reduce the vulnerability of people and property for the impacts of hazards.

The November 21 meeting will focus on creating new mitigation actions to be implemented over the next five years.

Feedback from the public will be incorporated into the draft plan, which will be available for public review and comment. Upon the formal adoption by each participating jurisdiction the plan will be presented to Missouri State Emergency Management Agency (SEMA) and Federal State Emergency Management Agency (FEMA) for approval. Jurisdictions that participate in updating the plan will remain eligible for hazard mitigation assistance grants.

Mo-Kan Regional Council is partnering with Clinton County to update the plan. For more information about participating in updating the plan and/or to RSVP to the upcoming meeting, contact Rebecca Thacker at Mo-Kan at (816) 233-3144 or rebecca@mo-kan.org.

Jan 11, 2018 Paper

Clinton County Hazard Mitigation Plan

CLINTON COUNTY, MO – Clinton County is seeking public participation in updating the Clinton County Multi-Jurisdictional Hazard Mitigation Plan. The purpose of the plan is to mitigate the impact of hazards and to reduce the loss of life and property. The public can participate several different ways, including attending meetings, distributing emergency preparedness information at public events and taking a survey about natural and man-made disasters. The survey link is https://www.surveymonkey.com/r/RSZP29S.

The planning committee is comprised of representatives from Clinton County, the incorporated cities, public school districts, agencies, businesses and community volunteers. The fourth and final meetings will be held at 1:00 pm on Tuesday, January 16 at the Clinton County Courthouse, 207 N. Main Street, Plattsburg, MO 64477.

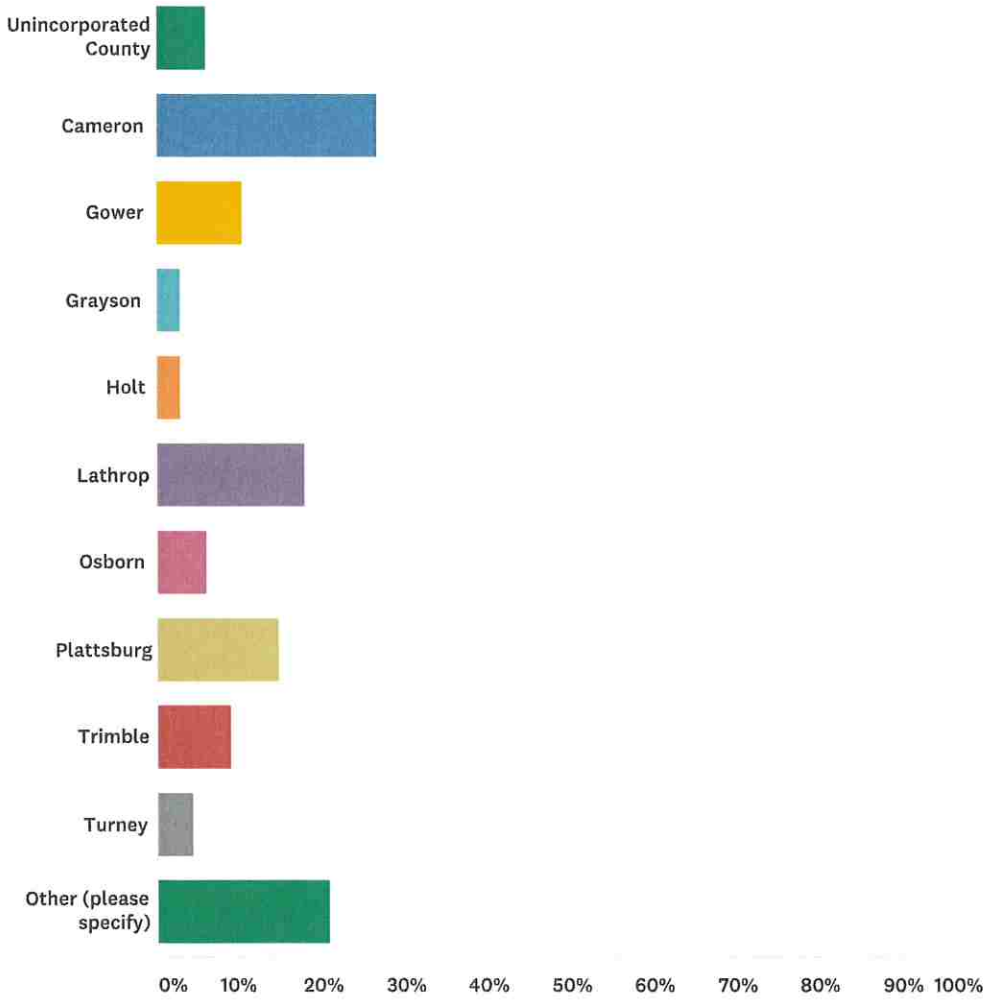
The plan update will address a comprehensive list of hazards – ranging from severe winter storms and floods to drought and tornados – and will assess the likely impacts of these hazards on communities and school districts in Clinton County. The committee will also update current strategies and identify additional activities to reduce the vulnerability of people and property for the impacts of hazards.

The January 16 meeting will focus on the public comment period and adoption process of the updated plan. Feedback from the public will be incorporated into the draft plan, which will be available for public review and comment. Upon the formal adoption by each participating jurisdiction the plan will be presented to Missouri State Emergency Management Agency (SEMA) and Federal State Emergency Management Agency (FEMA) for approval. Jurisdictions that participate in updating the plan will remain eligible for hazard mitigation assistance grants.

Mo-Kan Regional Council is partnering with Clinton County to update the plan. For more information about participating in updating the plan and/or to RSVP to the upcoming meeting, contact Rebecca Thacker at Mo-Kan at (816) 233-3144 or rebecca@mo-kan.org.

Q1 Please select your jurisdiction from the list

Answered: 67 Skipped: 0



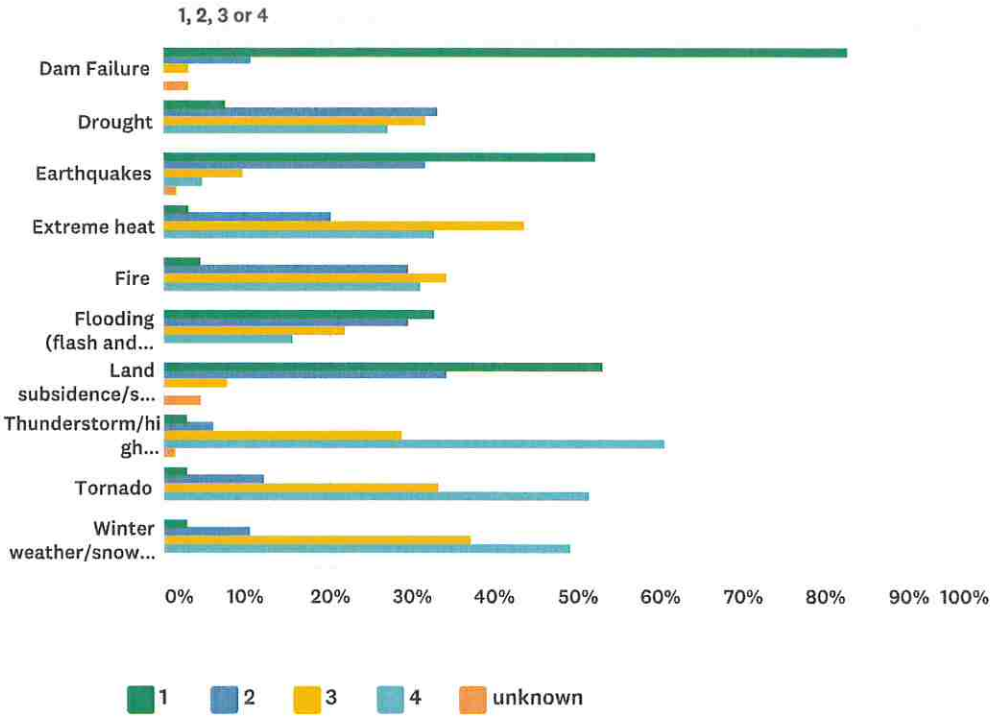
ANSWER CHOICES	RESPONSES	
Unincorporated County	5.97%	4
Cameron	26.87%	18
Gower	10.45%	7
Grayson	2.99%	2
Holt	2.99%	2
Lathrop	17.91%	12
Osborn	5.97%	4
Plattsburg	14.93%	10
Trimble	8.96%	6
Turney	4.48%	3

Other (please specify)	20.90%	14

Total Respondents: 67

Q2 Please indicate your opinion on the likelihood for each natural hazard to impact YOUR JURISDICTION (identified above). Please rate each hazard 1 through 4 as follows: 1=Unlikely, 2=Occasional, 3=Likely, 4= Highly Likely

Answered: 67 Skipped: 0



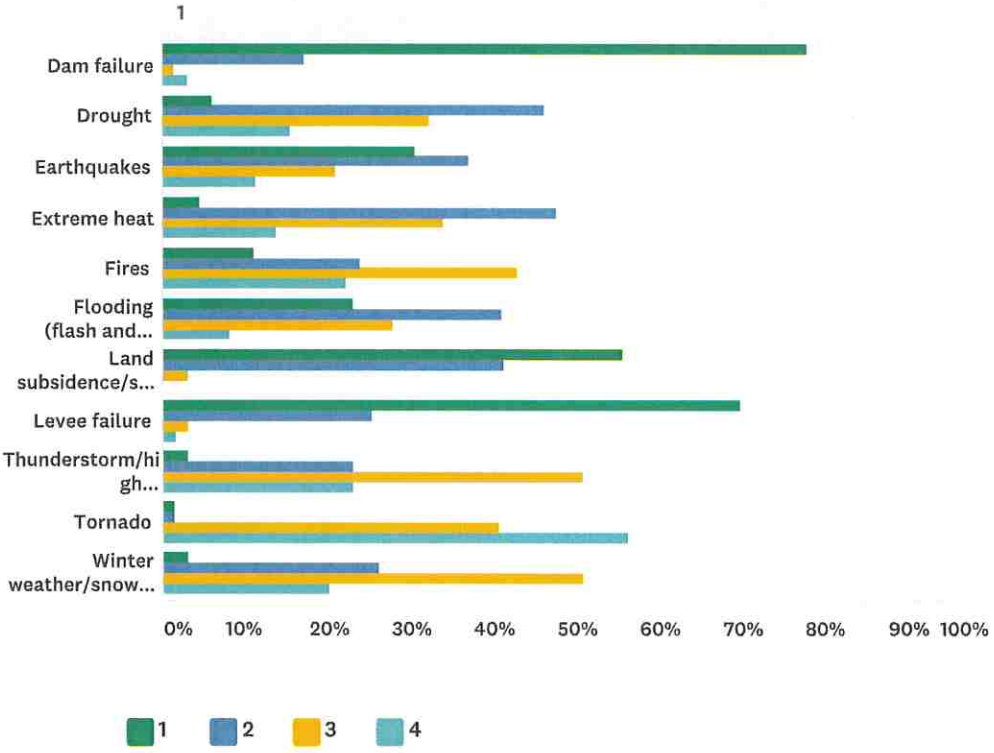
1, 2, 3 or 4

	1	2	3	4	UNKNOWN	TOTAL
Dam Failure	83.08% 54	10.77% 7	3.08% 2	0.00% 0	3.08% 2	65
Drought	7.58% 5	33.33% 22	31.82% 21	27.27% 18	0.00% 0	66
Earthquakes	52.38% 33	31.75% 20	9.52% 6	4.76% 3	1.59% 1	63
Extreme heat	3.13% 2	20.31% 13	43.75% 28	32.81% 21	0.00% 0	64
Fire	4.69% 3	29.69% 19	34.38% 22	31.25% 20	0.00% 0	64
Flooding (flash and river)	32.81% 21	29.69% 19	21.88% 14	15.63% 10	0.00% 0	64
Land subsidence/sinkholes	53.13% 34	34.38% 22	7.81% 5	0.00% 0	4.69% 3	64
Thunderstorm/high winds/lightning/hail	3.03% 2	6.06% 4	28.79% 19	60.61% 40	1.52% 1	66

Tornado	3.03% 2	12.12% 8	33.33% 22	51.52% 34	0.00% 0	66
Winter weather/snow/ice/severe cold	2.99% 2	10.45% 7	37.31% 25	49.25% 33	0.00% 0	67

Q3 Please indicate your opinion on the potential magnitude of each hazard's impact on YOUR JURISDICTION (identified above). Please rate each hazard 1 through 4 as follows: 1=Negligible, 2=Limited, 3=Critical, 4= Catastrophic

Answered: 65 Skipped: 2



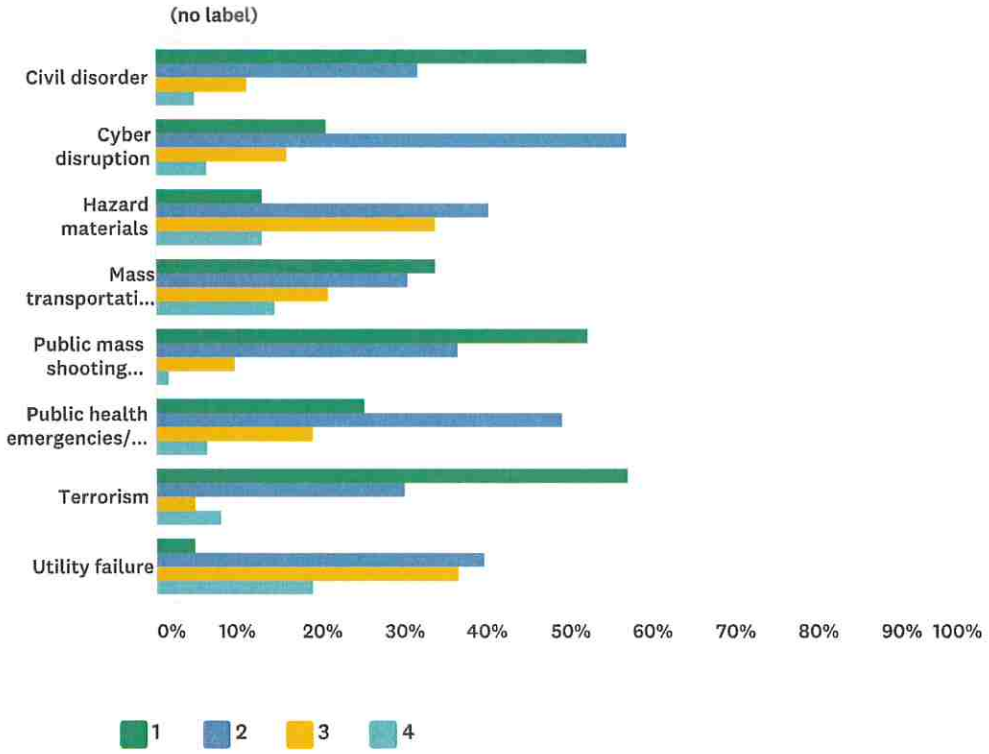
1

	1	2	3	4	TOTAL
Dam failure	78.13% 50	17.19% 11	1.56% 1	3.13% 2	64
Drought	6.15% 4	46.15% 30	32.31% 21	15.38% 10	65
Earthquakes	30.65% 19	37.10% 23	20.97% 13	11.29% 7	62
Extreme heat	4.62% 3	47.69% 31	33.85% 22	13.85% 9	65
Fires	11.11% 7	23.81% 15	42.86% 27	22.22% 14	63
Flooding (flash and river)	22.95% 14	40.98% 25	27.87% 17	8.20% 5	61
Land subsidence/sinkholes	55.56% 35	41.27% 26	3.17% 2	0.00% 0	63
Levee failure	69.84% 44	25.40% 16	3.17% 2	1.59% 1	63

Thunderstorm/high winds/lighting/hail	3.08% 2	23.08% 15	50.77% 33	23.08% 15	65
Tornado	1.56% 1	1.56% 1	40.63% 26	56.25% 36	64
Winter weather/snow/ice/severe cold	3.08% 2	26.15% 17	50.77% 33	20.00% 13	65

Q4 Please indicate your opinion on the likelihood for each man-made hazard to impact YOUR JURISDICTION (identified above). Please rate each hazard 1 through 4 as follows: 1=Unlikely, 2=Occasional, 3=Likely, 4= Highly Likely

Answered: 63 Skipped: 4

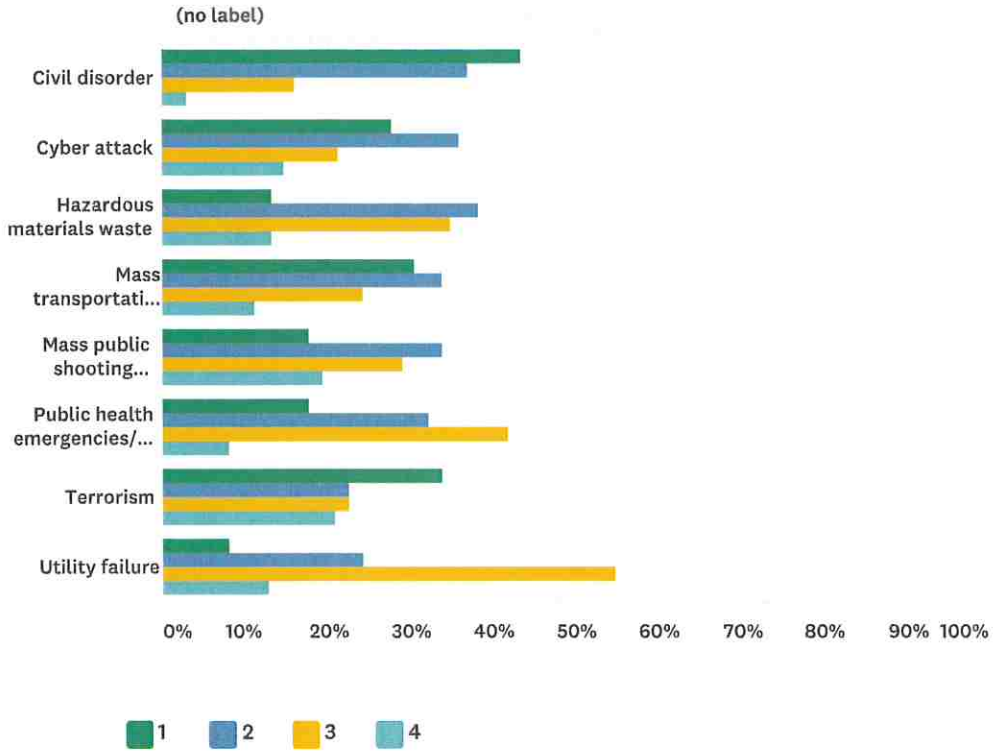


(no label)

	1	2	3	4	TOTAL
Civil disorder	52.38% 33	31.75% 20	11.11% 7	4.76% 3	63
Cyber disruption	20.63% 13	57.14% 36	15.87% 10	6.35% 4	63
Hazard materials	12.90% 8	40.32% 25	33.87% 21	12.90% 8	62
Mass transportation accidents	33.87% 21	30.65% 19	20.97% 13	14.52% 9	62
Public mass shooting incidents	52.38% 33	36.51% 23	9.52% 6	1.59% 1	63
Public health emergencies/environmental issues	25.40% 16	49.21% 31	19.05% 12	6.35% 4	63
Terrorism	57.14% 36	30.16% 19	4.76% 3	7.94% 5	63
Utility failure	4.76% 3	39.68% 25	36.51% 23	19.05% 12	63

Q5 Please indicate your opinion on the potential magnitude of each hazard's impact on YOUR JURISDICTION (identified above). Please rate each hazard 1 through 4 as follows: 1=Negligible, 2=Limited, 3=Critical, 4=Catastrophic

Answered: 62 Skipped: 5

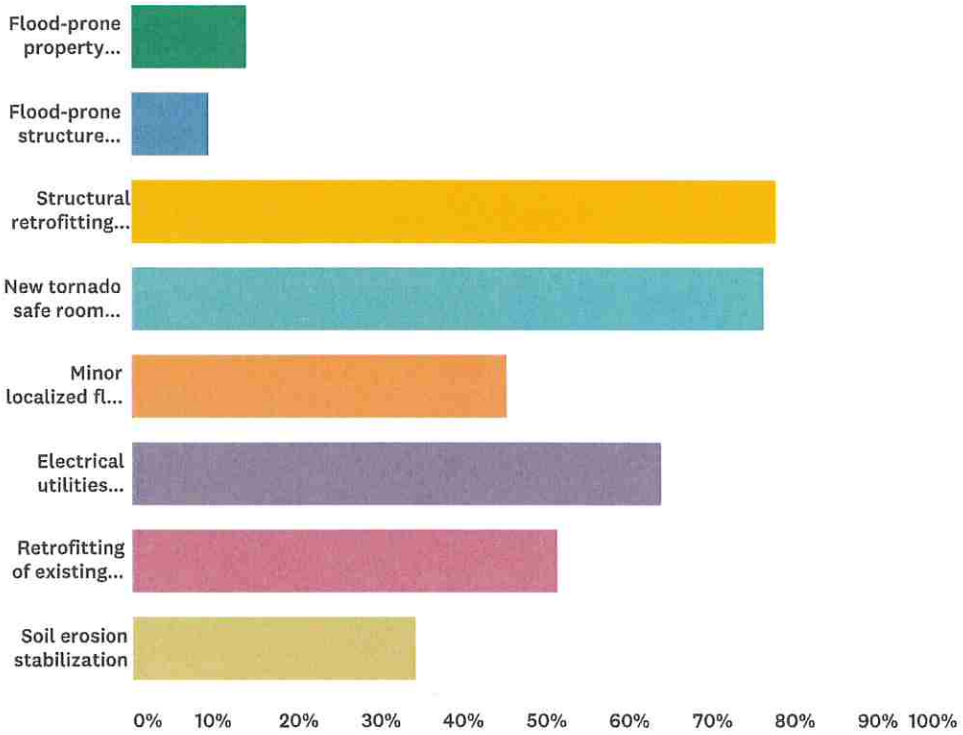


(no label)

	1	2	3	4	TOTAL
Civil disorder	43.55% 27	37.10% 23	16.13% 10	3.23% 2	62
Cyber attack	27.87% 17	36.07% 22	21.31% 13	14.75% 9	61
Hazardous materials waste	13.33% 8	38.33% 23	35.00% 21	13.33% 8	60
Mass transportation accidents	30.65% 19	33.87% 21	24.19% 15	11.29% 7	62
Mass public shooting incidents	17.74% 11	33.87% 21	29.03% 18	19.35% 12	62
Public health emergencies/environmental issues	17.74% 11	32.26% 20	41.94% 26	8.06% 5	62
Terrorism	33.87% 21	22.58% 14	22.58% 14	20.97% 13	62
Utility failure	8.06% 5	24.19% 15	54.84% 34	12.90% 8	62

Q6 FEMA Hazard Mitigation Assistant Grants are administered by the State Emergency Management Agency. Listed below are some types of projects considered for the grants. Please check all those that could benefit your jurisdiction, in your opinion.

Answered: 64 Skipped: 3



ANSWER CHOICES	RESPONSES	
Flood-prone property acquisition & structure demolition/relocation	14.06%	9
Flood-prone structure elevation	9.38%	6
Structural retrofitting of existing buildings to add a tornado safe room	78.13%	50
New tornado safe room construction	76.56%	49
Minor localized flood reduction projects (stormwater management or localized flood control projects)	45.31%	29
Electrical utilities infrastructure retrofit	64.06%	41
Retrofitting of existing buildings and facilities from wind damage	51.56%	33
Soil erosion stabilization	34.38%	22

Total Respondents: 64

Q7 Please comment on any other issues that the Clinton County Multi-Jurisdictional Hazard Mitigation Planning Committee should consider in developing a strategy to reduce future losses caused by natural and man-made hazards.

Answered: 16 Skipped: 51

Appendix C: Mitigation Actions

Appendix D: Adoption Resolutions

(will be submitted)

Appendix B: Supporting materials (maps, preliminary firms, reports, etc.)