

Appendices

Appendix I **Sample Plan Adoption Resolutions**

The Erie County Commissioners as well as the incorporated areas of the Village of Bay View, City of Bellevue, Village of Berlin Heights, Village of Castalia, City of Huron, Kelleys Island, Village of Milan, City of Sandusky and City of Vermilion will be passing a Resolution of Support for the Erie County countywide Mitigation Plan after contingent approval from the State of Ohio EMA as well as FEMA.

An example of the Resolution of Adoption that will be presented to the Commissioners as well as the participating incorporated jurisdictions is provided on the following pages.

RESOLUTION NO. _____

ADOPTION OF THE ERIE COUNTY COUNTYWIDE NATURAL HAZARDS MITIGATION PLAN

WHEREAS, on _____, the Erie County Commissioners passed Resolution No. _____ adopting the ERIE COUNTY COUNTYWIDE NATURAL HAZARDS MITIGATION PLAN (the Mitigation Plan) pursuant to _____ which established goals to minimize and reduce stormwater damages to existing structures and land use in order to maximize the protection of public health, safety, and welfare, and identify and develop revenue sources to complete the goals and objectives; and

WHEREAS, the mission of the Erie County Countywide Natural Hazards Mitigation Plan Core Group is: “To develop a working document that fulfills the mandates of the Federal Disaster Mitigation Act of 2000, and satisfies the requirements of FEMA and the Ohio EMA, as well as meets the needs of all of Erie County. Further, by researching and planning for future natural hazards and implementing appropriate mitigation techniques, all of Erie County can save lives and protect property, reduce the cost of disasters and provide for a rapid and efficient recovery by coordinating response efforts, and increasing the educational awareness of natural hazard events and their effects on the people, property, and resources of all Erie County.”; and

WHEREAS, on _____, 2014, the Erie County Emergency Management Agency Director approved the development of a Mitigation Plan on behalf of the Erie County Board of County Commissioners; and

WHEREAS, a Mitigation Plan for Erie County will be required beginning in January 1st, 2013 to receive any state or federal mitigation funding such as flood prone property improvement or buyout funds; and

WHEREAS, the County of Erie County is subject to flooding, tornadoes, winter storms, and other natural hazards that can damage property, close businesses, disrupt traffic, and present a public health and safety hazard; and

WHEREAS the Mitigation Planning Core Group, comprised of representatives from the County, municipalities and stakeholder organizations, has prepared a recommended Mitigation Plan that reviews the options to protect people and reduce damage from these natural hazards; and

WHEREAS, the recommended Mitigation Plan has been widely circulated for review by the County’s residents and federal, state and regional agencies and has been supported by those reviewers.

NOW, THEREFORE BE IT RESOLVED by the Erie County Commissioners that:

1. ERIE COUNTY COUNTYWIDE NATURAL HAZARDS MITIGATION PLAN is hereby adopted as an official plan of Erie County.

2. The Mitigation Planning Core Group is hereby established as a permanent advisory body. It shall be composed of representatives from the existing Mitigation Planning Core Group, as recommended by the Erie County Emergency Management and Homeland Security Office. This includes those municipalities that pass a resolution to adopt for the Mitigation Plan.
3. The Core Group shall meet as often as necessary to prepare or review mitigation activities and progress toward implementing the Mitigation Plan. It shall meet at least once each year to review the status of ongoing projects.
4. The schedule of Core Group meetings shall be posted in appropriate places. All meetings of the Core Group shall be open to the public.
5. By November 30 each year, the Core Group shall prepare an annual evaluation report on the Mitigation Plan for the County Board of Commissioners and the municipalities.

The report will cover the following points:

- a. A review of the original plan.
 - b. A review of any natural disasters that occurred during the previous calendar year.
 - c. A review of the action items in the original plan, including how much was accomplished during the previous year.
 - d. A discussion of why any action items were not completed or why implementation is behind schedule.
 - e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval by the County Board of Commissioners and the affected municipality's governing boards as amendments to the adopted plan.
6. The director of each County office identified as "responsible agency" for the Mitigation Plan's action items shall ensure that the action item is implemented by the listed deadline subject to fiscal and staff time constraints.

Passed by the Erie County Board of Commissioners on _____.

Vote:

Yes _____

No _____

ORDINANCE NO. _____

AN ORDINANCE APPROVING AND ADOPTING THE COUNTYWIDE NATURAL
HAZARDS MITIGATION PLAN PREPARED BY URS CORPORATION.

WHEREAS, the _____ County Commissioners have approved the
aforementioned plan by resolution, and

WHEREAS, the Plan will fulfill the mandates of the Federal Disaster Mitigation Act
of 2000, satisfies the requirements of FEMA and Ohio EMA, and meets the needs of Erie
County,

NOW, THEREFORE, Be it ordained by the Council of the City/Village of
_____, State of Ohio:

SECTION 1: That the Erie County Countywide Natural Hazards Mitigation Plan as
prepared by URS Corp., and approved by the Erie County Commissioners, is hereby
approved and adopted.

SECTION 2: That this Ordinance shall take effect and be enforced from and after the
earliest period allowed by law.

ADOPTED: _____, 2014.

ATTEST: _____
Clerk of Council President of Council

Date filed with Mayor: _____, 2014.

Date approved by Mayor: _____, 2014.

Mayor

Approved as to form:

Director of Law

Appendix II

Core Group Invite and Meeting Minutes

Erie County EMA

Emergency Management Agency

2800 Columbus Avenue, Sandusky, OH. 44870

EMA: Tel. 419-627-7617 Fax 419-627-8108

April 29, 2013

From the desk of:

Mr. Timothy G. Jonovich, Director
Erie County Emergency Management Agency
2900 Columbus Avenue
Sandusky, OH. 44870

Dear Core Group Member:

Erie County has been awarded a planning grant from the Federal Emergency Management Agency (FEMA) under the Hazard Mitigation Grant Program (HMGP) to update the Erie County Natural Hazards Mitigation Plan to remain compliant with the Disaster Mitigation Act of 2000.

As you are aware, Erie County and all nine (9) of its incorporated jurisdictions have a FEMA approved Natural Hazards Mitigation Plan. Those incorporated jurisdictions include: Huron, Sandusky, Vermilion, Bay View, Berlin Heights, Castalia, Kelley's Island, Bellevue, and Milan.

Although townships are not required to attend, however we encourage their participation in this effort.

This effort requires us to evaluate the existing Natural Hazards Mitigation Plan, to update the Action Plan for each participating community and to help those communities who participate to achieve and sustain future economic and community development, growth, and change that incorporate their local values and concerns for resiliency to natural disasters. Although natural weather-related occurrences will continue, this planning process will help local communities lessen their impact.

We request your participation in this process and hope that you can attend our first meeting scheduled for Wednesday, June 5, 2013 at 5:00 p.m. at the Erie County Office Building, located at 247 Columbus Avenue, Sandusky. Request that all visitors use the parking garage and enter through that door after 4:30 p.m. Enter the building and take the elevator up to the third floor. We will provide a catered dinner and refreshments. Please let us know if you are **unable** to attend since we will need a number for the caterer.

Please e-mail the name of your representative who will be attending this meeting, and their e-mail address for further correspondence and updates to mcheetham@eriecounty.oh.gov.

If you have any questions about this process please feel free to give me a call.

Sincerely,

Timothy G. Jonovich, Director

CC: Kari Mackenbach, URS Corporation
File



Erie County Natural Hazards Mitigation Plan

Subject:	Core Group Meeting Minutes	Location:	
Meeting Date:	June 5, 2013	From:	Kari Mackenbach
Time:	5:00 pm – 7:00pm	Issue Date:	

Attendees:

Distribution:

This report attempts to confirm items discussed and/or reached during the Core Group Meeting

- I. New hazard mitigation template passed around for core group review.
- II. Hazards ranked in order of importance per the 2004 Core Group were:
 1. Severe Storm
 2. Flooding
 3. Lake/Stream Bank Erosion
 4. Tornados
 5. Drought
 6. Earthquakes
- III. Potential inclusions to 2013 plan
 1. Ice Jams
 - i. The water distribution plant intake froze disrupting service in the late 90's.
 - ii. Ice jams in the local waterways causing floods
 - iii. Problem areas include:
 1. Vermilion
 2. Pipe Creek
 3. Franklin flats
 4. Mill Creek (during Karst flooding)
 - a. Can preventative maintenance be included?
 - b. Ditch Petition Maintenance Clearance - How many are in Erie County?
 2. Invasive Species
 - i. Blue/green algae
 - ii. Zebra mussels
 3. Containment barges (specific to Kelleys Island)
 4. Fire
 - i. Emerald Ash Tree (Borer) population increases risk of wide spread tire.
 - ii. 20%-30% at Kelleys Island

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Page 2

5. High Rail Traffic

6. Population shift in summer vs. winter can increase loss of life risk.

7. Chemical (Davis Besse) – Non-natural hazard

i. Acknowledge & refer to EOP (Emergency Operation Plan)

8. Sanitary & combined sewers are undersized

IV. Core Group Mission Statement: Decision was made to shorten existing statement to just the first paragraph

V. New rankings for 2013 report:

1. Flooding (Flash & 100 year) (Karst) (Schich effect) (Localized)

2. Severe storm (All seasons)

3. Tornados (Straight-line winds)

4. Ice Jams

5. Lake/stream bank erosion

6. Invasive species

7. Drought

8. Fire

9. Earthquake

VI. Goals:

1. Flooding:

i. 2004 goal reapproved.

2. Severe Storms:

i. Adjust 2004 goal to account for summer and winter storms

3. Tornados:

i. Adjust 2004 goal to mention Sirens/Warnings and High risk/population areas.

ii. Remove Cedar Point

4. Ice Jams:

i. I.D./Monitor/Evaluate high risk areas of concern

5. Lake/Stream Bank Erosion:

i. 2004 goal reapproved

6. Invasive Species

i. Blue/Green Algae: To proactively evaluate the effects of blue/green algae on Erie County & residents. (Tourists)

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Page 3

7. Droughts:
 - i. 2004 goal was approved.
8. Fire:
 - i. Increase awareness & fire prevention
9. Earthquakes:
 - i. Increase awareness events
 - ii. Review additional admin controls before construction & establish.

Unless information to the contrary is received within five (5) working days, the writer will assume all participants agree with the contents of this memorandum.

Signed:

URS Corporation

ATTENDANCE SHEET

PROJECT: Erie County Natural Hazards Mitigation Plan

PROJECT NO.: 14578336

TIME/DATE: June 5, 2013

PLACE: Erie County Office Building, Commission Chambers, located at 247 Columbus Avenue, Sandusky, Ohio

PURPOSE: Core Group Kickoff Meeting

URS

277 West Nationwide Boulevard
Columbus, OH 43215-2566
Telephone: (614) 464-4500
Facsimile: (614) 464-0588

	NAME	REPRESENTING	PHONE #	EMAIL OR MAILING ADDRESS
1.	Tim White	Erie SWCD	419-626-5211	twhite@eriecountych.gov
2.	MATT HEYDUNK	ERIE CO HEALTH	419-626-5623	mheydunk@ecghd.org
3.	Kyle Pearce	Kelleys Island	419-504-8626	mayor@kelleysisland.us
4.	Datti Kelly	Erie County FCW	419-202-3915	blue532604@aol.com
5.	Ron Doeski	Erie County FCW	419-202-2447	ron.doeski@kbibearing.com
6.	MICHAEL BAREFOOT	CASTALIA P.D.	419-656-9629	mbarefoot@aol.com
7.	RAUL GOMEZ	KALAMITARI Resort	305-301-9167	RAULGOMEZ1199@aol.com
8.	Barb Wobser	Bay View	419-656-8278	bwobser@villageofbayview.com
9.	BUD VANCE	NASA	419-621-3377	boyd.m.vance@nasa.gov
10.	STEVE BOGGIA	ERPC	419-627-6671	Steve@eriecountych.gov
11.	Tim Coleman	Perkins Twp	419-627-1032	

ATTENDANCE SHEET

PROJECT: Erie County Natural Hazards Mitigation Plan

PROJECT NO.: 14578336

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	NAME	REPRESENTING	PHONE #	EMAIL OR MAILING ADDRESS
1.	RON EHRLICH	Kelley's Is Rd	419-746-3735	POLICECHIEF@KELLEYISLAND.US
2.	JOHN HOSTAL	Kelley's Is. F.D	419-746-2788	FIRE@KELLEYISLAND.US
3.	JIM GREEN	SANDUSKY FIRE	419.627.5837	
4.	NORM + ORAN SHEPHER	FRIENDS OF PIPE CREEK WATERSHED	419-271-7194	njs60@yahoo.com
5.	KEITH WOHLER	Perkins Twp Fire	419-626-1337	Kwohler@perkinsfire.com
6.	Kelley Bemis	Erie Co. Health	419 626 5623	kbemis@ecghd.org
7.	BRIAN PROSPER	Milan Twp. Fire	419-541-0149	brospert@neo.rr.com
8.	Kathie Mueller	FPCW	419-359-1893	Kathiemue@aol.com
9.	ERIC DODRILL	PERKINS TWP	419-607-1433	edadrill@perkinstownship.com
10.	JEFF FERRELL	PERKINS TWP	419-607-1432	JFERRELL@PERKINSTOWNSHIP.COM
11.	GABE FERENCZ	OHIO VETERANS HOME	419-625-2454	GABE.FERENCZ@DVS.OHIO.GOV



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- | | | | | |
|-----|-------------------|--------------------|--------------------|------------------------------|
| 12. | Tim Mahoney | Ohio Veterans Home | 419-625-2454 x1415 | Tim.Mahoney@Ohio.Gov |
| 13. | MARIANNE CHEETHAM | EMA | 419-627-7617 | mcheetham@eriecounty.oh.gov |
| 14. | Tim Jonovich | EMA | 419-627-7617 | TJonovich@eriecounty.oh.gov |
| 15. | Bob Hall | EMA | 419-627-7617 | BHALL@eriecounty.oh.gov |
| 16. | KERRY D. JETT | Groton Twp | 419-656-1247 | grotontownship@earthlink.net |
| 17. | Jim Green | Sandusky Fire | 419-627-5837 | jgreen@ci.sandusky.oh.us |
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Minutes



Natural Hazards Mitigation - Core Group Meeting

August 14th, 2013

- I. Finalize Mitigation Goals (from last meeting) The mitigation goals which were created and voted on at the last Core Group meeting were evaluated one more time to ensure that the Core Group as well as participating jurisdictions agreed with the Mitigation Goals for the County as well as their own jurisdiction.
- II. Regulatory Capabilities Discussion and Matrix –a Regulatory Capabilities Matrix was passed out to all the jurisdictions' present and will be mailed to those jurisdictions that could not make tonight's meet to help URS collect the information as it relates to the pertinent documents such as zoning and planning documents that need to be recognized as part of the overall Erie County Hazard Mitigation Planning effort. Each jurisdiction was asked to review the matrix and fill it out including the name of the document and the year it was adopted.
- III. Methodology Discussion on ranking Action Items (Socially Equitable, **Economically Feasible**, Technically Sound, Environmentally Sustainable and Legal)

The Core Group and the jurisdictions' present then voted on the methodology approach for helping them rank the Action Items for the Erie County Plan as well as all the Action Items that the jurisdictions agree upon for their own community.

- IV. Action Items
 - a. Evaluate 2005 Action Items –All the Core Group members and participating jurisdictions were sent a copy of the 2005 approved Action Items. As part of this initial review each Core Group member and jurisdictions were asked review the Action Plan and come to the meeting prepared to discuss the 2005 Action Items as well as be ready to have additional Action Items to discuss.
 - b. Add New Action Items (County and Jurisdictional)
 - c. Prioritize Action Items (Collectively vote on Action Items agreed on for the County)
- V. Next Steps

- a. Identify Completed or In Progress Actions (Coordinate with Erie County EMA) –Along with our review of the current Action Items
- b. Conduct Public Meeting
- c. Update and Finalize Plan

VI. Establish Meetings and Important Dates

- a. Public Meeting December 2013

ATTENDANCE SHEET

PROJECT: Erie County Natural Hazards Mitigation Plan

PROJECT NO.: 14578336

TIME/DATE: August 14th, 2013

PLACE: Erie County Office Building, Commission Chambers, located at 247 Columbus Avenue, Sandusky, Ohio

PURPOSE: Core Group/Jurisdictional Meeting

URS

277 West Nationwide Boulevard
Columbus, OH 43215-2566
Telephone: (614) 464-4500
Facsimile: (614) 464-0588

	<u>NAME</u>	<u>REPRESENTING</u>	<u>PHONE #</u>	<u>EMAIL OR MAILING ADDRESS</u>
1.	JOHN HOSTAL	KELLEY'S ISLAND	419-746-2788	FILE@KELLEY'S ISLAND, US
2.	Tim Coleman	Perkins Twp	419-366-3159	Tim Coleman @ Perkins Township, Con
3.	Kyle Paine	Kelley's Isl	419-746-2254	Mayer & Kelley's Isl. US
4.	John Butler	Perkins	419-636-4795	114 Meadow Lane
5.	Dennell Butler	Perkins Twp	419-625-9914	202 Norbert Place
6.	Tim Jonovich	Erie Co EMA		
7.	BOB HALL	ERIE CO EMA		
8.				
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11.				

ATTENDANCE SHEET

PROJECT: Erie County Natural Hazards Mitigation Plan

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3.	MATTHEW HEYDICK	ECHD	419-626-5623	mheydick@ecghd.org
4.	John Rufo	ESLVD	419-626-5211	Jrufo@eriecountyohio.gov
5.	Kerith Wohlehen	Perkins Fire	419 626 -1334	Kwohlehen@perkinsfire.com
6.	BUD VANCE	NASA	419-621-3377	bud.vance@nasa.gov
7.	Jim Green	Sandusky Fire	419 627-5837	jgreen@ci.sandusky.oh.us
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9.	ORAN SHERER	FPCW	419-626-4963	njs60@yahoo.com
10.	NORM SHERER	FPCW	419-626-4963	njs60@yahoo.com
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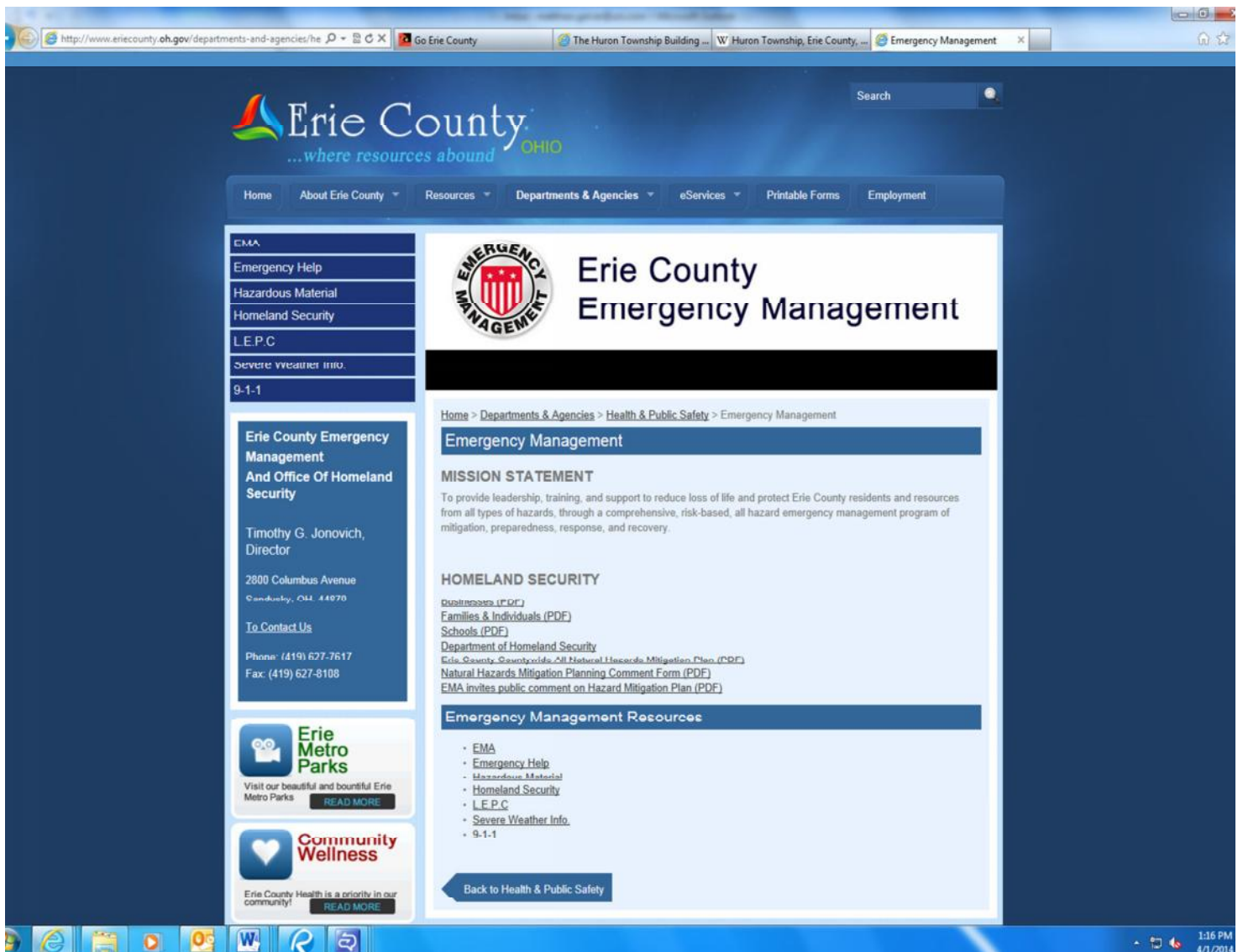
12. CARRIE WHITAKER ERPC 419-627-7652 cwhitaker@
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Appendix III

Letter to Reviewers

Appendix IV Public Involvement

A screen shot was taken of the Erie County's website to show that the public had access to the Plan and was able to make comments as it was being updated. Both the Plan and Comment Form were in PDF form to be viewed on screen or printed out.



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Public Comment on Hazard Mitigation Plan

Posted on March 6, 2014

Erie County Emergency Management Agency (EMA) invites public comment on Hazard Mitigation Plan.

Erie County Emergency Management Agency is currently updating the Erie County, Ohio Hazard Mitigation Plan – 2005 version, to remain compliant with the Disaster Mitigation Act of 2000, according to Tim G. Jonovich, Director of Erie County Emergency Management and Office of Homeland Security. "This effort requires a review and evaluation of the existing plan, an update of the action plan for each participating community and the overall development of an updated plan for the county," said Mr. Jonovich. "The process also helps the participating communities to achieve and sustain future economic and community development, growth, and changes that incorporate their local values and concerns for resiliency to natural disasters." Although natural hazards and weather-related events will continue to happen, the planning process can help local communities lessen the impact of such events. "We cannot stop natural hazards from occurring, of course, but we can often identify steps that communities can take to reduce the impact or consequences of a particular hazard on the community," he added.

Erie County EMA is inviting PUBLIC PARTICIPATION in the planning process by providing an opportunity to review the current approved plan and to submit written comments. The public can view the old plan online at the Erie County Engineer's website at <http://www.eriecounty.oh.gov/departments-and-agencies/health-and-safety/emergency-management/>. A download of Adobe Acrobat Reader might first be required to view the documents. "I appreciate the support of several county offices, political subdivisions, businesses and Friends of Pipe Creek partnering with our agency to make the plan available for public comment," said Tim Jonovich. "Key community leaders have been involved in the review process. Collaboration is always a very important part of the emergency management planning process".

COMMENTS: A printable PDF Comment Form is included on the Erie County Ohio Emergency Management Agency webpage. To comment, you may download, complete and FAX or E-mail the form to Erie County EMA. You may also review a copy of the Natural Hazards Mitigation Plan 2005 by appointment, or you may request a Comment Form in person at the Emergency Management Agency Office located at 2900 Columbus Avenue, Sandusky, OH 44870. Call, E-mail or fax the agency for an appointment or form.

PUBLIC MEETING: Erie County EMA will host a public meeting concerning Hazard Mitigation at a future date to be announced.

To learn more, contact Erie County (Ohio) Emergency Management Agency at 419-627-7617 or by fax at 419-627-8108 or by E-mail at ema@eriecounty.oh.gov

News Archive

▼ 2014

▼ March

[Redfern \(D\) & Gardner \(R\) Speak on Issues](#)

[Public Comment on Hazard Mitigation Plan](#)

[Free Breakfast - Meadows at Osborn Park](#)

[2014 Spring Career Fair](#)

▶ 2013

▶ 2012

▶ 2011

NEWS RELEASE

February 21, 2014

For Immediate Release

Subject: Erie County Emergency Management Agency (EMA) invites public comment on Hazard Mitigation Plan.

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PUBLIC MEETING: Erie County EMA will host a public meeting concerning Hazard Mitigation at a future date to be announced.

To learn more, contact Erie County (Ohio) Emergency Management Agency at 419-627-7617 or by fax at 419-627-8108 or by E-mail at ema@eriecounty.oh.gov

County seeks danger zones

Officials hope to prevent and combat flooding, tornadoes

By **ANDY OURIEL**

ouriel@sanduskyregister.com

VERMILION

Most people want to avoid disasters, such as tornadoes, tsunamis, torrential downpours and the like.

But Erie County officials seek to face these natural hazards head on — at least in spots before they happen.

Officials are working on updating a plan, which includes a digital map, pinpointing potential disasters and danger zones in Erie County.

Last revised about five years ago, the plan also offers solutions to both prevent and combat disasters.

"The plan identifies natural hazards that we have or could have in the county, and we determine how we are going to mitigate them in the future," said Tim Jonovich, Erie County's emergency management director.

Local officials just used the plan a few weeks ago during severe flooding in Vermilion. They



An ice jam locks up the Vermilion River at the Mill Hollow bridge.

Register photo/
SHAWN
FOUCHER

determined, through a map, several homes on Riverside Drive were elevated. This allowed emergency boats to access the river so residents could flee their homes.

This event, along with others occurring in recent

years, will be included in the new plan.

The map also identifies critical structures, power substations, roadways and railroads — or potentially vulnerable areas where many people could sustain

serious injuries or even die if a natural disaster occurred there.

An update is necessary to receive money from the Federal Emergency Management Agency.

"After a disaster comes

through, the county could qualify for funding to rebuild or receive a reimbursement from the damages incurred," Jonovich said. "If you don't have an updated mitigation plan, you will not be eligible for the funding."

Want to report?

Anyone with a stake in Erie County — from residents to tourists and even entrepreneurs — are encouraged to inform county officials of a potential danger zone or vulnerable area.

This could include, but is not limited to, potential areas prone to flooding, tornadoes, severe storms, erosion, earthquakes and droughts.

To submit information:

■ **CALL:** 419-627-7617

■ **EMAIL:** tjonovich@eriecounty.oh.gov

■ **VISIT:** eriecounty.oh.gov/departments-and-agencies/health-and-safety/emergency-management

Example Letter to Adjacent Counties



**Erie County Emergency Management Agency &
Office of Homeland Security**

2900 Columbus Avenue
Sandusky, Ohio 44870

Office: (419) 627-7617

FAX: (419) 627-8108

Timothy G. Jonovich, Director

April 1, 2013

To:

Jason Roblin, Director Huron County EMA

From: Timothy G. Jonovich, Director Erie County EMA

Subject: Erie County Natural Hazards Mitigation Plan update process

The purpose of this letter is to notify you that the Erie County is actively updating the Erie County, Natural Hazards Mitigation Plan. This is a required notification to adjacent communities about these actions.

In an effort to continue to meet the mission of protecting lives, property, economic interests and quality of life for the people of Erie County, the county is updating the current Natural Hazards Mitigation Plan originally developed and adopted subsequent to November 2003. This is a required update to remain eligible for FEMA federal mitigation funds and programs.

The updated plan will incorporate past and current hazard event information, as well as risk assessments, identification and documentation of hazards, benefit cost review where required, and other aspects of potential future mitigation efforts in the county. Included will be information concerning flooding, tornadoes, severe storms, erosion, earthquakes, and droughts.

Participants in the update process will include state, county, municipal and township governmental entities as well as emergency response, private agencies, organizations and individuals who are stakeholders in the process. By updating the plan collaboratively, the county can best identify all areas of risk, assess the magnitude of the risks and develop strategies and priorities for reducing the risks. The county, as well as all municipal jurisdictions will be participating in the update process. Through a grant, we have enlisted a contractor, URS Corporation, to facilitate the process and production of the updated plan.

Please contact the Erie County EMA as necessary to contribute to the process, or, with any questions, comments, concerns or requests for more information on this plan update effort.

Sincerely,

A handwritten signature in black ink, appearing to read "Tim Jonovich".

Timothy G. Jonovich, Director
Erie Emergency Management Agency

CC: Kari Mackenbach, URS Corporation
File

Invitation Letter Mailing List

Chief John Orzeck
Sandusky Police Department
222 Meigs Street
Sandusky, OH 44870

Chief Ken Klammer
Perkins Police Department
2610 Columbus Ave.
Sandusky, OH 44870

Village of Bay View
304 East Bayview Drive
Sandusky, OH 44870

Village of Kelleys Island
121 Addison
P.O. Box 469
Kelleys Island, OH 43438

Florence Township Trustees
11011 Chapel Street
Wakeman, OH 44889-8359

Margaretta Township Trustees
114 Main Street
P.O. Box 278
Castalia, OH 44824

Perkins Township Trustees
2610 Columbus Avenue
Sandusky, OH 44870

City of Sandusky
Kelley Kresser, Clerk
222 Meigs Street
Sandusky, OH 44870

Chief Ron Ehrbar
Kelleys Island Police Dept.
P.O. box 466
Kelleys Island, OH 43438

Chief Charity Schafer
Berlin Heights Police Dept.
Village Hall
Berlin Heights, OH 44814

Chief James J. Rose
Milan Police Department
11 S. Main St., P.O. 1450
Milan, OH 44846

Chief Ken Majoy
Castalia Police Department
106 South Avenue
Castalia, OH 44824

Village of Berlin Heights
8 West Main Street
P.O. Box 30
Berlin Heights, OH 44814

Village of Milan
11 S. Main Street
Milan, OH 44846

Groton Township Trustees
Township Hall
9414 Portland Rd.
Castalia, OH 44824

Milan Township Trustees
1518 St. Rt. 113 East
Milan, OH 44846

Vermilion Township Trustees
1907 State Road
Vermilion, OH 44089

City of Vermilion
Attn: Carl Schmidt
5511 Liberty Avenue
Vermilion, OH 44089

Chief Chris Hartung
Vermilion Police Dept.
691 Grand Street
Vermilion, OH 44089

Chief Gabe Ferencz
Ohio Veterans Home
3416 Columbus Avenue
Sandusky, OH 44870

Chief Helen Prosowski
Bay View Police Department
304 E. Bayview Drive
Sandusky, OH 44870

Sheriff Paul Sigsworth
Erie County Sheriff Dept.
2800 Columbus Ave.
Sandusky, OH 44870

Village of Castalia
Village Hall
126 Main Street
Castalia, OH 44824

Berlin Township Trustees
Fire Hall, P. O. Box 52
Berlin Heights, OH 44814

Huron Township Trustees
1820 Bogart Road
Huron, OH 44839

Oxford Township Trustees
11104 Ransom Road
Monroeville, OH 44847

City of Huron
417 Main Street
Huron, OH 44839

Chief Robert Lippert
Huron Police Dept.
413 Main Street
Huron, OH 44839

Chief Ken Majoy
Castalia Police Dept.
106 South Avenue
Castalia, OH 44824

Chief Brian Brace
Bay View Fire Dept.
132 E. Algonquin Trail
Sandusky, OH 44870

Chief Andy Smith
Berlin Twp. Fire Dept. #1
P.O.Box 21
Berlin Heights, OH 44814

Chief Kerry Jett
Groton Twp. Fire Dept.
7215 Magill Road
Castalia, OH 44824

Chief Brian Rospert
Milan Fire Department
1 North Center Street
Milan, OH 44846

Chief Chris Stempowski
Vermilion Fire Department
5467 Ohio Street
Vermilion, OH 44089

Ken Berryhill, Safety Director
Cedar Point
One Cedar Point Drive
Sandusky, OH 44870

NASA Plum Brook Facility
David L. Stringer, Director
6100 Columbus Avenue
Sandusky, OH 44870

Erie Co. Regional Planning
Steve Poggiali

Pete Schade, Health Commissioner
Erie Co. Health Department

Chief Jeff Rodisel
Cedar Point Fire Dept.
1 Cedar Point Dr.
Sandusky, OH 44870

Chief Steve Osterling
Huron Fire Department
417 Main Street
Huron, OH 44839

Chief Keith Wohlever
Perkins Twp. Fire Dept.
3003 Campbell Street
Sandusky, OH 44870

Chief Jack Hostal
Kelleys Island Fire Dept.
121 Addison Road
Kelleys Island, OH 43438

Kalahari Resort
Safety Director
700 Kalahari Drive
Sandusky, OH 44870

Firelands Regional Medical Center
Terry Bartlett
1111 Hayes Avenue
Sandusky, OH 44870

Erie County Commissioners
Bill Monaghan, President

Perkins Schools, Administration
3714 Campbell Street, Suite B
Sandusky, OH 44870

Chief Bill Rennie Jr.
Florence Twp. Fire Dept.
11011 Chapel Street
Birmingham, OH 44816

Chief Bill Mohr
Margaretta Twp. Fire Dept.
113 South Main Street
Castalia, OH 44824

Chief Paul Ricci
Sandusky Fire Dept.
901 West Market St.
Sandusky, OH 44870

Chief Frank Triana
Vermilion Twp. Fire Dept.
1907 St. Rt. 60, PO Box 83
Vermilion, OH 44089

BGSU, Firelands Campus
Dean, William Balzer
1 University Drive
Huron, OH 44839

Erie Soil and Water
Tim Smith

Friends of Pipe Creek
Kathie Mueller
7707 Patten Tract Rd.
Sandusky, OH 44870

Jack Farschman
Erie County Engineer

Appendix IX

2005 Action Item Status

Hazard	Action Proposed in Previous Mitigation Plan	Status
Severe Storms-Summer	Provide more NOAA radios in critical facilities to move toward achieving a "Storm Ready" community status. Provide additional NOAA radios for other facilities such as private businesses	Several hundred provided. Ongoing, included in action plan update
Severe Storms-Summer	Provide more back-up generators (both temporary and permanent) for critical facilities.	Ongoing, included in action plan update
Severe Storms-Summer	Provide additional interoperable sirens to provide early warnings to citizens of approaching severe weather	Ongoing, listed as a tornado hazard action item in updated plan
Severe Storms-Summer	Develop a public education program for informing residents about the benefits of having NOAA radios and Family Disaster Plans, which will help them better respond to an emergency situation.	Reworded and included in updated plan
Severe Storms-Summer	Provide more shelters for people to seek safety from severe weather, especially for mobile home parks, campgrounds and Cedar Point Amusement Park.	Ongoing, included in action plan update
Severe Storms-Summer	Develop a tree maintenance program to prune or remove those trees recognized to be hazards.	Ongoing, included in action plan update
Flooding	Provide maintenance for ditches and waterways to avoid overflow due to sediment and debris build up.	Ongoing, included in action plan update
Flooding	Update flood insurance rate maps (FIRMs). Current maps are from 1970-1980 generation	Completed in 2008
Flooding	Provide back-up generators (both temporary and permanent) for pumping and lift stations in sanitary sewer systems.	Ongoing, included in action plan update. Not FEMA fundable.
Flooding	Eliminate cross contamination of storm and sanitary sewers by eliminating CSO and SSO systems.	Ongoing, included in action plan update. Not FEMA fundable.
Flooding	Increase capacity of sanitary sewer lift stations to avoid overflow.	Ongoing, included in action plan update. Not FEMA fundable.
Flooding	Replace undersized culverts to avoid overflow and washouts of driveways and roadways.	Reworded and included in updated plan
Flooding	Construct elevated or alternative roads that are unaffected by flooding to eliminate repairs and replacements due to deterioration caused by repeated flooding.	Reworded and included in updated plan

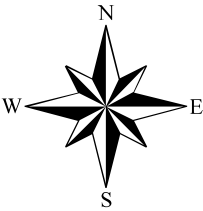
Hazard	Action Proposed in Previous Mitigation Plan	Status
Severe Storms-Winter	Provide more NOAA radios in critical facilities to move toward achieving a "Storm Ready" community status. Provide additional NOAA radios for other facilities such as private businesses	Several hundred provided. Ongoing, included in action plan update
Severe Storms-Winter	Provide more back-up generators (both temporary and permanent) for critical facilities.	Ongoing, included in action plan update
Severe Storms-Winter	Develop and provide outreach program for County residents and those in the sensitive/special needs population covering the dangers associated with severe storms.	Ongoing, included in action plan update
Severe Storms-Winter	Promote Family and Vehicle Disaster plans to educate citizens on how to be better prepared for a disaster to protect themselves.	Reworded and included in updated plan
Severe Storms-Winter	Seek funding to establish and maintain websites for incorporated and unincorporated jurisdictions. Websites would help the communities better disseminate information concerning severe weather to those with access to the World Wide Web.	Reworded and included in updated plan
Severe Storms-Winter	Provide more shelters for people to seek safety from severe weather, especially for mobile home parks, campgrounds and Cedar Point Amusement Park.	Ongoing, included in action plan update
Severe Storms-Winter	Develop a tree maintenance program to prune or remove those trees recognized to be hazards.	Ongoing, included in action plan update
Tornadoes (Straight-Line Winds)	Provide additional interoperable sirens to provide early warnings to citizens of approaching severe weather.	Ongoing, included in action plan update
Tornadoes (Straight-Line Winds)	Provide NOAA radios in critical facilities to move forward on the "Storm Ready" Community status.	Ongoing, included in action plan update
Tornadoes (Straight-Line Winds)	Evaluate the need for additional back-up generators (both temporary and permanent) for critical facilities.	Ongoing, included in action plan update
Tornadoes (Straight-Line Winds)	Develop and provide outreach program for County residents and those in the sensitive/special needs population covering the dangers associated with tornadoes.	Ongoing, included in action plan update
Tornadoes (Straight-Line Winds)	Develop a tree maintenance program to prune or remove those trees recognized to be hazards.	Ongoing, included in action plan update
Tornadoes (Straight-Line Winds)	Evaluate the need for multi- use shelters for marinas and for high tourist areas within the County	Ongoing, included in action plan update

Hazard	Action Proposed in Previous Mitigation Plan	Status
Lake/Stream Bank Erosion	Update flood insurance rate maps (FIRMs). Current maps are from 1970-1980 generation	Completed in 2008
Lake/Stream Bank Erosion	Provide additional monitoring of water levels in streams and rivers with stream gauges	Ongoing, included in action plan update
Lake/Stream Bank Erosion	Assess and inventory problems with roadways susceptible to flooding within Erie County	Ongoing, included in action plan update
Drought	Develop a public education program for restrictions on water usage during drought conditions.	Ongoing, included in action plan update
Drought	Develop a public education program on the hazards associated with droughts and extreme heat.	Ongoing, included in action plan update
Earthquakes	Develop a public education program on the dangers of earthquakes	Ongoing, included in action plan update

Appendix V

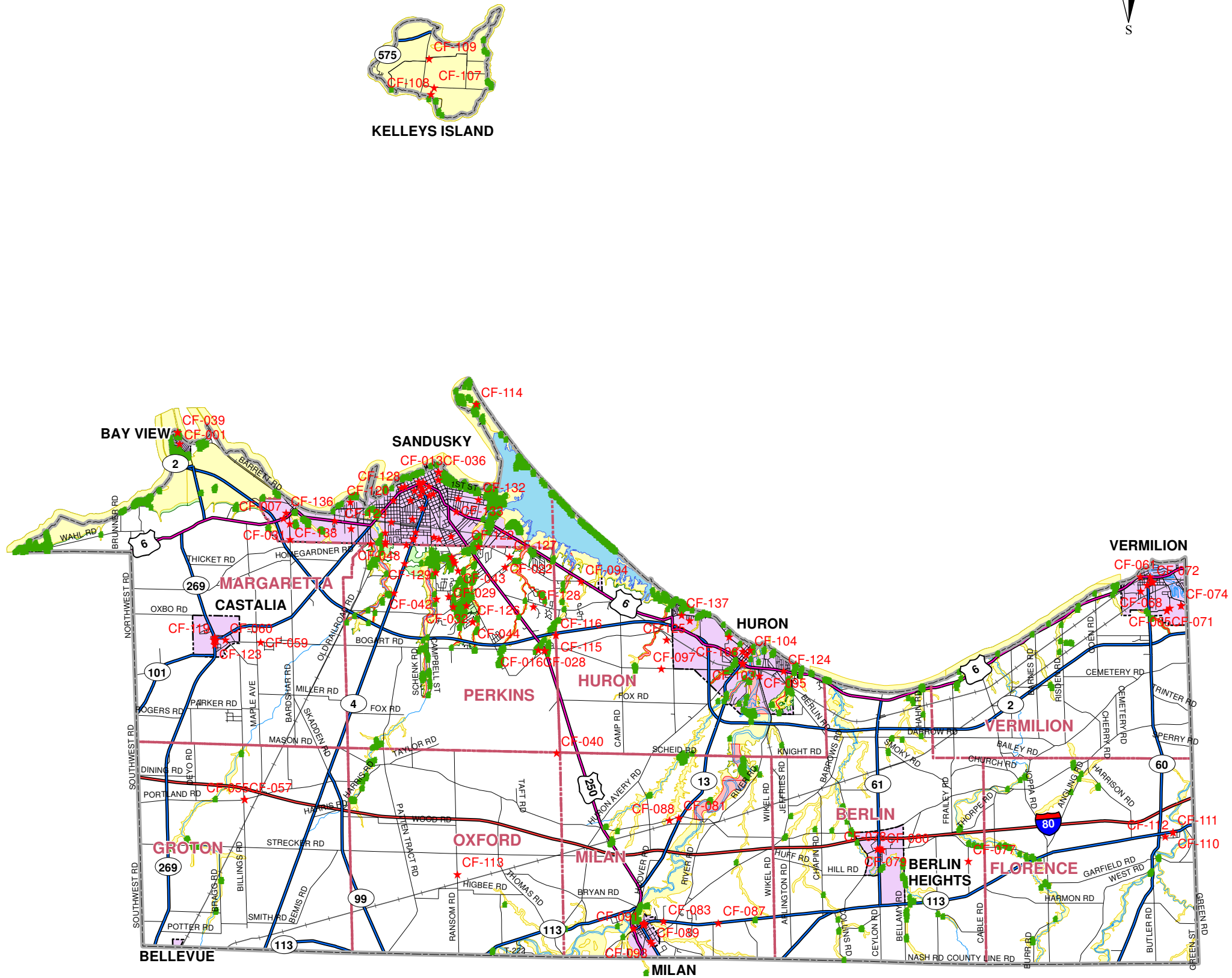
Multi-Hazard Maps

Critical Facility locations based on geocoded coordinates.
At-Risk structures for entire county: 2136
At-Risk structures for uincorporated areas: 1292



Legend

- ★ CriticalFacilities
- At-Risk Structures
- ➡ Tornado Paths
- ▭ County Line
- ▭ Township Lines
- Interstate Route
- U.S. Route
- State Route
- Roads - Municipal
- Roads - County
- Railroads
- Waterways
- Lakes
- Floodway
- Floodplain - 100 year
- Floodplain - Other
- ▭ Municipalities



Map intended for reference only

ERIE COUNTY, OHIO
MULTI-HAZARD MAP OF
ERIE COUNTY

ERIE COUNTY - COUNTYWIDE ALL
NATURAL HAZARDS MITIGATION PLAN
MULTI-HAZARD MAP: ERIE01

Job No. 2004-1251	Scale: 1" = 15,000'
Date: April 22, 2014	

ERIE COUNTY, OHIO MULTI-HAZARD MAP OF BAY VIEW

ERIE COUNTY - COUNTYWIDE ALL
NATURAL HAZARDS MITIGATION PLAN
MULTI-HAZARD MAP: ERIE02

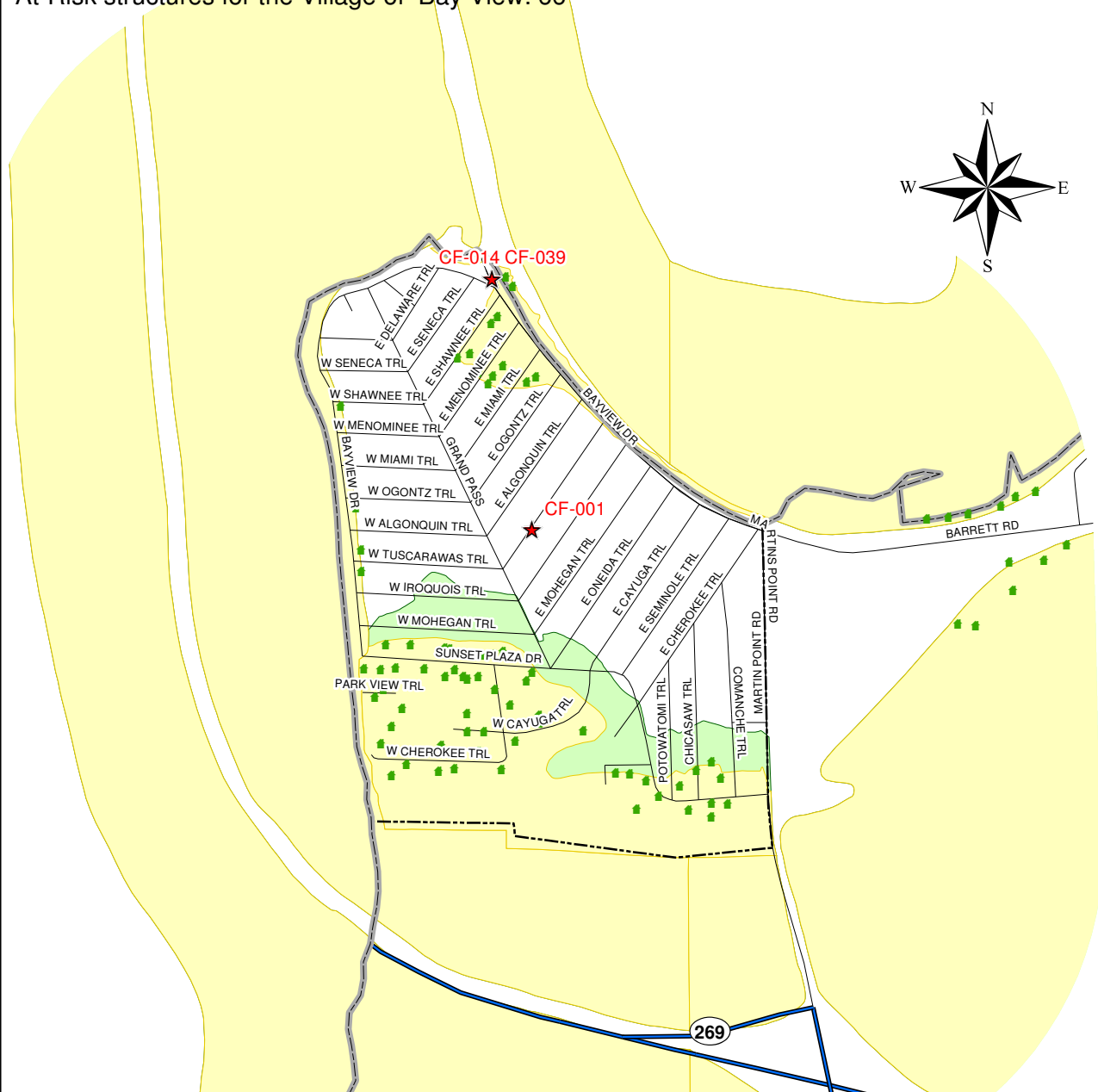
Date: April 22, 2014

Job No. 14578336

Scale: 1" = 1,000'

Critical Facility locations based on geocoded coordinates.
At-Risk structures for the Village of Bay View: 66

Map intended for reference only



Legend

- | | | | |
|-----------------------|----------------|-------------------|-----------------------|
| ★ Critical Facilities | County Line | Interstate Route | Waterways |
| ■ At-Risk Structures | Municipalities | U.S. Route | Lakes |
| ➔ Tornado Paths | Township Lines | State Route | Floodway |
| | | Roads - Municipal | Floodplain - 100 year |
| | | Roads - County | Floodplain - Other |
| | | Railroads | |

ERIE COUNTY, OHIO
**MULTI-HAZARD MAP OF
BELLEVUE**

ERIE COUNTY - COUNTYWIDE ALL
NATURAL HAZARDS MITIGATION PLAN
MULTI-HAZARD MAP: ERIE03

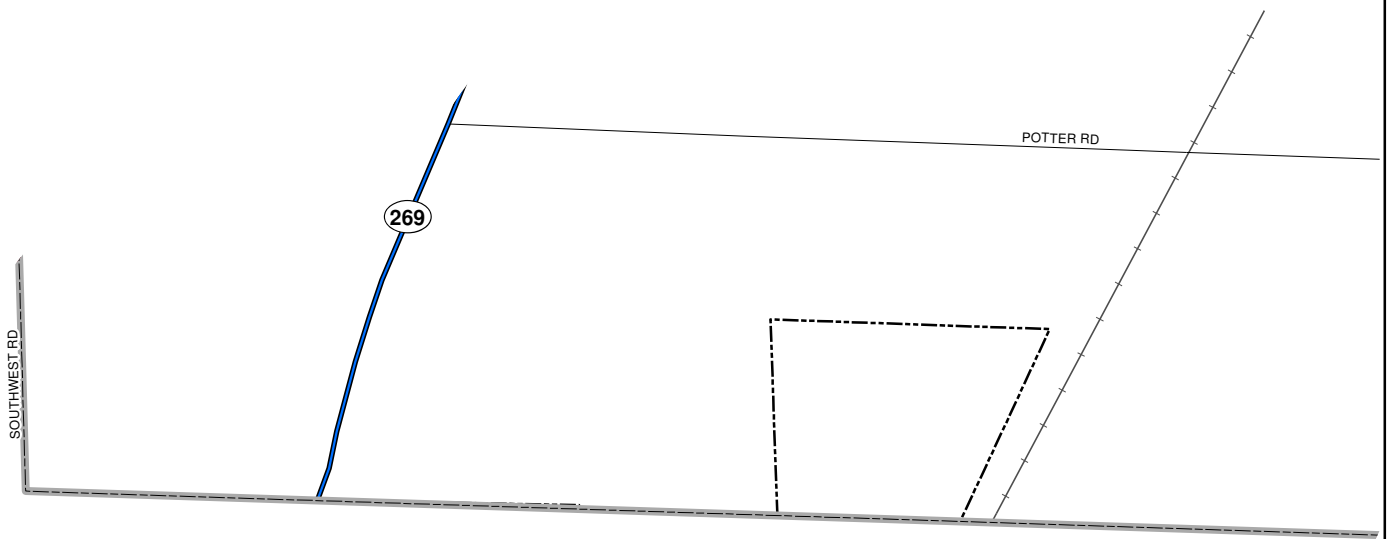
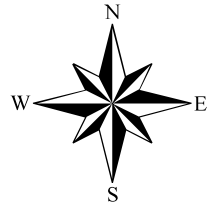
Date: April 22, 2014

Job No. 14578336

Scale: 1" = 1,000'

Critical Facility locations based on geocoded coordinates.
At-Risk structures for the City of Bellevue: 0

Map intended for reference only



Legend

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|-----------------------|----------------|-------------------|-----------------------|
| ★ Critical Facilities | County Line | Interstate Route | Waterways |
| ■ At-Risk Structures | Municipalities | U.S. Route | Lakes |
| ➡ Tornado Paths | Township Lines | State Route | Floodway |
| | | Roads - Municipal | Floodplain - 100 year |
| | | Roads - County | Floodplain - Other |
| | | Railroads | |

Data Sources: Ohio Department of Transportation (ODOT) & Ohio Department of Natural Resources (ODNR)

ERIE COUNTY, OHIO MULTI-HAZARD MAP OF BERLIN HEIGHTS

ERIE COUNTY - COUNTYWIDE ALL
NATURAL HAZARDS MITIGATION PLAN
MULTI-HAZARD MAP: ERIE04

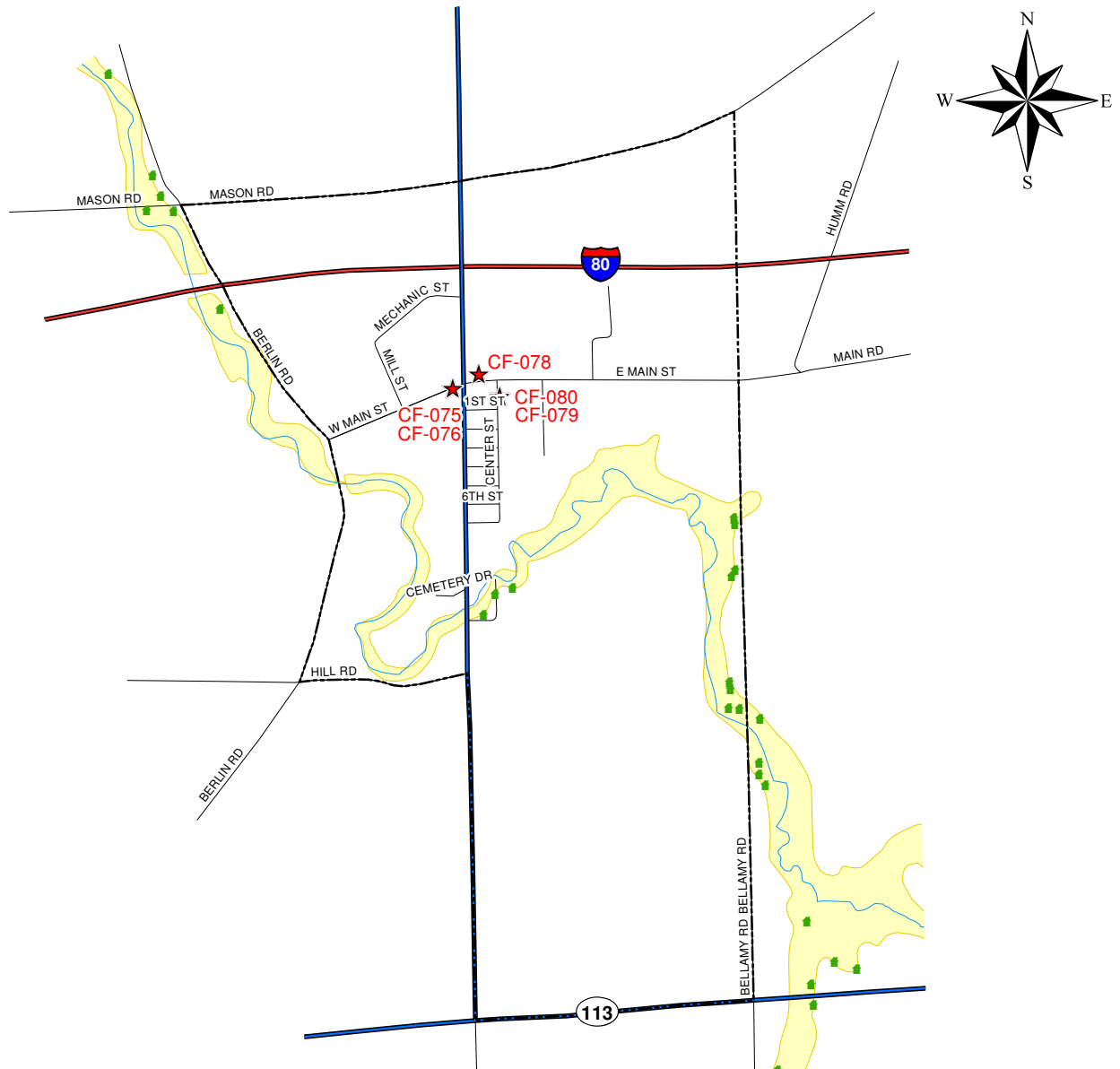
Date: April 22, 2014

Job No. 14578336

Scale: 1" = 2,000'

Critical Facility locations based on geocoded coordinates.
At-Risk structures for the Village of Berlin Heights: 11

Map intended for reference only



Legend

- | | | | |
|-----------------------|-------------------|------------------|-----------------------|
| ★ Critical Facilities | County Line | Interstate Route | Waterways |
| ■ At-Risk Structures | Municipalities | U.S. Route | Lakes |
| ➡ Tornado Paths | Township Lines | State Route | Floodway |
| | Roads - Municipal | Roads - County | Floodplain - 100 year |
| | Railroads | | Floodplain - Other |

ERIE COUNTY, OHIO
**MULTI-HAZARD MAP OF
CASTALIA**

ERIE COUNTY - COUNTYWIDE ALL
NATURAL HAZARDS MITIGATION PLAN
MULTI-HAZARD MAP: ERIE05

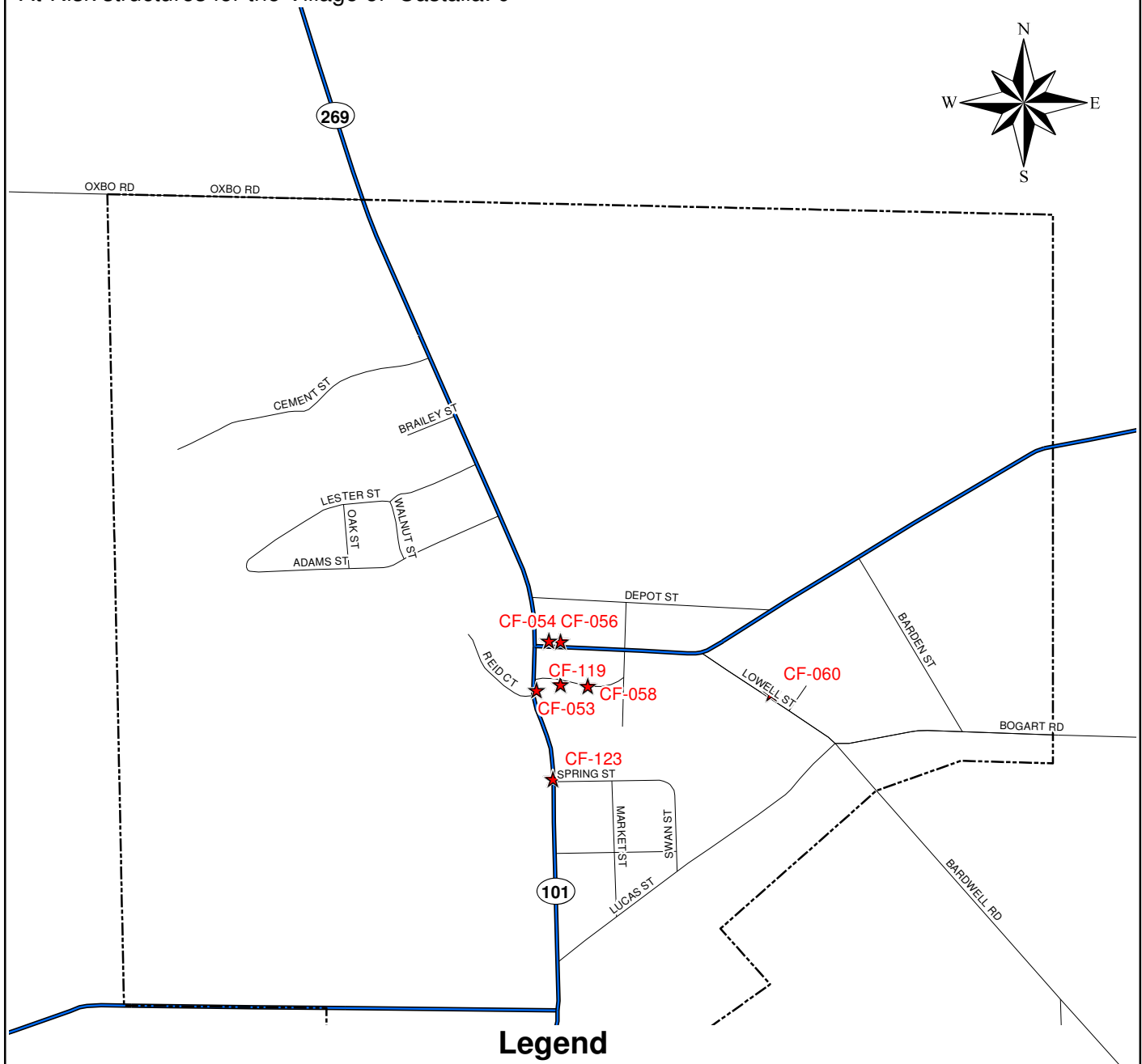
Date: April 22, 2014

Job No. 14578336

Scale: 1" = 1,000'

Critical Facility locations based on geocoded coordinates.
At-Risk structures for the Village of Castalia: 0

Map intended for reference only



Legend

- | | | | |
|-----------------------|----------------|-------------------|-----------------------|
| ★ Critical Facilities | County Line | Interstate Route | Waterways |
| ■ At-Risk Structures | Municipalities | U.S. Route | Lakes |
| Tornado Paths | Township Lines | State Route | Floodway |
| | | Roads - Municipal | Floodplain - 100 year |
| | | Roads - County | Floodplain - Other |
| | | Railroads | |

ERIE COUNTY, OHIO MULTI-HAZARD MAP OF HURON

ERIE COUNTY - COUNTYWIDE ALL
NATURAL HAZARDS MITIGATION PLAN
MULTI-HAZARD MAP: ERIE06

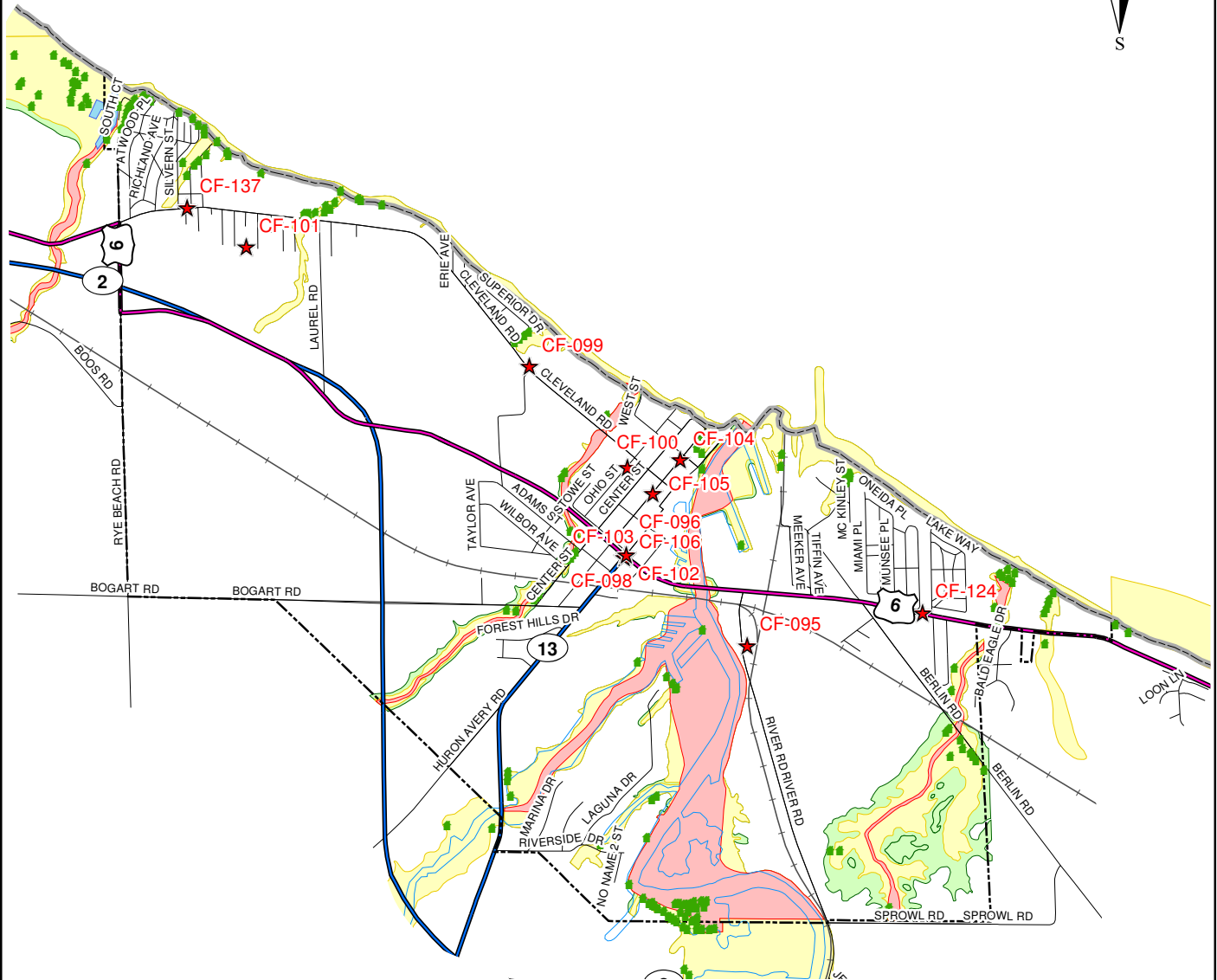
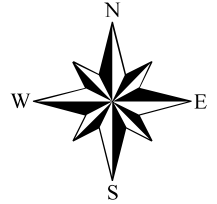
Date: April 22, 2014

Job No. 14578336

Scale: 1" = 3,000'

Critical Facility locations based on geocoded coordinates.
At-Risk structures for the City of Huron: 154

Map intended for reference only



Legend

- | | | | |
|-----------------------|----------------|-------------------|-----------------------|
| ★ Critical Facilities | County Line | Interstate Route | Waterways |
| • At-Risk Structures | Municipalities | U.S. Route | Lakes |
| → Tornado Paths | Township Lines | State Route | Floodway |
| | | Roads - Municipal | Floodplain - 100 year |
| | | Roads - County | Floodplain - Other |
| | | Railroads | |

Data Sources: Ohio Department of Transportation (ODOT) & Ohio Department of Natural Resources (ODNR)

ERIE COUNTY, OHIO
**MULTI-HAZARD MAP OF
 KELLEYS ISLAND**

ERIE COUNTY - COUNTYWIDE ALL
 NATURAL HAZARDS MITIGATION PLAN
 MULTI-HAZARD MAP: ERIE07

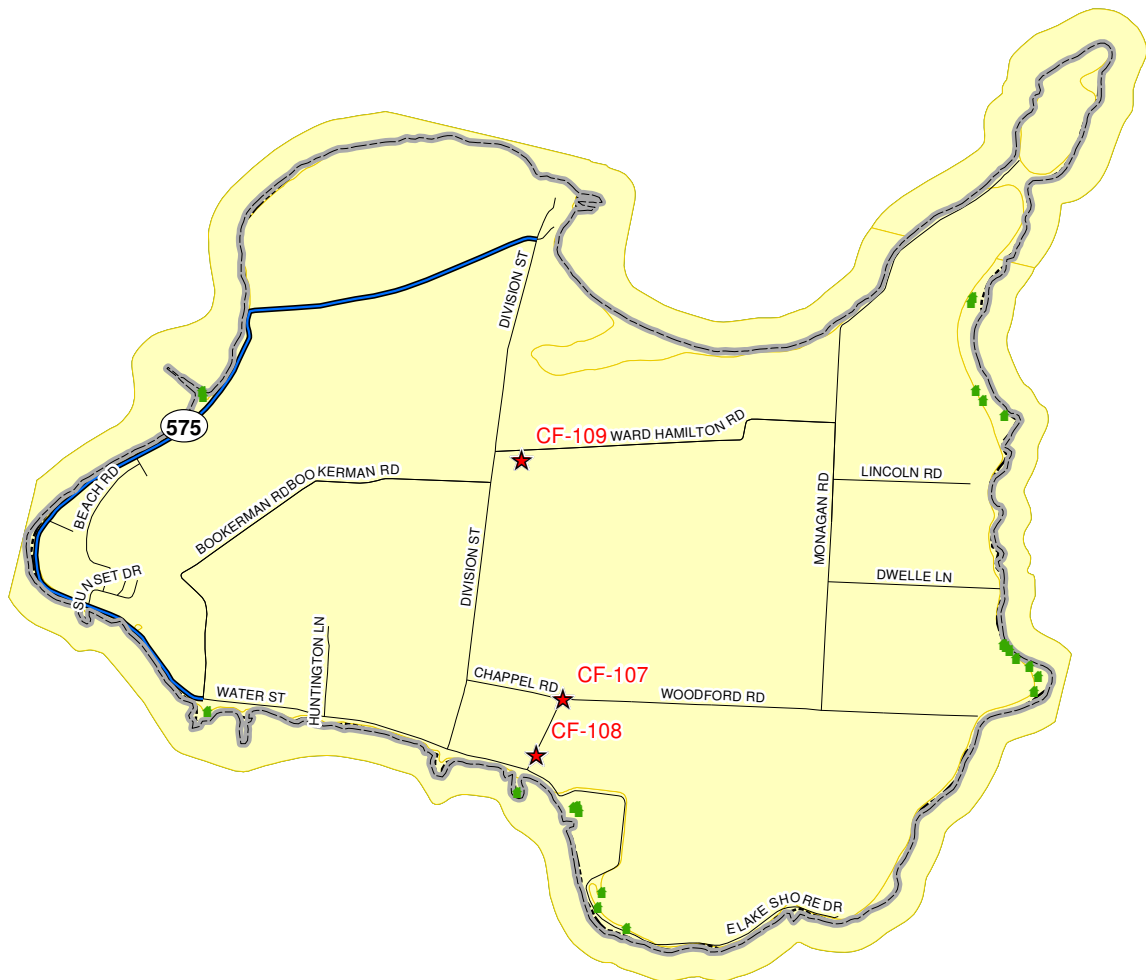
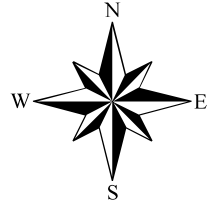
Date: April 22, 2014

Job No. 14578336

Scale: 1" = 3,000'

Critical Facility locations based on geocoded coordinates.
 At-Risk structures for the Village of Kelleys Island: 22

Map intended for reference only



Legend

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|-----------------------|----------------|-------------------|-----------------------|
| ★ Critical Facilities | County Line | Interstate Route | Waterways |
| ■ At-Risk Structures | Municipalities | U.S. Route | Lakes |
| ➔ Tornado Paths | Township Lines | State Route | Floodway |
| | | Roads - Municipal | Floodplain - 100 year |
| | | Roads - County | Floodplain - Other |
| | | Railroads | |

ERIE COUNTY, OHIO
**MULTI-HAZARD MAP OF
MILAN**

ERIE COUNTY - COUNTYWIDE ALL
NATURAL HAZARDS MITIGATION PLAN
MULTI-HAZARD MAP: ERIE08

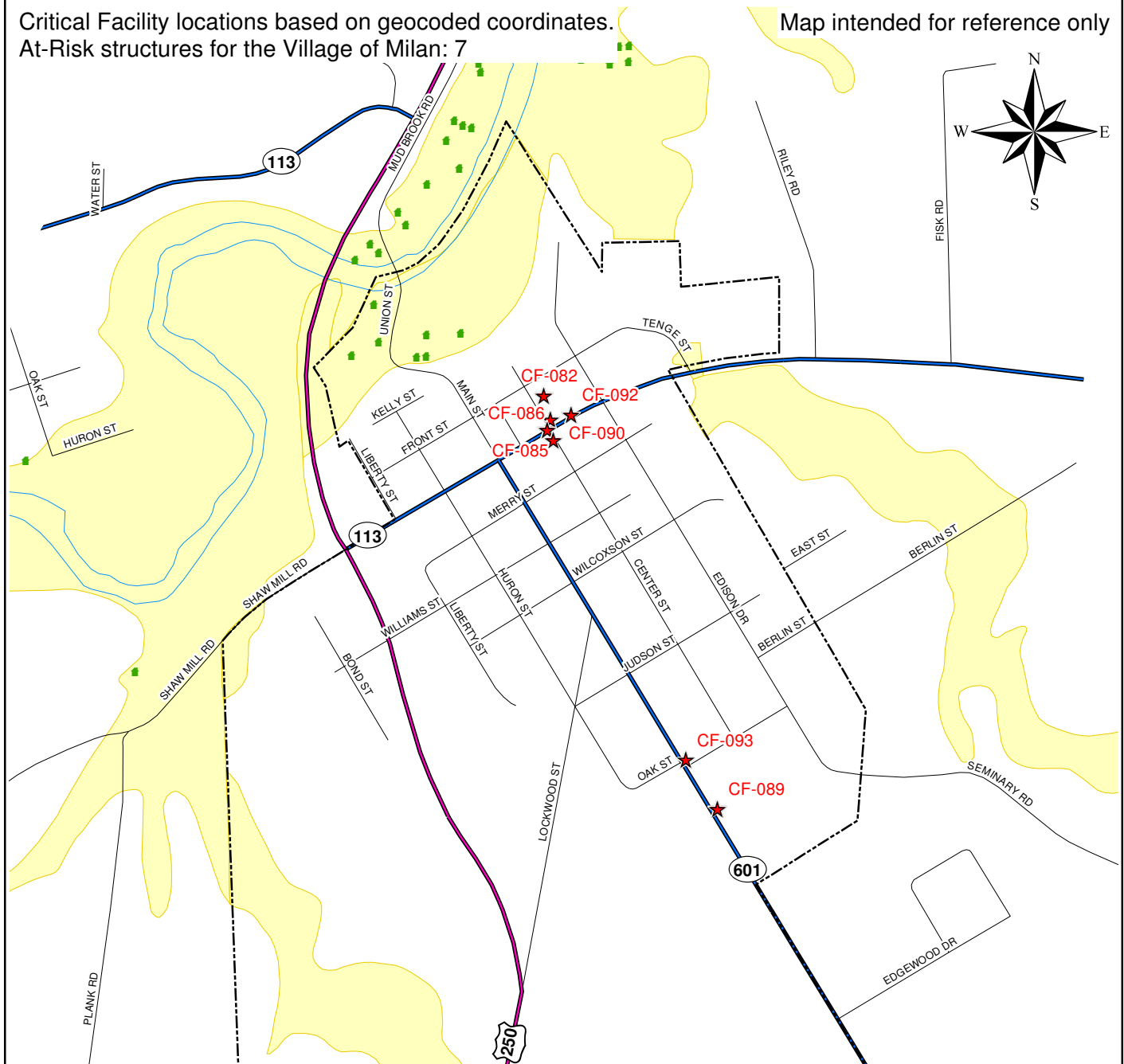
Date: April 22, 2014

Job No. 14578336

Scale: 1" = 1,000'

Critical Facility locations based on geocoded coordinates.
At-Risk structures for the Village of Milan: 7

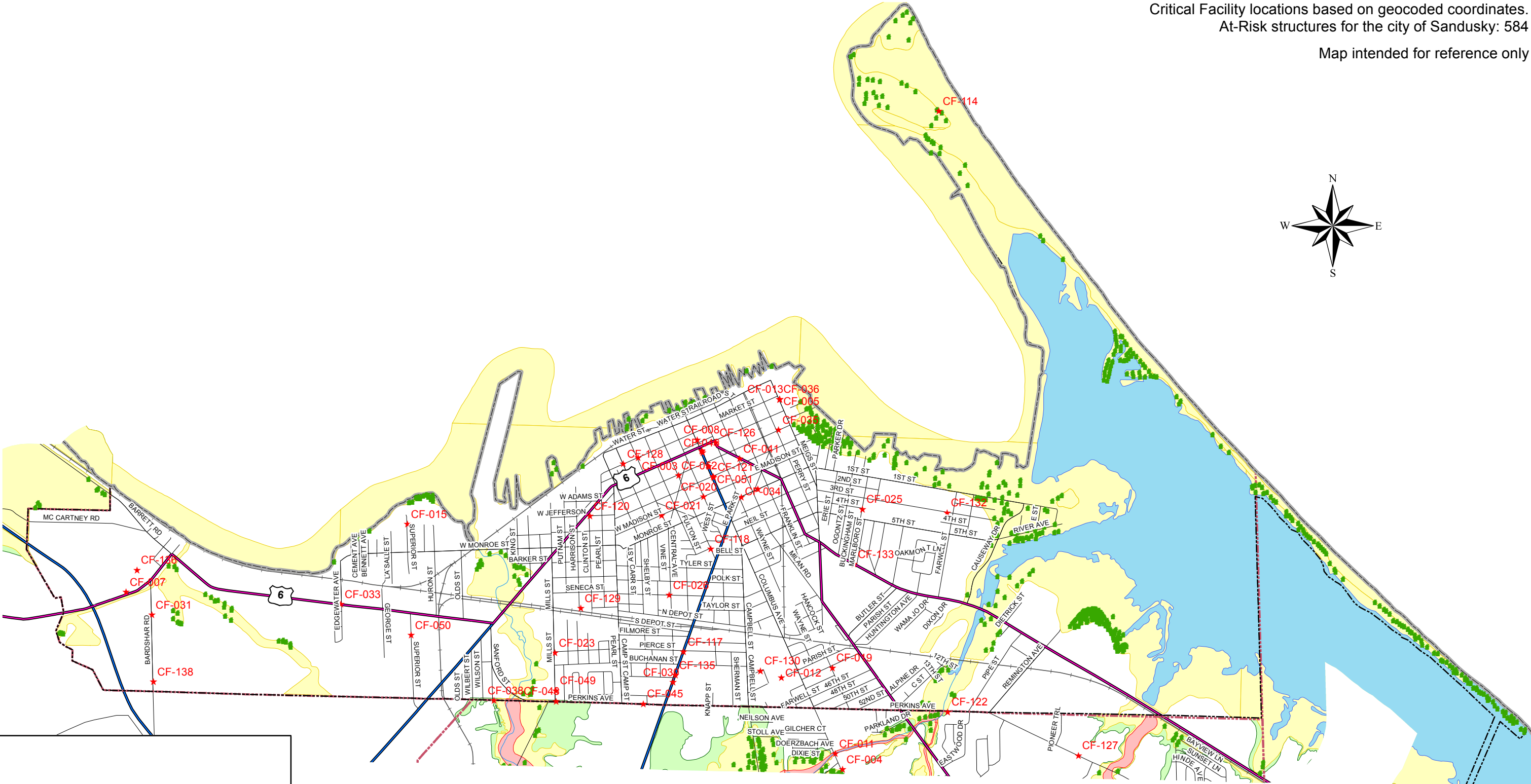
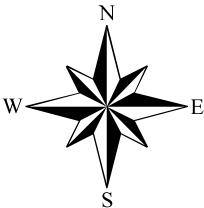
Map intended for reference only



Legend

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|-----------------------|----------------|-------------------|-----------------------|
| ★ Critical Facilities | County Line | Interstate Route | Waterways |
| ■ At-Risk Structures | Municipalities | U.S. Route | Lakes |
| Tornado Paths | Township Lines | State Route | Floodway |
| | | Roads - Municipal | Floodplain - 100 year |
| | | Roads - County | Floodplain - Other |
| | | Railroads | |

Data Sources: Ohio Department of Transportation (ODOT) & Ohio Department of Natural Resources (ODNR)



Legend

- | | | | |
|-----------------------|----------------|-------------------|-----------------------|
| ★ Critical Facilities | County Line | Interstate Route | Waterways |
| ■ At-Risk Structures | Municipalities | U.S. Route | Lakes |
| ➡ Tornado Paths | Township Lines | State Route | Floodway |
| | | Roads - Municipal | Floodplain - 100 year |
| | | Roads - County | Floodplain - Other |
| | | Railroads | |

ERIE COUNTY, OHIO
MULTI-HAZARD MAP OF SANDUSKY
ERIE COUNTY - COUNTYWIDE ALL NATURAL HAZARDS MITIGATION PLAN
MULTI-HAZARD MAP: ERIE09

Job No. 14578336
Date: April 22, 2014

Scale: 1" = 3,000'

ERIE COUNTY, OHIO MULTI-HAZARD MAP OF VERMILION

ERIE COUNTY - COUNTYWIDE ALL
NATURAL HAZARDS MITIGATION PLAN
MULTI-HAZARD MAP: ERIE10

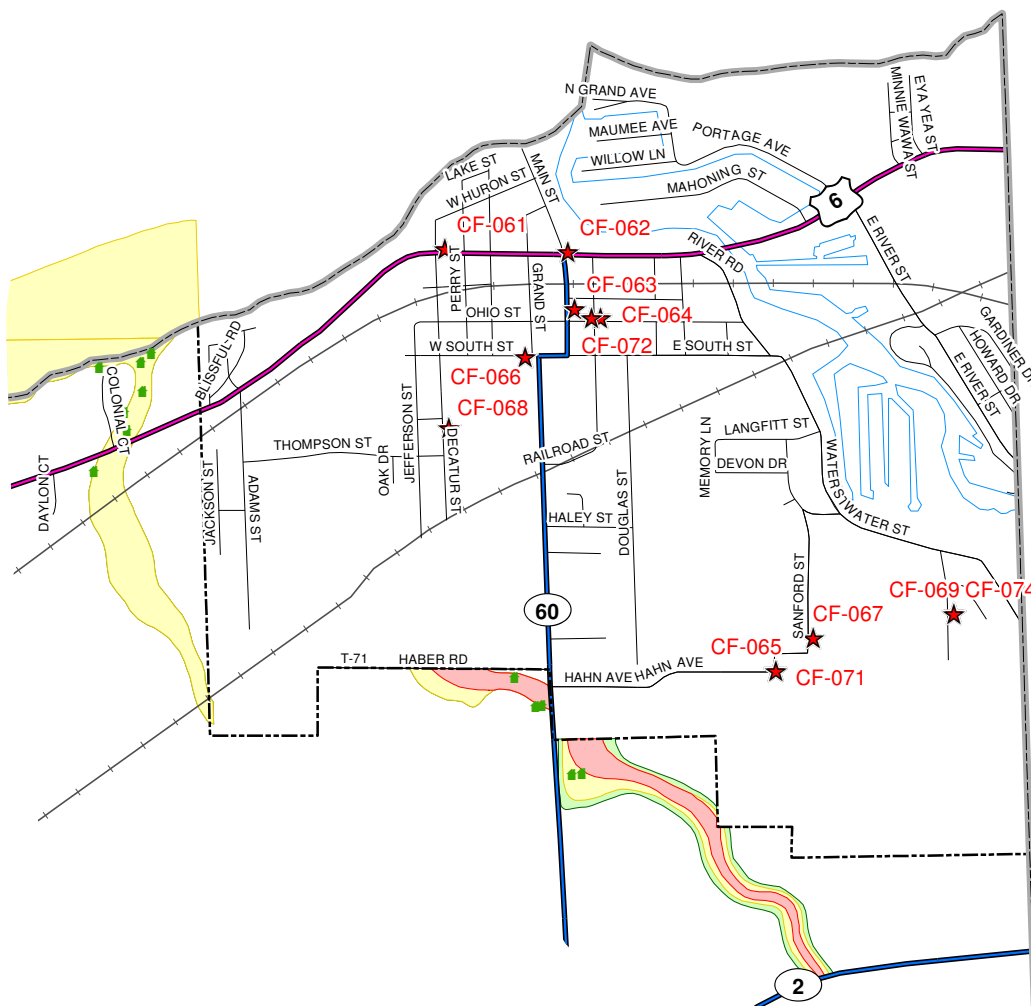
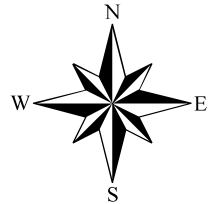
Date: April 22, 2014

Job No. 14578336

Scale: 1" = 2,000'

Critical Facility locations based on geocoded coordinates.
At-Risk structures for the City of Vermilion: 0

Map intended for reference only



Legend

- | | | | |
|-----------------------|----------------|-------------------|-----------------------|
| ★ Critical Facilities | County Line | Interstate Route | Waterways |
| ■ At-Risk Structures | Municipalities | U.S. Route | Lakes |
| Tornado Paths | Township Lines | State Route | Floodway |
| | | Roads - Municipal | Floodplain - 100 year |
| | | Roads - County | Floodplain - Other |
| | | Railroads | |

Data Sources: Ohio Department of Transportation (ODOT) & Ohio Department of Natural Resources (ODNR)

Appendix VI NCDC Historical Events

Flood History

88 Events were reported in Erie County between 01/01/1964 and 08/01/2013.

Date	Type	County	Injuries	Deaths	PrD x 1000	CrD x 1000
3/4/1964	Flooding	Erie	0	0	57	0
3/9/1964	Flooding	Erie	0	0	57	0
4/26/1966	Flooding	Erie	1	0	125	0
1/28/1968	Flooding	Erie	0	0	1	0
6/25/1968	Flooding	Erie	0	0	6	0
1/28/1969	Flooding	Erie	0	0	0	0
4/18/1969	Flooding	Erie	0	0	17	0
5/17/1969	Flooding	Erie	0	0	8	0
7/4/1969	Flooding	Erie	15	1	132	5000
3/12/1972	Flooding	Erie	0	0	0	0
6/9/1972	Flooding	Erie	0	0	1	0
11/13/1972	Flooding	Erie	0	0	625	0
4/9/1973	Flooding	Erie	0	0	714	5
6/17/1973	Flooding	Erie	0	0	3	0
8/20/1973	Flooding	Erie	0	0	0	0
4/8/1974	Flooding	Erie	0	0	83	0
2/23/1975	Flooding	Erie	0	0	0	0
3/14/1975	Flooding	Erie	0	0	1	0
4/2/1975	Flooding	Erie	0	0	1	0
1/25/1976	Flooding	Erie	0	0	0	0
2/16/1976	Flooding	Erie	0	0	0	0
12/13/1977	Flooding	Erie	0	0	2	0
4/12/1980	Flooding	Erie	0	0	13	0
4/6/1982	Flooding	Erie	0	0	83	0
3/21/1984	Flooding	Erie	0	0	6	0
1/19/1987	Flooding	Erie	0	0	25	0
2/8/1987	Flooding	Erie	0	0	2	0
4/4/1987	Flooding	Erie	0	0	6	0
4/5/1987	Flooding	Erie	0	0	50	0
5/26/1989	Flooding	Erie	0	0	88	0
11/15/1989	Flooding	Erie	0	0	3	0
2/2/1990	Flooding	Erie	0	0	1	0

2/16/1990	Flooding	Erie	0	0	1	0
4/11/1990	Flooding	Erie	0	0	1	0
8/19/1990	Flooding	Erie	0	0	1	0
12/3/1990	Flooding	Erie	0	0	5	0
12/18/1990	Flooding	Erie	0	0	6	0
12/19/1990	Flooding	Erie	0	0	1	0
12/23/1990	Flooding	Erie	0	0	1	0
12/29/1990	Flooding	Erie	0	0	455	0
12/30/1990	Flooding	Erie	0	0	50	0
2/19/1991	Flooding	Erie	0	0	1	0
4/18/1992	Flooding	Erie	0	0	0	0
9/5/1992	Flooding	Erie	0	0	5	0
9/10/1992	Flooding	Erie	0	0	0	0
12/30/1992	Flooding	Erie	0	0	50	0
1/4/1993	Flooding	Erie	0	0	50	0
3/4/1993	Flooding	Erie	0	0	0	0
3/23/1993	Flooding	Erie	0	0	1	0
4/1/1993	Flooding	Erie	0	0	1	0
4/10/1993	Flooding	Erie	0	0	1	0
2/28/1994	Flooding	Erie	1	0	500	0
6/2/1995	Flooding	Erie	0	0	3	0
7/15/1995	Flooding	Erie	0	0	25	0
7/25/1995	Flooding	Erie	0	0	15	0
8/9/1995	Flooding	Erie	0	0	3600	100
8/17/1995	Flooding	Erie	0	0	30	0
8/18/1995	Flooding	Erie	0	0	8	0
6/19/1996	Flooding	Erie	0	0	10	0
9/9/1996	Flooding	Erie	0	0	50	0
2/4/1997	Flooding	Erie	0	0	75	0
5/25/1997	Flooding	Erie	0	0	50	0
6/1/1997	Flooding	Erie	0	0	200	0
6/1/1997	Flooding	Erie	0	0	150	15
1/7/1998	Flooding	Erie	0	0	100	0
2/4/1998	Flooding	Erie	0	0	75	0
2/17/1998	Flooding	Erie	0	0	500	0
3/20/1998	Flooding	Erie	0	0	100	0
4/9/1998	Flooding	Erie	0	0	5	0
6/28/1998	Flooding	Erie	0	0	5	0
6/30/1998	Flooding	Erie	0	0	30	0
8/25/1998	Flooding	Erie	0	0	500	0
1/22/1999	Flooding	Erie	0	0	100	0

1/23/1999	Flooding	Erie	0	0	100	0
4/6/2001	Flooding	Erie	0	0	20	0
1/1/2005	Flooding	Erie	0	0	425	0
8/20/2005	Flooding	Erie	0	0	30	0
6/21/2006	Flooding	Erie	0	0	2000	0
6/22/2006	Flooding	Erie	0	0	24500	5000
3/2/2007	Flooding	Erie	0	0	100	0
8/20/2007	Flooding	Erie	0	0	150	0
5/31/2010	Flooding	Erie	0	0	200	0
4/25/2011	Flooding	Erie	0	0	80	0
4/25/2011	Flooding	Erie	0	0	50	0
9/7/2011	Flooding	Erie	0	0	3	0
10/30/2012	Flooding	Erie	0	0	40	0
10/30/2012	Flooding	Erie	0	0	15	0
7/10/2013	Flooding		0	0	1	0
		Total:	17	1	36578	10120

Severe Storm History

477 severe storm events were reported in Erie County between 01/01/1961 and 11/01/2012.

Date	Type	County	Injuries	Deaths	PrD x 1000	CrD x 1000
2/25/1961	Severe Storm	Erie	0	0	21	0
8/8/1962	Severe Storm	Erie	0	0	0	5
3/9/1964	Severe Storm	Erie	0	0	1	0
5/9/1966	Severe Storm	Erie	0	0	0	57
6/9/1966	Severe Storm	Erie	0	0	1	0
7/4/1966	Severe Storm	Erie	0	0	1	0
7/9/1966	Severe Storm	Erie	0	0	6	0
7/14/1966	Severe Storm	Erie	0	0	0	6
8/8/1966	Severe Storm	Erie	0	0	1	0
8/9/1966	Severe Storm	Erie	0	0	1	0
8/10/1966	Severe Storm	Erie	0	0	9	0
11/28/1966	Severe Storm	Erie	0	0	0	0
2/15/1967	Severe Storm	Erie	0	0	57	0
3/23/1967	Severe Storm	Erie	0	0	1	0
6/16/1967	Severe Storm	Erie	0	0	1	0
6/21/1967	Severe Storm	Erie	0	0	0	0
7/2/1967	Severe Storm	Erie	0	0	0	0
7/18/1967	Severe Storm	Erie	0	0	0	1
7/30/1967	Severe Storm	Erie	0	0	1	1

8/2/1967	Severe Storm	Erie	0	0	0	0
3/12/1968	Severe Storm	Erie	1	0	6	0
3/22/1968	Severe Storm	Erie	0	0	1	0
4/14/1968	Severe Storm	Erie	0	0	6	0
4/23/1968	Severe Storm	Erie	0	0	1	0
5/3/1968	Severe Storm	Erie	0	0	0	0
5/6/1968	Severe Storm	Erie	0	0	0	6
5/15/1968	Severe Storm	Erie	0	0	1	0
6/10/1968	Severe Storm	Erie	0	0	1	0
6/11/1968	Severe Storm	Erie	0	0	1	0
7/16/1968	Severe Storm	Erie	0	0	0	0
7/22/1968	Severe Storm	Erie	0	0	1	0
8/7/1968	Severe Storm	Erie	0	0	1	0
8/8/1968	Severe Storm	Erie	0	0	1	0
3/20/1969	Severe Storm	Erie	0	0	0	0
5/8/1969	Severe Storm	Erie	0	0	6	0
5/10/1969	Severe Storm	Erie	0	0	0	0
6/1/1969	Severe Storm	Erie	0	0	1	0
6/12/1969	Severe Storm	Erie	0	0	1	0
6/27/1969	Severe Storm	Erie	0	0	1	0
6/27/1969	Severe Storm	Erie	0	0	0	1
6/30/1969	Severe Storm	Erie	0	0	0	1
7/2/1969	Severe Storm	Erie	0	0	1	0
7/11/1969	Severe Storm	Erie	0	0	0	0
7/27/1969	Severe Storm	Erie	0	0	0	0
9/6/1969	Severe Storm	Erie	0	0	0	0
3/26/1970	Severe Storm	Erie	0	0	6	0
4/1/1970	Severe Storm	Erie	0	0	6	0
5/11/1970	Severe Storm	Erie	0	0	0	0
5/13/1970	Severe Storm	Erie	0	0	6	0
5/24/1970	Severe Storm	Erie	0	0	0	0
5/25/1970	Severe Storm	Erie	0	0	1	0
6/14/1970	Severe Storm	Erie	0	0	1	0
6/17/1970	Severe Storm	Erie	0	0	1	0
7/2/1970	Severe Storm	Erie	0	0	1	0
7/8/1970	Severe Storm	Erie	0	0	1	0
7/28/1970	Severe Storm	Erie	0	0	0	1
7/29/1970	Severe Storm	Erie	0	0	1	0
8/19/1970	Severe Storm	Erie	0	0	0	0
9/8/1970	Severe Storm	Erie	0	0	1	0
9/22/1970	Severe Storm	Erie	0	0	0	0

9/23/1970	Severe Storm	Erie	0	0	1	0
11/20/1970	Severe Storm	Erie	0	0	0	0
12/3/1970	Severe Storm	Erie	0	0	1	0
1/13/1971	Severe Storm	Erie	7	0	1	0
1/26/1971	Severe Storm	Erie	1	0	6	0
1/29/1971	Severe Storm	Erie	0	0	1	0
2/5/1971	Severe Storm	Erie	0	0	0	0
2/8/1971	Severe Storm	Erie	0	0	0	0
2/22/1971	Severe Storm	Erie	0	0	1	0
2/26/1971	Severe Storm	Erie	0	0	1	0
3/4/1971	Severe Storm	Erie	0	0	6	0
5/16/1971	Severe Storm	Erie	0	0	1	0
5/19/1971	Severe Storm	Erie	0	0	0	0
5/24/1971	Severe Storm	Erie	0	0	6	0
6/2/1971	Severe Storm	Erie	0	0	1	0
6/6/1971	Severe Storm	Erie	0	0	6	0
6/7/1971	Severe Storm	Erie	0	0	1	0
6/13/1971	Severe Storm	Erie	0	0	0	0
6/20/1971	Severe Storm	Erie	0	0	1	0
6/28/1971	Severe Storm	Erie	0	0	1	0
7/9/1971	Severe Storm	Erie	0	0	1	0
7/15/1971	Severe Storm	Erie	0	0	1	0
7/19/1971	Severe Storm	Erie	0	0	1	0
8/10/1971	Severe Storm	Erie	0	0	1	0
8/22/1971	Severe Storm	Erie	0	0	1	0
9/6/1971	Severe Storm	Erie	0	0	1	0
11/2/1971	Severe Storm	Erie	0	0	0	0
12/10/1971	Severe Storm	Erie	0	0	6	0
12/15/1971	Severe Storm	Erie	0	0	6	0
12/30/1971	Severe Storm	Erie	0	0	1	0
1/24/1972	Severe Storm	Erie	0	0	0	0
3/21/1972	Severe Storm	Erie	0	0	0	0
4/6/1972	Severe Storm	Erie	0	0	1	0
4/12/1972	Severe Storm	Erie	0	0	6	0
4/14/1972	Severe Storm	Erie	0	0	1	0
4/19/1972	Severe Storm	Erie	0	0	1	0
5/8/1972	Severe Storm	Erie	0	0	0	0
5/14/1972	Severe Storm	Erie	0	0	1	0
6/15/1972	Severe Storm	Erie	0	0	0	0
6/29/1972	Severe Storm	Erie	0	0	0	0
7/9/1972	Severe Storm	Erie	0	0	1	0

7/12/1972	Severe Storm	Erie	0	0	1	0
7/15/1972	Severe Storm	Erie	0	0	0	0
7/18/1972	Severe Storm	Erie	0	0	1	0
8/2/1972	Severe Storm	Erie	0	0	0	0
8/14/1972	Severe Storm	Erie	0	0	0	0
8/18/1972	Severe Storm	Erie	0	0	0	0
8/26/1972	Severe Storm	Erie	0	0	0	0
9/13/1972	Severe Storm	Erie	0	0	1	0
9/17/1972	Severe Storm	Erie	0	0	1	0
3/14/1973	Severe Storm	Erie	0	0	1	0
3/16/1973	Severe Storm	Erie	0	0	6	0
4/16/1973	Severe Storm	Erie	0	0	1	0
6/3/1973	Severe Storm	Erie	0	0	0	0
6/4/1973	Severe Storm	Erie	0	0	0	0
6/12/1973	Severe Storm	Erie	0	0	0	0
6/16/1973	Severe Storm	Erie	0	0	0	0
6/26/1973	Severe Storm	Erie	0	0	1	0
6/28/1973	Severe Storm	Erie	0	0	0	0
1/9/1974	Severe Storm	Erie	0	0	0	0
1/26/1974	Severe Storm	Erie	0	0	1	0
2/22/1974	Severe Storm	Erie	0	0	0	0
5/29/1974	Severe Storm	Erie	0	0	0	0
6/30/1974	Severe Storm	Erie	0	0	0	0
7/4/1974	Severe Storm	Erie	0	0	1	0
7/29/1974	Severe Storm	Erie	0	0	1	0
8/7/1974	Severe Storm	Erie	0	0	0	0
8/13/1974	Severe Storm	Erie	0	0	1	0
8/27/1974	Severe Storm	Erie	0	0	0	0
11/20/1974	Severe Storm	Erie	0	0	0	0
12/1/1974	Severe Storm	Erie	0	0	6	0
1/11/1975	Severe Storm	Erie	0	0	0	0
3/14/1975	Severe Storm	Erie	0	0	0	0
5/21/1975	Severe Storm	Erie	0	0	1	0
7/3/1975	Severe Storm	Erie	0	0	1	0
7/7/1975	Severe Storm	Erie	0	0	0	0
7/10/1975	Severe Storm	Erie	0	1	0	0
7/13/1975	Severe Storm	Erie	0	0	1	0
8/13/1975	Severe Storm	Erie	0	0	0	0
9/3/1975	Severe Storm	Erie	0	0	1	0
9/5/1975	Severe Storm	Erie	0	0	1	0
10/17/1975	Severe Storm	Erie	0	0	1	0

3/3/1976	Severe Storm	Erie	0	0	1	0
3/5/1976	Severe Storm	Erie	0	0	1	0
3/12/1976	Severe Storm	Erie	0	0	0	0
3/20/1976	Severe Storm	Erie	0	0	0	0
5/2/1976	Severe Storm	Erie	1	0	1	0
5/5/1976	Severe Storm	Erie	0	0	0	0
7/15/1976	Severe Storm	Erie	0	0	6	0
7/16/1976	Severe Storm	Erie	0	0	1	0
8/13/1976	Severe Storm	Erie	0	0	0	0
1/9/1977	Severe Storm	Erie	0	0	0	0
1/13/1977	Severe Storm	Erie	0	0	0	0
1/16/1977	Severe Storm	Erie	0	0	1	0
1/28/1977	Severe Storm	Erie	0	1	1	0
1/31/1977	Severe Storm	Erie	0	0	0	0
4/20/1977	Severe Storm	Erie	0	1	0	0
5/31/1977	Severe Storm	Erie	0	0	1	0
6/30/1977	Severe Storm	Erie	0	0	10	0
7/4/1977	Severe Storm	Erie	1	0	29	0
7/18/1977	Severe Storm	Erie	8	0	2	0
12/1/1977	Severe Storm	Erie	0	0	0	0
12/5/1977	Severe Storm	Erie	0	0	0	0
12/6/1977	Severe Storm	Erie	0	0	0	0
1/8/1978	Severe Storm	Erie	0	0	6	0
1/20/1978	Severe Storm	Erie	0	0	6	0
1/26/1978	Severe Storm	Erie	0	1	5682	568
6/26/1978	Severe Storm	Erie	0	0	29	0
6/27/1978	Severe Storm	Erie	0	0	1	0
8/9/1978	Severe Storm	Erie	0	0	0	0
8/19/1978	Severe Storm	Erie	0	0	0	0
2/17/1979	Severe Storm	Erie	0	0	0	0
4/6/1979	Severe Storm	Erie	0	0	1	0
6/10/1979	Severe Storm	Erie	0	0	0	0
7/23/1979	Severe Storm	Erie	0	0	1	0
8/5/1979	Severe Storm	Erie	0	0	10	0
9/13/1979	Severe Storm	Erie	0	0	926	0
12/7/1979	Severe Storm	Erie	1	0	50	0
1/11/1980	Severe Storm	Erie	0	0	1	0
3/21/1980	Severe Storm	Erie	0	0	1	0
5/13/1980	Severe Storm	Erie	0	0	5	0
6/7/1980	Severe Storm	Erie	0	1	17	0
7/1/1980	Severe Storm	Erie	0	0	341	0

7/28/1980	Severe Storm	Erie	0	0	7	0
8/13/1980	Severe Storm	Erie	0	0	5	0
9/13/1980	Severe Storm	Erie	0	0	13	0
12/24/1980	Severe Storm	Erie	0	0	0	0
2/12/1981	Severe Storm	Erie	0	0	0	0
5/1/1981	Severe Storm	Erie	0	0	568	568
6/8/1981	Severe Storm	Erie	1	0	0	0
1/4/1982	Severe Storm	Erie	0	0	13	0
1/4/1982	Severe Storm	Erie	0	0	6	0
1/11/1982	Severe Storm	Erie	0	0	1	0
2/17/1982	Severe Storm	Erie	0	0	0	0
4/3/1982	Severe Storm	Erie	0	0	6	0
5/22/1982	Severe Storm	Erie	0	0	25	0
6/15/1982	Severe Storm	Erie	3	0	25	0
6/22/1982	Severe Storm	Erie	0	0	25	0
6/22/1982	Severe Storm	Erie	0	0	25	0
6/28/1982	Severe Storm	Erie	0	0	3	0
12/28/1982	Severe Storm	Erie	0	0	1	0
5/2/1983	Severe Storm	Erie	3	0	50	0
6/19/1983	Severe Storm	Erie	0	0	0	0
7/4/1983	Severe Storm	Erie	0	0	3	0
7/21/1983	Severe Storm	Erie	0	0	5	0
9/6/1983	Severe Storm	Erie	0	0	3	0
1/19/1984	Severe Storm	Erie	0	0	1	0
2/27/1984	Severe Storm	Erie	0	0	1	0
3/8/1984	Severe Storm	Erie	0	0	1	0
4/30/1984	Severe Storm	Erie	0	0	6	0
8/8/1984	Severe Storm	Erie	0	0	50	0
8/8/1984	Severe Storm	Erie	0	0	17	0
1/19/1985	Severe Storm	Erie	0	0	1	0
1/19/1985	Severe Storm	Erie	0	0	0	0
1/25/1985	Severe Storm	Erie	0	0	0	0
2/12/1985	Severe Storm	Erie	0	0	1	1
3/4/1985	Severe Storm	Erie	0	0	1	0
3/12/1985	Severe Storm	Erie	0	0	1	0
3/28/1985	Severe Storm	Erie	0	0	50	0
3/28/1985	Severe Storm	Erie	0	0	5	0
7/15/1985	Severe Storm	Erie	0	0	5	0
5/6/1986	Severe Storm	Erie	0	0	5	0
6/16/1986	Severe Storm	Erie	0	0	5	0
8/26/1986	Severe Storm	Erie	0	0	1	0

9/26/1986	Severe Storm	Erie	0	0	5	0
6/8/1987	Severe Storm	Erie	0	0	5	0
6/29/1987	Severe Storm	Erie	0	0	5	0
8/2/1987	Severe Storm	Erie	0	0	5	0
8/2/1987	Severe Storm	Erie	0	0	5	0
12/15/1987	Severe Storm	Erie	0	0	14	0
2/22/1988	Severe Storm	Erie	0	0	1	0
5/9/1988	Severe Storm	Erie	0	0	5	0
8/5/1988	Severe Storm	Erie	0	0	5	0
10/18/1988	Severe Storm	Erie	0	0	2	0
11/10/1988	Severe Storm	Erie	0	0	1	0
5/31/1989	Severe Storm	Erie	0	0	5	0
11/20/1989	Severe Storm	Erie	0	0	1	0
11/27/1989	Severe Storm	Erie	0	0	50	0
11/27/1989	Severe Storm	Erie	0	0	1	0
12/15/1989	Severe Storm	Erie	0	0	8	0
1/11/1990	Severe Storm	Erie	0	0	1	0
1/25/1990	Severe Storm	Erie	0	0	57	0
2/14/1990	Severe Storm	Erie	0	0	12	0
2/24/1990	Severe Storm	Erie	0	0	16	0
5/10/1990	Severe Storm	Erie	0	0	1	0
5/17/1990	Severe Storm	Erie	0	0	3	0
5/17/1990	Severe Storm	Erie	0	0	3	0
6/3/1990	Severe Storm	Erie	0	0	5	0
6/3/1990	Severe Storm	Erie	0	0	5	0
12/22/1990	Severe Storm	Erie	0	0	1	0
12/23/1990	Severe Storm	Erie	0	0	0	0
1/20/1991	Severe Storm	Erie	0	0	0	0
1/29/1991	Severe Storm	Erie	0	0	0	0
2/14/1991	Severe Storm	Erie	0	0	3	0
3/3/1991	Severe Storm	Erie	0	0	11	0
3/27/1991	Severe Storm	Erie	0	0	5	0
3/27/1991	Severe Storm	Erie	0	0	5	0
12/14/1991	Severe Storm	Erie	0	0	1	0
1/14/1992	Severe Storm	Erie	0	0	0	0
1/15/1992	Severe Storm	Erie	0	0	0	0
3/22/1992	Severe Storm	Erie	0	0	2	0
5/17/1992	Severe Storm	Erie	0	0	50	0
9/9/1992	Severe Storm	Erie	0	0	5	0
9/9/1992	Severe Storm	Erie	0	0	1	0
11/12/1992	Severe Storm	Erie	0	0	6	0

2/11/1993	Severe Storm	Erie	0	0	21	0
2/15/1993	Severe Storm	Erie	0	0	6	0
2/22/1993	Severe Storm	Erie	0	0	3	0
3/4/1993	Severe Storm	Erie	0	0	17	0
3/10/1993	Severe Storm	Erie	0	0	3	0
3/13/1993	Severe Storm	Erie	1	0	63	0
12/26/1993	Severe Storm	Erie	0	0	1	0
2/5/1994	Severe Storm	Erie	0	0	0	0
2/6/1994	Severe Storm	Erie	0	0	0	0
2/8/1994	Severe Storm	Erie	0	0	2	2
2/8/1994	Severe Storm	Erie	0	0	0	0
2/14/1994	Severe Storm	Erie	0	0	1	0
2/17/1994	Severe Storm	Erie	0	0	57	6
2/21/1994	Severe Storm	Erie	0	0	0	0
2/26/1994	Severe Storm	Erie	0	0	0	0
4/16/1994	Severe Storm	Erie	2	0	1	0
11/21/1994	Severe Storm	Erie	0	0	1	0
11/28/1994	Severe Storm	Erie	0	0	1	0
1/21/1995	Severe Storm	Erie	0	0	24	0
2/11/1995	Severe Storm	Erie	0	0	1	0
4/10/1995	Severe Storm	Erie	0	0	10	0
5/28/1995	Severe Storm	Erie	0	0	5	0
6/28/1995	Severe Storm	Erie	0	0	10	0
7/13/1995	Severe Storm	Erie	2	0	183	0
7/15/1995	Severe Storm	Erie	1	0	0	0
7/15/1995	Severe Storm	Erie	0	0	0	3
8/15/1995	Severe Storm	Erie	0	0	2	0
10/5/1995	Severe Storm	Erie	0	0	25	0
10/5/1995	Severe Storm	Erie	0	0	3	0
10/20/1995	Severe Storm	Erie	0	0	6	0
10/24/1995	Severe Storm	Erie	0	0	1	0
11/11/1995	Severe Storm	Erie	0	0	8	0
11/27/1995	Severe Storm	Erie	0	0	3	0
12/9/1995	Severe Storm	Erie	0	0	7	0
12/9/1995	Severe Storm	Erie	0	0	0	0
12/19/1995	Severe Storm	Erie	0	0	32	0
2/2/1996	Severe Storm	Erie	0	0	113	0
2/10/1996	Severe Storm	Erie	0	0	2	0
3/19/1996	Severe Storm	Erie	0	0	16	0
3/25/1996	Severe Storm	Erie	0	0	23	0
4/12/1996	Severe Storm	Erie	0	0	50	0

4/25/1996	Severe Storm	Erie	0	0	2	0
6/11/1996	Severe Storm	Erie	0	0	350	0
7/14/1996	Severe Storm	Erie	0	0	20	0
7/30/1996	Severe Storm	Erie	0	0	75	0
9/7/1996	Severe Storm	Erie	0	0	7	11
10/30/1996	Severe Storm	Erie	0	0	177	77
12/1/1996	Severe Storm	Erie	0	0	2	0
1/10/1997	Severe Storm	Erie	0	0	7	0
1/16/1997	Severe Storm	Erie	0	0	3	0
2/21/1997	Severe Storm	Erie	0	0	1	0
2/27/1997	Severe Storm	Erie	0	0	6	0
5/1/1997	Severe Storm	Erie	0	0	0	35
5/18/1997	Severe Storm	Erie	0	0	2	0
5/19/1997	Severe Storm	Erie	0	0	2	0
7/26/1997	Severe Storm	Erie	0	0	8	0
8/16/1997	Severe Storm	Erie	0	0	15	0
9/29/1997	Severe Storm	Erie	0	0	2	0
1/13/1998	Severe Storm	Erie	8	0	0	0
3/28/1998	Severe Storm	Erie	0	0	37	0
4/9/1998	Severe Storm	Erie	1	0	0	0
6/26/1998	Severe Storm	Erie	0	0	10	0
7/21/1998	Severe Storm	Erie	0	0	805	0
8/9/1998	Severe Storm	Erie	0	0	12	0
8/25/1998	Severe Storm	Erie	0	0	10	0
11/10/1998	Severe Storm	Erie	0	0	33	0
11/11/1998	Severe Storm	Erie	0	0	253	0
1/2/1999	Severe Storm	Erie	2	0	21	0
1/8/1999	Severe Storm	Erie	0	0	2	0
3/5/1999	Severe Storm	Erie	0	0	23	0
5/6/1999	Severe Storm	Erie	0	0	33	5
7/6/1999	Severe Storm	Erie	0	0	15	0
7/9/1999	Severe Storm	Erie	0	0	20	0
7/30/1999	Severe Storm	Erie	0	0	5	0
7/31/1999	Severe Storm	Erie	0	0	325	0
10/13/1999	Severe Storm	Erie	0	0	30	0
3/11/2000	Severe Storm	Erie	0	0	26	0
7/14/2000	Severe Storm	Erie	0	0	35	0
8/2/2000	Severe Storm	Erie	0	0	85	0
8/6/2000	Severe Storm	Erie	0	0	15	0
8/9/2000	Severe Storm	Erie	0	0	40	0
10/4/2000	Severe Storm	Erie	0	0	5	0

12/11/2000	Severe Storm	Erie	0	0	163	0
12/13/2000	Severe Storm	Erie	0	0	104	0
2/9/2001	Severe Storm	Erie	0	0	13	0
2/25/2001	Severe Storm	Erie	0	0	20	0
4/12/2001	Severe Storm	Erie	0	0	33	0
10/25/2001	Severe Storm	Erie	0	0	28	0
2/1/2002	Severe Storm	Erie	0	0	42	0
3/9/2002	Severe Storm	Erie	0	0	314	0
3/24/2002	Severe Storm	Erie	0	0	57	0
3/26/2002	Severe Storm	Erie	0	0	146	0
4/28/2002	Severe Storm	Erie	0	0	35	0
5/30/2002	Severe Storm	Erie	0	0	10	0
5/30/2002	Severe Storm	Erie	0	0	10	0
6/14/2002	Severe Storm	Erie	0	0	5	0
6/21/2002	Severe Storm	Erie	0	0	10	0
7/22/2002	Severe Storm	Erie	0	0	10	0
7/27/2002	Severe Storm	Erie	0	0	2	0
7/28/2002	Severe Storm	Erie	0	0	10	0
7/29/2002	Severe Storm	Erie	0	0	15	0
8/4/2002	Severe Storm	Erie	0	0	10	0
9/20/2002	Severe Storm	Erie	0	0	5	0
11/10/2002	Severe Storm	Erie	0	0	600	0
11/10/2002	Severe Storm	Erie	0	0	25	0
12/24/2002	Severe Storm	Erie	0	0	125	0
2/12/2003	Severe Storm	Erie	0	0	217	0
2/22/2003	Severe Storm	Erie	0	0	714	0
4/4/2003	Severe Storm	Erie	0	0	3	0
4/4/2003	Severe Storm	Erie	0	0	2	0
4/20/2003	Severe Storm	Erie	0	0	75	0
5/11/2003	Severe Storm	Erie	0	0	43	0
6/26/2003	Severe Storm	Erie	0	0	5	0
7/4/2003	Severe Storm	Erie	0	0	50	0
7/7/2003	Severe Storm	Erie	0	0	20	0
7/7/2003	Severe Storm	Erie	0	0	15	0
7/8/2003	Severe Storm	Erie	0	0	400	0
9/26/2003	Severe Storm	Erie	0	0	5	0
10/14/2003	Severe Storm	Erie	0	0	11	0
11/12/2003	Severe Storm	Erie	0	0	82	0
11/12/2003	Severe Storm	Erie	0	0	5	0
1/4/2004	Severe Storm	Erie	0	0	157	0
3/5/2004	Severe Storm	Erie	0	0	86	0

4/17/2004	Severe Storm	Erie	0	0	2	0
5/21/2004	Severe Storm	Erie	0	0	50	0
6/9/2004	Severe Storm	Erie	0	0	15	0
6/13/2004	Severe Storm	Erie	0	0	8	0
6/14/2004	Severe Storm	Erie	0	0	3	0
11/27/2004	Severe Storm	Erie	0	0	7	0
12/1/2004	Severe Storm	Erie	0	0	30	0
12/7/2004	Severe Storm	Erie	0	0	12	0
12/22/2004	Severe Storm	Erie	0	0	4575	0
1/5/2005	Severe Storm	Erie	0	0	4461	0
1/22/2005	Severe Storm	Erie	0	0	265	0
6/5/2005	Severe Storm	Erie	0	0	2	0
6/30/2005	Severe Storm	Erie	0	0	10	0
7/18/2005	Severe Storm	Erie	0	0	5	0
7/26/2005	Severe Storm	Erie	0	0	4	0
7/26/2005	Severe Storm	Erie	0	0	2	0
9/22/2005	Severe Storm	Erie	0	0	750	0
11/6/2005	Severe Storm	Erie	0	0	24	0
11/6/2005	Severe Storm	Erie	0	0	1	0
2/4/2006	Severe Storm	Erie	0	0	73	0
3/10/2006	Severe Storm	Erie	0	0	14	0
5/25/2006	Severe Storm	Erie	0	0	6	0
6/19/2006	Severe Storm	Erie	0	0	5	0
6/21/2006	Severe Storm	Erie	0	0	1	0
7/4/2006	Severe Storm	Erie	0	0	10	0
7/30/2006	Severe Storm	Erie	0	0	6	0
12/1/2006	Severe Storm	Erie	0	0	12	0
2/13/2007	Severe Storm	Erie	0	0	107	0
6/2/2007	Severe Storm	Erie	0	0	5	0
6/8/2007	Severe Storm	Erie	0	0	30	0
6/8/2007	Severe Storm	Erie	0	0	1	0
6/21/2007	Severe Storm	Erie	0	0	3	0
9/8/2007	Severe Storm	Erie	0	0	25	0
12/15/2007	Severe Storm	Erie	0	0	22	0
12/23/2007	Severe Storm	Erie	0	0	1	0
12/23/2007	Severe Storm	Erie	0	0	0	0
1/9/2008	Severe Storm	Erie	0	0	30	0
1/29/2008	Severe Storm	Erie	0	0	25	0
2/25/2008	Severe Storm	Erie	0	0	11	0
3/4/2008	Severe Storm	Erie	0	0	38	0
3/7/2008	Severe Storm	Erie	0	0	46	0

3/21/2008	Severe Storm	Erie	0	0	14	0
6/9/2008	Severe Storm	Erie	0	0	2	0
6/10/2008	Severe Storm	Erie	0	0	2	0
6/15/2008	Severe Storm	Erie	0	0	2	0
6/15/2008	Severe Storm	Erie	0	0	1	0
7/8/2008	Severe Storm	Erie	0	0	7	0
8/1/2008	Severe Storm	Erie	0	0	1	0
9/14/2008	Severe Storm	Erie	0	0	6089	550
12/19/2008	Severe Storm	Erie	0	0	38	0
1/9/2009	Severe Storm	Erie	0	0	178	0
1/27/2009	Severe Storm	Erie	0	0	256	0
2/11/2009	Severe Storm	Erie	0	0	553	0
6/25/2009	Severe Storm	Erie	0	0	20	0
6/25/2009	Severe Storm	Erie	0	0	2	0
8/28/2009	Severe Storm	Erie	0	0	3	0
12/9/2009	Severe Storm	Erie	0	0	337	0
4/25/2010	Severe Storm	Erie	0	0	5	0
5/7/2010	Severe Storm	Erie	0	0	500	0
5/7/2010	Severe Storm	Erie	0	0	250	0
5/7/2010	Severe Storm	Erie	0	0	50	0
5/7/2010	Severe Storm	Erie	0	0	15	0
6/6/2010	Severe Storm	Erie	0	0	12	0
6/6/2010	Severe Storm	Erie	0	0	5	0
6/27/2010	Severe Storm	Erie	0	0	25	0
6/27/2010	Severe Storm	Erie	0	0	10	0
6/27/2010	Severe Storm	Erie	0	0	1	0
2/1/2011	Severe Storm	Erie	0	0	250	0
4/28/2011	Severe Storm	Erie	0	0	10	0
5/12/2011	Severe Storm	Erie	0	0	5	0
5/25/2011	Severe Storm	Erie	0	0	400	0
5/25/2011	Severe Storm	Erie	0	0	300	0
5/25/2011	Severe Storm	Erie	0	0	125	0
5/25/2011	Severe Storm	Erie	0	0	20	0
5/25/2011	Severe Storm	Erie	0	0	10	0
7/2/2011	Severe Storm	Erie	0	0	10	0
7/22/2011	Severe Storm	Erie	0	0	15	0
7/22/2011	Severe Storm	Erie	0	0	10	0
4/29/2012	Severe Storm	Erie	0	0	200	0
6/18/2012	Severe Storm	Erie	0	0	50	0
6/18/2012	Severe Storm	Erie	0	0	15	0
6/18/2012	Severe Storm	Erie	0	0	2	0

6/18/2012	Severe Storm	Erie	0	0	1	0
6/18/2012	Severe Storm	Erie	0	0	1	0
7/1/2012	Severe Storm	Erie	1	0	15	0
7/1/2012	Severe Storm	Erie	0	0	10	0
7/1/2012	Severe Storm	Erie	0	0	2	0
8/9/2012	Severe Storm	Erie	0	0	15	0
10/29/2012	Severe Storm	Erie	0	0	750	0
		Total	50	5	36789	1904

Tornado History

8 Tornadoes were reported in Erie County between 01/01/1961 and 08/01/2013.

Date	Type	County	Injuries	Deaths	PrD x 1000	CrD x 1000
4/5/1961	Tornado	Erie	0	0	1	0
9/26/1970	Tornado	Erie	0	0	1	0
5/10/1973	Tornado	Erie	3	0	125	0
6/30/1977	Tornado	Erie	3	0	5	0
3/28/1985	Tornado	Erie	0	0	50	0
7/12/1992	Tornado	Erie	0	0	500	0
9/20/2000	Tornado	Erie	0	0	175	0
11/10/2002	Tornado	Erie	0	0	500	0
		Total	6	0	1356	0

Drought History

1 Drought event was reported in Erie County between 01/01/1895 and 08/01/2013.

Date	Type	County	Injuries	Deaths	PrD x 1000	CrD x 1000
9/1/1999	Drought	Erie	0	0	0	7143
		Total	0	0	0	7143

This historical weather data for Erie County was collected from the national Climatic Data Center and SHELDUS. The National Climatic Data Center is the world's largest active archive of weather data. The NCDC is part of the Department of Commerce, National oceanic and Atmospheric Administration (NOAA) and the National Environmental Satellite, Data and Information Services (NESDIS). SHELDUS is a county-level hazard data set for the U.S. for 18 different natural hazard events types such as thunderstorms, hurricanes, floods, wildfires, and tornados. The data were derived from several existing national data sources such as National Climatic Data Center's monthly Storm Data publications and NGDC's Tsunami Event Database. Originally, SHELDUS contained only those events that generated more than \$50,000 in damage or at least one death.

Appendix VII Critical Facilities

CFID	Facility	Address	City	State	Zip
CF-001	Bay View Fire Dept.	125 E. Tuscarawas Tr	Sandusky	Ohio	44870
CF-002	Perkins Twp FD	3003 Campbell St	Sandusky	Ohio	44870
CF-003	Sandusky FD	901 W. Market St	Sandusky	Ohio	44870
CF-004	Erie County Sheriff's Office	2800 Columbus Ave	Sandusky	Ohio	44870
CF-005	Sandusky PD	222 Meigs St	Sandusky	Ohio	44870
CF-006	Perkins Twp PD	5420 Milan Rd	Sandusky	Ohio	44870
CF-007	Ohio State Highway Patrol	511 Fremont Ave	Sandusky	Ohio	44870
CF-008	Erie County Office Building	247 Columbus Ave	Sandusky	Ohio	44870
CF-009	Erie County Courthouse	323 Columbus Ave	Sandusky	Ohio	44870
CF-010	Erie County Service Center	2900 Columbus Ave	Sandusky	Ohio	44870
CF-011	Erie County Highway Garage	2700 Columbus Ave	Sandusky	Ohio	44870
CF-012	Erie County Jobs & Family Services	221 W. Parish St	Sandusky	Ohio	44870
CF-013	Sandusky City Hall	222 Meigs St	Sandusky	Ohio	44870
CF-014	Bay View Village Hall	304 E. Bayview Dr	Sandusky	Ohio	44870
CF-015	Erie County Health Dept	420 Superior St	Sandusky	Ohio	44870
CF-016	Perkins Twp Hall	5420 Milan Rd	Sandusky	Ohio	44870
CF-017	Adams Junior High School	318 Columbus Ave	Sandusky	Ohio	44870-
CF-018	Furry Elementary School	310 Douglas Dr	Sandusky	Ohio	44870-
CF-019	Hancock Elementary School	2314 Hancock St	Sandusky	Ohio	44870-
CF-020	Jackson Junior High School	314 W Madison St	Sandusky	Ohio	44870-
CF-021	Madison Elementary School	910 W Madison St	Sandusky	Ohio	44870-
CF-022	Meadowlawn Elementary School	1313 E Strub Rd	Sandusky	Ohio	44870-
CF-023	Mills Elementary School	1918 Mills St	Sandusky	Ohio	44870-
CF-024	Monroe Elementary School	328 E Monroe St	Sandusky	Ohio	44870-
CF-025	Ontario Elementary School	924 Ontario St	Sandusky	Ohio	44870-
CF-026	Osborne Elementary School	920 W Osborne St	Sandusky	Ohio	44870-
CF-027	Perkins High School	3714 Campbell St	Sandusky	Ohio	44870-
CF-028	Perkins Local Sd School	1210 East Bogart Rd	Sandusky	Ohio	44870-
CF-029	Perkins Middle School	3700 South Ave	Sandusky	Ohio	44870-
CF-030	Sandusky High School	2130 Hayes Ave	Sandusky	Ohio	44870-
CF-031	Venice Heights Elementary School	4501 Venice Hgts Blvd	Sandusky	Ohio	44870-
CF-032	Briarfield Of Sandusky--Nursing Home	620 W STRUB RD	SANDUSKY	Ohio	44870
CF-033	Portland House--Nursing Home	3808 VENICE RD	SANDUSKY	Ohio	44870
CF-034	First BAPT Church-A B C	211 East Monroe	Sandusky	Ohio	44870
CF-035	Freewill BAPT Chapel	613 East Adams	Sandusky	Ohio	44870
CF-036	City of Sandusky Water & Sewer	222 Meigs St	Sandusky,	Ohio	44870
CF-037	Erie County Division of Water & Sewer	2900 Columbus Ave.	Sandusky	Ohio	44870
CF-038	First Energy Corp./Ohio Edision	2508 W. Perkins Ave.	Sandusky	Ohio	44870
CF-039	Bay View PD	304 E. Bayview Dr	Sandusky	Ohio	44870
CF-040	St John Lutheran Church	106 W. Scheid Road	Sandusky	Ohio	44870
CF-041	First United Church of Christ	435 Hancock Street	Sandusky	Ohio	44870
CF-042	American Legion Post #83	3615 Hayes Ave	Sandusky	Ohio	44870
CF-043	Erie County Fairgrounds	3100 Columbus Ave	Sandusky	Ohio	44870
CF-044	Resurrection Lutheran Church	216 Pennsylvania Ave	Sandusky	Ohio	44870
CF-045	Eagles Aerie 444	1235 W. Perkins Ave	Sandusky	Ohio	44870

CF-046	Emmanuel United Church of Christ	334 Columbus Ave	Sandusky	Ohio	44870
CF-047	First Cong. UCC	431 Columbus Ave	Sandusky	Ohio	44870
CF-048	Sandusky YMCA	2101 W. Perkins Ave	Sandusky	Ohio	44870
CF-049	St. Paul Lutheran	2211 Mills St	Sandusky	Ohio	44870
CF-050	Volunteers of America	1843 Superior St	Sandusky	Ohio	44870
CF-051	Zion Lutheran	503 Columbus Ave	Sandusky	Ohio	44870
CF-052	Sandusky City Schools	407 Decatur St	Sandusky	Ohio	44870
CF-053	Castalia PD	106 South Ave	Castalia	Ohio	44824
CF-054	Castalia Village Hall	126 Main St	Castalia	Ohio	44824
CF-055	Groton Twp Hall & FD	9414 Portland Rd	Castalia	Ohio	44824
CF-056	Margaretta Twp Hall	114 Main St	Castalia	Ohio	44824
CF-057	Groton Twp FD	9414 Portland Rd	Castalia	Ohio	44824
CF-058	Margaretta Twp FD	113 South Ave	Castalia	Ohio	44824
CF-059	Bogart Elementary School	5906 Bogart Rd W	Castalia	Ohio	44824-
CF-060	Margaretta High School	209 Lowell St	Castalia	Ohio	44824-
CF-061	Vermilion PD	5791 Liberty Ave	Vermilion	Ohio	44089
CF-062	Vermilion City Hall	5511 Liberty Ave	Vermilion	Ohio	44089
CF-063	Vermilion Twp Hall	736 Main St	Vermilion	Ohio	44089
CF-064	Vermilion FD	5467 Ohio St	Vermilion	Ohio	44089
CF-065	Sailorway Middle School	5355 Sailorway Dr	Vermilion	Ohio	44089-
CF-066	South Street Elementary School	5735 South St	Vermilion	Ohio	44089-
CF-067	Vermilion High School	1250 Sanford St	Vermilion	Ohio	44089-
CF-068	Vermilion Intermediate Elemen School	935 Decatur St	Vermilion	Ohio	44089-
CF-069	Vermilion Local Sd School	1230 Beechview Dr	Vermilion	Ohio	44089-
CF-070	Lakeview Pre-School Center	591 Ferndale Avenue	Vermilion	Ohio	44089
CF-071	Vermilion Middle School	5355 Sailorway Dr	Vermilion	Ohio	44089
CF-072	St. Mary's Church and School	5450 Ohio St	Vermilion	Ohio	44089
CF-073	Vermilion YMCA	320 Aldrich St	Vermilion	Ohio	44089
CF-074	Valley View Administration	1230 Beechview Dr	Vermilion	Ohio	44089
CF-075	Berlin Heights PD	8 W. Main St	Berlin	Ohio	44814
CF-076	Berlin Heights Village Hall	8 W. Main St	Berlin	Ohio	44814
CF-077	Berlin Twp Hall	12101 St Rt 61	Berlin	Ohio	44814
CF-078	Berlin Twp FD	11 E. Main St	Berlin	Ohio	44814
CF-079	Berlin Elementary School	20 Center St.	Berlin	Ohio	44814-
CF-080	Berlin-Milan Middle School	20 Center St.	Berlin	Ohio	44814-
CF-081	Erie County Courthouse	150 Mason Rd W	Milan	Ohio	44846
CF-082	Milan Village Hall	24 Public Sq	Milan	Ohio	44846
CF-083	Milan Twp Hall	1518 St Rt 113 E	Milan	Ohio	44846
CF-084	North Central EMS	12120 St Rt 250	Milan	Ohio	44846
CF-085	Milan Twp FD	1 North Center St	Milan	Ohio	44846
CF-086	Milan PD	9 Church St	Milan	Ohio	44846
CF-087	Edison High School	2603 St Rt 113 E	Milan	Ohio	44846-
CF-088	Ehove Career Center Vocational	316 Mason Rd W	Milan	Ohio	44846-
CF-089	Briarfield Of Milan--Nursing Home	185 S MAIN ST	Milan	Ohio	44846
CF-090	Edison Memorial United Methodist Church	10 East Church	Milan	Ohio	44846
CF-091	Village of Milan Water	9 E. Church St.	Milan	Ohio	44846
CF-092	First Presbyterian Church	17 E. Church St	Milan	Ohio	44846
CF-093	Milan Elementary	140 S. Main St	Milan	Ohio	44846
CF-094	Erie County Care Facility	3916 E. Perkins Ave	Huron	Ohio	44839

CF-095	Sanitary Engineer	554 River Rd	Huron	Ohio	44839
CF-096	Huron City Hall & PD	417 Main St	Huron	Ohio	44839
CF-097	Huron Twp Hall	1820 Bogart Rd	Huron	Ohio	44839
CF-098	Huron FD	417 Main St	Huron	Ohio	44839
CF-099	Huron High School	710 Cleveland Rd W	Huron	Ohio	44839-
CF-100	McCormick Middle School	325 Ohio St	Huron	Ohio	44839-
CF-101	Woodlands Elementary School	1810 Maple Ave	Huron	Ohio	44839-
CF-102	St Peter Church	430 Main Street	Huron	Ohio	44839
CF-103	St Peter's Catholic School - Parish Office	431 Main Street	Huron	Ohio	44839
CF-104	First Presbyterian Church	225 Williams Street	Huron	Ohio	44839
CF-105	Huron United Methodist Church	338 Williams Street	Huron	Ohio	44839
CF-106	City of Huron Water	417 Main St	Huron	Ohio	44839
CF-107	Kelleys Island Village Hall	112 Addison Rd	Kelleys	Ohio	43438
CF-108	Kelleys Island FD	121 Addison Rd	Kelleys	Ohio	43438
CF-109	Kelleys Island High School	Po Box 349	Kelleys	Ohio	43438
CF-110	Florence Twp Hall	11015 Chapel St	Birmingham	Ohio	44816
CF-111	Florence Twp FD	11011 Chapel St	Birmingham	Ohio	44816
CF-112	Birmingham United Methodist	15018 South St	Birmingham	Ohio	44816
CF-113	Oxford Twp Hall	11102 Ransom Rd	Monroeville	Ohio	44847
CF-114	Cedar Point PD	One Cedar Point Dr	Sandusky	Ohio	44870-
CF-115	Erie County MR/DD Facility	4405 Galloway Rd	Sandusky	Ohio	44870
CF-116	Double S Industries	4405 Galloway Rd	Sandusky	Ohio	44870
CF-117	Firelands Regional Medical Center S.	1912 Hayes Ave	Sandusky	Ohio	44870
CF-118	Firelands Regional Medical Center N.	1101 Decatur St	Sandusky	Ohio	44870
CF-119	Grace Lutheran Church	203 S Washington St	Castalia	Ohio	44824
CF-120	Holy Angels Church	1605 W. Jefferson St	Sandusky	Ohio	44870
CF-121	Sts. Peter and Paul Campus	510 Columbus Ave	Sandusky	Ohio	44870
CF-122	St. Stephen United Church of Christ	905 E. Perkins Ave	Sandusky	Ohio	44870
CF-123	Margaretta Local Schools	305 S. Washington St	Castalia	Ohio	44824
CF-124	Huron City Schools	712 Cleveland Rd E.	Huron	Ohio	44839
CF-125	BGSU - Firelands Campus	1 University Dr	Huron	Ohio	44839
CF-126	Christ Episcopal Church	315 Wayne St	Sandusky	Ohio	44870
CF-127	Kalahari Resorts & Convention Center	7000 Kalahari Drive	Sandusky	Ohio	44870
CF-128	Castaway Bay Water Park	2001 Cleveland Rd	Sandusky	Ohio	44870
CF-129	Great Wolf Lodge	4600 Milan Rd	Sandusky	Ohio	44870
CF-130	NOMS- Northern Ohio Medical Center	2500 W. Strub Rd	Sandusky	Ohio	44870
CF-131	North Coast Cancer Care	417 Quarry Lakes Dr	Sandusky	Ohio	44870

Appendix VIII

HAZUS-MH Reports

HAZUS-MH: Flood Event Report

Region Name: Erie Co OH (Flood Scenario)

Flood Scenario: 100-yr

Print Date: Friday, December 20, 2013

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social

Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	4

General Building Stock	
Essential Facility Inventory	
Flood Scenario Parameters	5
Building Damage	6
General Building Stock	
Essential Facilities Damage	
Induced Flood Damage	8
Debris Generation	
Social Impact	8
Shelter Requirements	
Economic Loss	9
Building-Related Losses	
	10
Appendix A: County Listing for the Region	
Appendix B: Regional Population and Building Value Data	11

General Description of the Region

HAZUS is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of HAZUS is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Ohio

Note:

Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 255 square miles and contains 2,310 census blocks. The region contains over 32 thousand households and has a total population of 79,551 people (2000 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 36,913 buildings in the region with a total building replacement value (excluding contents) of 7,149 million dollars (2006 dollars). Approximately 91.85% of the buildings (and 72.60% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

HAZUS estimates that there are 36,913 buildings in the region which have an aggregate total replacement value of 7,149 million (2006 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure (\$1000)	Percent of Total
Residential	5,190,324	72.6%
Commercial	1,202,776	16.8%
Industrial	440,456	6.2%
Agricultural	46,204	0.6%
Religion	122,109	1.7%
Government	63,501	0.9%
Education	84,027	1.2%
Total	7,149,397	100.00%

Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure (\$1000)	Percent of Total
Residential	938,843	67.0%
Commercial	272,580	19.4%
Industrial	116,551	8.3%
Agricultural	14,518	1.0%
Religion	19,787	1.4%
Government	30,767	2.2%
Education	8,471	0.6%
Total	1,401,517	100.00%

Essential Facility Inventory

For essential facilities, there are 2 hospitals in the region with a total bed capacity of 396 beds. There are 35 schools, 12 fire stations, 8 police stations and no emergency operation centers.

Flood Scenario Parameters

HAZUS used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name: Erie Co OH (Flood Scenario)
Scenario Name: 100-yr
Return Period Analyzed: 100
Analysis Options Analyzed: No What-ifs

Building Damage

General Building Stock Damage

HAZUS estimates that about 350 buildings will be at least moderately damaged. This is over 19% of the total number of buildings in the scenario. There are an estimated 86 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS Flood technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

Occupancy	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	3	75.00	1	25.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	48	13.79	69	19.83	63	18.10	82	23.56	86	24.71
Total	3		50		69		63		82		86	

Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	26	100.00
Masonry	1	2.04	8	16.33	11	22.45	10	20.41	11	22.45	8	16.33
Steel	1	50.00	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	0	0.00	40	14.60	58	21.17	53	19.34	71	25.91	52	18.98

Essential Facility Damage

Before the flood analyzed in this scenario, the region had hospital beds available for use. On the day of the

scenario flood event, the model estimates that hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities			Loss of Use
		At Least Moderate	At Least Substantial		
Fire Stations	12	0	0		0
Hospitals	2	0	0		0
Police Stations	8	0	0		0
Schools	35	0	0		0

If this report displays all zeros or is blank, two possibilities can explain this.

- (1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.
- (2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

HAZUS estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 16,272 tons of debris will be generated. Of the total amount, Finishes comprises 43% of the total, Structure comprises 31% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 651 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

HAZUS estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. HAZUS also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 819 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 1,338 people (out of a total population of 79,551) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the flood is 137.98 million dollars, which represents 9.85 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

69.01 **69.01** 69.01
69.01

The total building-related losses were 136.33 million dollars. 1% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 50.01% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates
(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<u>Building Loss</u>						
	Building	42.34	10.41	5.00	1.63	59.38
	Content	26.44	26.40	13.16	7.34	73.34
	Inventory	0.00	0.62	2.83	0.17	3.62
	Subtotal	68.77	37.43	20.99	9.14	136.33
<u>Business Interruption</u>						
	Income	0.03	0.23	0.00	0.02	0.28
	Relocation	0.09	0.05	0.01	0.00	0.14
	Rental Income	0.06	0.04	0.00	0.00	0.09
	Wage	0.07	0.23	0.01	0.85	1.14
	Subtotal	0.24	0.54	0.01	0.86	1.65
	Total	69.01	37.97	21.00	10.00	137.98
<u>ALL</u>						

Appendix A: County Listing for the Region

Ohio
- Erie

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Ohio				
Erie	79,551	5,190,324	1,959,073	7,149,397
Total	79,551	5,190,324	1,959,073	7,149,397

Total Study Region

79,551

5,190,324

1,959,073

7,149,397

HAZUS-Multi-Hazard
to SHARPP Conversion

Enter # of Buildings in the region:

Table 1
Building Exposure by Occupancy Type for the Study Region (County)

Occupancy		Enter Exposure from Table 1 (Exposure x \$1000)	Enter Percent of Total (i.e. 70.7% enter .707)	Number of Buildings
Residential	\$	5,190,324	0.726	26,799
Commercial	\$	1,202,776	0.168	6,201
Industrial	\$	440,456	0.062	2,289
Agriculture	\$	46,204	0.006	221
Religion	\$	122,109	0.017	628
Government	\$	63,501	0.009	332
Education	\$	84,027	0.012	443
Total	\$	7,149,397		100

Table 2
Building Exposure by Occupancy Type for this Scenario (Flood)

Occupancy		Enter Exposure from Table 2 (Exposure x \$1000)	Ratio (Do not enter any numbers)	Number of Buildings
Residential	\$	938,843	0.18	4847
Commercial	\$	272,580	0.23	1405
Industrial	\$	116,551	0.26	606
Agriculture	\$	14,518	0.31	70
Religion	\$	19,787	0.16	102
Government	\$	30,767	0.48	161
Education	\$	8,471	0.10	45
Total	\$	1,401,517		

Building Type	Number of Buildings	Exposure in Study Region
Residential	26,799	\$ 5,190,324,000
Non-Residential	8,711	\$ 1,689,436,000
Critical Facilities	1,403	\$ 269,637,000

Here is the Vulnerability Analysis for SHARPP:

Building Type	Number of Buildings	Exposure for this Scenario
Residential	4,847	\$ 938,843,000
Non-Residential	2,081	\$ 403,649,000
Critical Facilities	307	\$ 59,025,000

Totals: 7,235 \$ 1,401,517,000

Hazus-MH: Earthquake Event Report

Region Name Erie Co

Earthquake Scenario: Quake Scenario

Print Date: December 20, 2013

Totals only reflect data for those census tracts/blocks included in the user's study region.

Disclaimer:

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

Section	Page #
General Description of the Region	3
Building and Lifeline Inventory	4
Building Inventory	
Critical Facility Inventory	
Transportation and Utility Lifeline Inventory	
Earthquake Scenario Parameters	6
Direct Earthquake Damage	7
Buildings Damage	
Critical Facilities Damage	
Transportation and Utility Lifeline Damage	
Induced Earthquake Damage	11
Fire Following Earthquake	
Debris Generation	
Social Impact	12
Shelter Requirements	
Casualties	
Economic Loss	13
Building Losses	
Transportation and Utility Lifeline Losses	
Long-term Indirect Economic Impacts	
Appendix A: County Listing for the Region	
Appendix B: Regional Population and Building Value Data	

General Description of the Region

Hazus is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Ohio

Note:

Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 268.48 square miles and contains 19 census tracts. There are over 31 thousand households in the region which has a total population of 79,551 people (2002 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 36 thousand buildings in the region with a total building replacement value (excluding contents) of 7,149 (millions of dollars). Approximately 92.00 % of the buildings (and 73.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 2,443 and 2,308 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 36 thousand buildings in the region which have an aggregate total replacement value of 7,149 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 68% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 2 hospitals in the region with a total bed capacity of 396 beds. There are 35 schools, 12 fire stations, 8 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are 4 dams identified within the region. Of these, 0 of the dams are classified as 'high hazard'. The inventory also includes 52 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 4,751.00 (millions of dollars). This inventory includes over 242 kilometers of highways, 150 bridges, 3,153 kilometers of pipes.

Table 1: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	150	256.00
	Segments	85	1,700.90
	Tunnels	0	0.00
	Subtotal		1,956.90
Railways	Bridges	4	0.20
	Facilities	1	2.70
	Segments	180	178.70
	Tunnels	0	0.00
	Subtotal		181.50
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
	Subtotal		0.00
Bus	Facilities	2	2.30
	Subtotal		2.30
Ferry	Facilities	3	4.00
	Subtotal		4.00
Port	Facilities	14	28.00
	Subtotal		28.00
Airport	Facilities	4	42.60
	Runways	6	227.80
	Subtotal		270.40
		Total	2,443.10

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	31.50
	Facilities	0	0.00
	Pipelines	0	0.00
	Subtotal		31.50
Waste Water	Distribution Lines	NA	18.90
	Facilities	33	2,307.70
	Pipelines	0	0.00
	Subtotal		2,326.60
Natural Gas	Distribution Lines	NA	12.60
	Facilities	0	0.00
	Pipelines	0	0.00
	Subtotal		12.60
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
	Subtotal		0.00
Electrical Power	Facilities	0	0.00
	Subtotal		0.00
Communication	Facilities	7	0.70
	Subtotal		0.70
		Total	2,371.50

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	Quake Scenario
Type of Earthquake	Arbitrary
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	-82.71
Latitude of Epicenter	41.45
Earthquake Magnitude	5.40
Depth (Km)	0.00
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	Central & East US (CEUS 2008)

Building Damage

Building Damage

Hazus estimates that about 9,653 buildings will be at least moderately damaged. This is over 26.00 % of the buildings in the region. There are an estimated 782 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	84	0.46	33	0.37	44	0.68	27	1.15	9	1.12
Commercial	674	3.68	381	4.24	497	7.63	275	11.71	99	12.69
Education	23	0.13	12	0.13	16	0.24	8	0.34	3	0.38
Government	27	0.15	15	0.17	22	0.34	11	0.49	4	0.56
Industrial	207	1.13	102	1.14	145	2.22	90	3.83	32	4.08
Other Residential	3,284	17.96	1,646	18.34	1,349	20.70	595	25.33	195	24.94
Religion	67	0.37	36	0.40	38	0.58	21	0.89	8	1.01
Single Family	13,920	76.13	6,750	75.22	4,408	67.61	1,322	56.25	432	55.22
Total	18,286		8,974		6,519		2,351		783	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	13,964	76.36	6,737	75.07	3,757	57.63	681	28.96	87	11.15
Steel	281	1.53	122	1.36	252	3.87	196	8.33	70	8.97
Concrete	88	0.48	41	0.45	61	0.93	36	1.54	9	1.14
Precast	79	0.43	30	0.34	60	0.92	52	2.23	15	1.96
RM	76	0.42	21	0.23	38	0.59	29	1.22	5	0.67
URM	3,271	17.89	1,782	19.86	1,966	30.15	1,072	45.61	503	64.22
MH	526	2.88	241	2.69	386	5.91	285	12.11	93	11.89
Total	18,286		8,974		6,519		2,351		783	

*Note:

RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 396 hospital beds available for use. On the day of the earthquake, the model estimates that only 197 hospital beds (50.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 54.00% of the beds will be back in service. By 30 days, 67.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	2	1	0	1
Schools	35	21	0	8
EOCs	0	0	0	0
PoliceStations	8	5	0	1
FireStations	12	5	0	3

Transportation and Utility Lifeline Damage

Table 6 provides damage estimates for the transportation system.

Table 6: Expected Damage to the Transportation Systems

System	Component	Locations/ Segments	Number of Locations_			
			With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	85	0	0	85	85
	Bridges	150	1	0	149	149
	Tunnels	0	0	0	0	0
Railways	Segments	180	0	0	180	180
	Bridges	4	0	0	4	4
	Tunnels	0	0	0	0	0
	Facilities	1	1	0	0	1
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	2	1	0	1	2
Ferry	Facilities	3	2	0	1	3
Port	Facilities	14	9	0	5	14
Airport	Facilities	4	2	0	4	4
	Runways	6	0	0	6	6

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	33	9	0	10	31
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	7	5	0	2	7

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	1,577	191	48
Waste Water	946	96	24
Natural Gas	631	33	8
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	31,727	360	0	0	0	0
Electric Power		20,061	14,058	6,705	1,462	24

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.01 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 68 people and burn about 4 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.40 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 47.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 15,800 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 970 households to be displaced due to the earthquake. Of these, 621 people (out of a total population of 79,551) will seek temporary shelter in public shelters.

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	3	1	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	11	3	0	1
	Industrial	4	1	0	0
	Other-Residential	94	22	3	6
	Single Family	198	46	6	12
	Total	310	73	10	19
2 PM	Commercial	206	52	7	14
	Commuting	0	0	0	0
	Educational	47	12	2	3
	Hotels	2	1	0	0
	Industrial	27	7	1	2
	Other-Residential	24	6	1	2
	Single Family	48	11	2	3
	Total	354	89	13	24
5 PM	Commercial	152	38	5	10
	Commuting	2	3	5	1
	Educational	3	1	0	0
	Hotels	3	1	0	0
	Industrial	17	4	1	1
	Other-Residential	37	9	1	2
	Single Family	80	19	3	5
	Total	294	75	15	20

Economic Loss

The total economic loss estimated for the earthquake is 1,492.77 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 1,140.18 (millions of dollars); 20 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 51 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Table 11: Building-Related Economic Loss Estimates
(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	6.46	42.67	2.92	3.08	55.12
	Capital-Related	0.00	2.79	39.22	1.83	0.55	44.38
	Rental	9.44	14.36	19.20	1.12	1.29	45.41
	Relocation	34.70	8.11	29.47	4.67	8.90	85.85
	Subtotal	44.14	31.70	130.56	10.54	13.82	230.76
Capital Stock Losses							
	Structural	56.11	18.82	38.59	14.85	10.70	139.06
	Non_Structural	208.49	104.12	122.05	52.89	28.55	516.11
	Content	83.82	32.65	69.49	39.48	17.42	242.87
	Inventory	0.00	0.00	1.82	9.16	0.40	11.39
	Subtotal	348.42	155.59	231.95	116.38	57.07	909.42
Total		392.57	187.29	362.51	126.92	70.89	1,140.18

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Hazus estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 14 presents the results of the region for the given earthquake.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	1,700.94	\$0.00	0.00
	Bridges	256.00	\$10.15	3.96
	Tunnels	0.00	\$0.00	0.00
	Subtotal	1956.90	10.10	
Railways	Segments	178.66	\$0.00	0.00
	Bridges	0.18	\$0.01	3.39
	Tunnels	0.00	\$0.00	0.00
	Facilities	2.66	\$1.36	50.96
	Subtotal	181.50	1.40	
Light Rail	Segments	0.00	\$0.00	0.00
	Bridges	0.00	\$0.00	0.00
	Tunnels	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	0.00	
Bus	Facilities	2.29	\$0.68	29.88
	Subtotal	2.30	0.70	
Ferry	Facilities	3.99	\$1.59	39.93
	Subtotal	4.00	1.60	
Port	Facilities	27.96	\$11.93	42.69
	Subtotal	28.00	11.90	
Airport	Facilities	42.60	\$12.09	28.38
	Runways	227.78	\$0.00	0.00
	Subtotal	270.40	12.10	
	Total	2443.10	37.80	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Distribution Line	31.50	\$0.86	2.72
	Subtotal	31.53	\$0.86	
Waste Water	Pipelines	0.00	\$0.00	0.00
	Facilities	2,307.70	\$313.15	13.57
	Distribution Line	18.90	\$0.43	2.28
	Subtotal	2,326.61	\$313.58	
Natural Gas	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Distribution Line	12.60	\$0.15	1.17
	Subtotal	12.61	\$0.15	
Oil Systems	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	\$0.00	
Electrical Power	Facilities	0.00	\$0.00	0.00
	Subtotal	0.00	\$0.00	
Communication	Facilities	0.70	\$0.19	26.45
	Subtotal	0.74	\$0.19	
	Total	2,371.49	\$314.78	

Table 14. Indirect Economic Impact with outside aid

(Employment as # of people and Income in millions of \$)

LOSS	Total	%

Appendix A: County Listing for the Region

Erie,OH

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Ohio	Erie	79,551	5,190	1,959	7,149
Total State		79,551	5,190	1,959	7,149
Total Region		79,551	5,190	1,959	7,149

HAZUS-MH Earthquake
to SHARPP Conversion

1. Enter the Building Counts from Table 3:

	<u>None</u>	<u>Slight</u>	<u>Moderate</u>	<u>Extensive</u>	<u>Complete</u>	General Building <u>Stock</u>	<u>Total Affected</u>
Agriculture	84	33	44	27	9	197	80
Commercial	674	381	497	275	99	1,926	871
Education	23	12	16	8	3	62	27
Government	27	15	22	11	4	79	37
Industrial	207	102	145	90	32	576	267
Other Residential	3,284	1,646	1,349	595	195	7,069	2,139
Religion	67	36	38	21	8	170	67
Single Family	13,920	6,750	4,408	1,322	432	26,832	6,162
Totals by Damage:	18,286	8,975	6,519	2,349	782	36,911	9,650

2. Enter the Building Values, as is, from Appendix B:

	<u>Value</u>	<u>Value per Structure</u>
Enter the Residential Building Value	5,190	\$ 5,190,000,000 \$ 193,425.76
Enter Non-Residential Building Value	1,959	\$ 1,959,000,000 \$ 194,364.52

3. The computer calculates the "non-residential" structures and percentages as:

	<u># of Bldgs.</u>	<u>Percentage</u>
Number of Non-Residential Buildings	9,768	96.91%
Number of Critical Facilities	311	3.09%
Total of Non-Residential Structures	10,079	

4. Here is the Vulnerability Analysis for SHARPP:

<u>Building Type</u>	<u>Number of Buildings</u>	<u>Exposure in Study Region</u>
Residential	6,162	\$1,191,889,534.88
Non-Residential	3,357	\$652,481,694.61
<u>Critical Facilities</u>	<u>131</u>	<u>\$25,461,752.16</u>
Totals:	9,650	\$1,869,832,981.65

Appendix X

Updated Action Item Strategy

Hazard	Action Item	Responsible Agency	Potential Sources of Funding	Timeframe
Flooding	Provide maintenance for ditches and waterways to avoid overflow due to sediment and debris build up.	EMA/ Incorporated Jurisdictions	Planning Commission/Engineers Office	Ongoing-Programmatic Goal
Flooding/ Lake & Stream Bank Erosion	Update flood insurance rate maps (FIRMs). Current maps are from 1970-1980 generation	EMA/Planning Commission	State or Federal Sources	Completed in 2008
Flooding/ Severe Storms/ Tornadoes	Provide back-up generators (both temporary and permanent) for pumping and lift stations in sanitary sewer systems.	EMA/Engineers Office	State or Federal Sources	2015 Estimated Timed of Completion- Not FEMA fundable
Flooding	Eliminate cross contamination of storm and sanitary sewers by eliminating CSO and SSO systems.	EMA/Engineers Office	State or Federal Sources	Not FEMA fundable
Flooding	Increase capacity of sanitary sewer lift stations to avoid overflow.	EMA/ Water and Sewer Department	State or Federal Sources	Not FEMA fundable
Flooding	Assess and inventory problems with undersized culverts within Erie County	EMA/ Planning Commission/ Engineers Office	Existing Budget	Ongoing-Countywide 2020
Flooding/ Lake & Stream Bank Erosion	Assess and inventory problems with roadways susceptible to flooding within Erie County	EMA/ Planning Commission/ Engineers Office	Existing Budget	Ongoing-Countywide 2020
Flooding	Identify and assess Pipe Creek Watershed to identify actual hazard	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek funding by 2025
Flooding	Identify and assess culverts and undersized drainage pipe property and drainage affected on Kelley's Island	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek funding by 2020
Flooding	Identify and assess Chapel Creek watershed to benefit Berlin Heights-Florence Twp.	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek funding by 2025
Flooding	Re-evaluate Franklin Flats neighborhood for a buyout program.	EMA/ County Commissioners	State or Federal Sources	Ongoing-seek funding by 2025

Hazard	Action Item	Responsible Agency	Potential Sources of Funding	Timeframe
Flooding	Identify and assess other localized flooding areas and direct tributaries to the Bay and Lake	EMA/County Commissioners	State or Federal Sources	Ongoing-seek funding by 2025
Flooding	Identify a flood notification system and a river gauge system	EMA/County Commissioners	State or Federal Sources	Ongoing-seek funding by 2025
Flooding	Foster inter-agency coordination of floodplain management (Round Table)	EMA/County Commissioners	Existing Budget	Ongoing-seek funding by 2015
Flooding	Provide public education of floodplain regulations for new construction through brochures distributed county-wide.	EMA	Existing Budget	Ongoing-2015 Estimated Time of Completion
Flooding (Ice Jams)	Evaluate the need to consider Ice Jams as concern for those communities that are affected directly from these winter flooding hazard	EMA/County Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
Karst Flooding	Identify high risk areas and evaluate land-use planning techniques to mitigate future events	EMA/County Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
Severe Storms-Summer and Winter/ Tornadoes	Provide more NOAA radios in critical facilities to move toward achieving a "Storm Ready" community status. Provide additional NOAA radios for other facilities such as private businesses	EMA/ Incorporated Jurisdictions	State or Federal Sources	Several hundred provided-Ongoing Program
Severe Storms-Summer and Winter	Evaluate the potential to develop a Countywide Program for pre-wiring structures to accept generators	EMA/ Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek funding by 2025
Severe Storms-Summer and Winter/ Tornadoes	Provide additional interoperable sirens to provide early warnings to citizens of approaching severe weather.	EMA/ Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek funding by 2025

Hazard	Action Item	Responsible Agency	Potential Sources of Funding	Timeframe
Severe Storms-Summer and Winter/ Tornadoes	Develop and provide outreach program for County residents and those in the sensitive/special needs population covering the dangers associated with severe storms.	EMA/County Commissioners	Existing budget	Ongoing Program
Severe Storms-Summer and Winter	Construct designated safe shelters that would provide protection from severe weather throughout the County.	EMA/ County Commissioners/ Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek funding by 2025
Severe Storms-Summer and Winter/ Tornadoes	Develop a tree maintenance program to prune or remove those trees recognized to be hazards.	EMA/ County Commissioners/ City of Sandusky	Existing Budget	Ongoing-seek additional funding by 2025
Severe Storms-Summer and Winter	Evaluate the need for shelters for marinas and for high tourist areas within the County	EMA/ County Commissioners/ City of Sandusky	State or Federal Sources	Ongoing-seek additional funding by 2025
Severe Storms-Summer and Winter	Develop and provide outreach on the unique weather patterns in Erie County	EMA/ County Commissioners/ City of Sandusky	Existing Budget	Ongoing Program
Tornadoes (Straight-Line Winds)	Evaluate the need for multi- use shelters for marinas and for high tourist areas within the County	EMA/ County Commissioners/ Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek additional funding by 2025
Lake & Stream Bank Erosion	Provide additional monitoring of water levels in streams and rivers with stream gauges	EMA/ USGS/County Commissioners	State or Federal Sources	Ongoing-seek additional funding by 2025
Lake & Stream Bank Erosion	Identify and evaluate areas and tributaries impacted by stormwater	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek additional funding by 2020
Lake & Stream Bank Erosion	Identify and evaluate Best Management Practices for stormwater and localized stream and lake bank erosion	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek additional funding by 2015
Lake & Stream Bank Erosion	Develop and provide educational information and promotion of urban and agricultural impacts of stormwater	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek additional funding by 2015

Hazard	Action Item	Responsible Agency	Potential Sources of Funding	Timeframe
Drought	Develop a public education program for restrictions on water usage during drought conditions.	EMA/ Planning Commission	Existing Budget	Ongoing-Countywide 2020
Drought	Develop a public education program on the hazards associated with droughts and extreme heat.	EMA/ Planning Commission	Existing Budget	Ongoing-Countywide 2020
Fire	Develop educational program for restrictions on water usage during fire events	EMA/ Planning Commission	Existing Budget	Ongoing-Countywide 2020
Earthquakes	Develop a public education program on the dangers of earthquakes	EMA/ County Commissioners	Existing Budget	Ongoing-Countywide 2020
Earthquakes	Develop and enforce appropriate building codes for structures to be constructed in seismic areas.	EMA/ County Commissioners	Existing Budget	Ongoing-Countywide 2020
Earthquakes	Evaluate the potential association of injection wells and how that is affected by earthquakes	EMA/ County Commissioners	State or Federal Sources	Ongoing-Countywide 2025
Invasive Species	Evaluate the types and effects of Invasive Species on Erie County and its residents	EMA/ County Commissioners	State or Federal Sources	Ongoing-Countywide 2025

Village of Bay View	Evaluate the need to consider Ice Jams as concern for those communities that are affected directly from these winter flooding hazard	EMA/County/Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
Village of Bay View	Identify high risk areas and evaluate land-use planning techniques to mitigate future events	EMA/County Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
Village of Bay View	Assess and inventory problems with undersized culverts within Erie County	EMA/ Planning Commission/ Engineers Office	Existing Budget	Ongoing-Countywide 2020
Village of Bay View	Develop and provide outreach program for County residents and those in the sensitive/special needs population covering the dangers associated with severe storms.	EMA/County Commissioners	Existing budget	Ongoing Program
Village of Bay View	Construct designated safe shelters that would provide protection from severe weather throughout the County.	EMA/ County Commissioners/Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek funding by 2025
Village of Bay View	Develop and provide educational information and promotion of urban and agricultural impacts of stormwater	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek additional funding by 2015
City of Bellevue	Evaluate the need to consider Ice Jams as concern for those communities that are affected directly from these winter flooding hazard	EMA/County/Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
City of Bellevue	Identify high risk areas and evaluate land-use planning techniques to mitigate future events	EMA/County Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
City of Bellevue	Assess and inventory problems with undersized culverts within Erie County	EMA/ Planning Commission/ Engineers Office	Existing Budget	Ongoing-Countywide 2020

City of Bellevue	Develop and provide outreach program for County residents and those in the sensitive/special needs population covering the dangers associated with severe storms.	EMA/County Commissioners	Existing budget	Ongoing Program
City of Bellevue	Construct designated safe shelters that would provide protection from severe weather throughout the County.	EMA/ County Commissioners/Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek funding by 2025
City of Bellevue	Develop and provide educational information and promotion of urban and agricultural impacts of stormwater	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek additional funding by 2015
Village of Berlin Heights	Evaluate the need to consider Ice Jams as concern for those communities that are affected directly from these winter flooding hazard	EMA/County/Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
Village of Berlin Heights	Identify high risk areas and evaluate land-use planning techniques to mitigate future events	EMA/County Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
Village of Berlin Heights	Assess and inventory problems with undersized culverts within Erie County	EMA/ Planning Commission/ Engineers Office	Existing Budget	Ongoing-Countywide 2020
Village of Berlin Heights	Develop and provide outreach program for County residents and those in the sensitive/special needs population covering the dangers associated with severe storms.	EMA/County Commissioners	Existing budget	Ongoing Program
Village of Berlin Heights	Construct designated safe shelters that would provide protection from severe weather throughout the County.	EMA/ County Commissioners/Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek funding by 2025
Village of Berlin Heights	Develop and provide educational information and promotion of urban and agricultural impacts of stormwater	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek additional funding by 2015

Village of Castalia	Evaluate the need to consider Ice Jams as concern for those communities that are affected directly from these winter flooding hazard	EMA/County/Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
Village of Castalia	Identify high risk areas and evaluate land-use planning techniques to mitigate future events	EMA/County Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
Village of Castalia	Assess and inventory problems with undersized culverts within Erie County	EMA/ Planning Commission/ Engineers Office	Existing Budget	Ongoing-Countywide 2020
Village of Castalia	Develop and provide outreach program for County residents and those in the sensitive/special needs population covering the dangers associated with severe storms.	EMA/County Commissioners	Existing budget	Ongoing Program
Village of Castalia	Construct designated safe shelters that would provide protection from severe weather throughout the County.	EMA/ County Commissioners/Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek funding by 2025
Village of Castalia	Develop and provide educational information and promotion of urban and agricultural impacts of stormwater	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek additional funding by 2015
City of Huron	Evaluate the need to consider Ice Jams as concern for those communities that are affected directly from these winter flooding hazard	EMA/County/Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
City of Huron	Identify high risk areas and evaluate land-use planning techniques to mitigate future events	EMA/County Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
City of Huron	Assess and inventory problems with undersized culverts within Erie County	EMA/ Planning Commission/ Engineers Office	Existing Budget	Ongoing-Countywide 2020

City of Huron	Develop and provide outreach program for County residents and those in the sensitive/special needs population covering the dangers associated with severe storms.	EMA/County Commissioners	Existing budget	Ongoing Program
City of Huron	Construct designated safe shelters that would provide protection from severe weather throughout the County.	EMA/ County Commissioners/Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek funding by 2025
City of Huron	Develop and provide educational information and promotion of urban and agricultural impacts of stormwater	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek additional funding by 2015
Kelleys Island	Evaluate the need for multi-use shelters for marinas and for high tourist areas within the County	EMA/ County Commissioners/Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek additional funding by 2025
Kelleys Island	Develop and provide outreach program for County residents and those in the sensitive/special needs population covering the dangers associated with severe storms.	EMA/County Commissioners	Existing budget	Ongoing Program
Kelleys Island	Identify and assess culverts and undersized drainage pipe property and drainage affected on Kelley's Island	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek funding by 2020
Kelleys Island	Assess and inventory problems with roadways susceptible to flooding within Erie County	EMA/ Planning Commission/ Engineers Office	Existing Budget	Ongoing-Countywide 2020
Kelleys Island	Provide NOAA radios in critical facilities to move forward on the "Storm Ready" Community status.	EMA/ County Commissioners/Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek additional funding by 2020
Kelleys Island	Develop and provide educational information and promotion of urban and agricultural impacts of stormwater	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek additional funding by 2015

Village of Milan	Evaluate the need to consider Ice Jams as concern for those communities that are affected directly from these winter flooding hazard	EMA/County/Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
Village of Milan	Identify high risk areas and evaluate land-use planning techniques to mitigate future events	EMA/County Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
Village of Milan	Assess and inventory problems with undersized culverts within Erie County	EMA/ Planning Commission/ Engineers Office	Existing Budget	Ongoing-Countywide 2020
Village of Milan	Develop and provide outreach program for County residents and those in the sensitive/special needs population covering the dangers associated with severe storms.	EMA/County Commissioners	Existing budget	Ongoing Program
Village of Milan	Construct designated safe shelters that would provide protection from severe weather throughout the County.	EMA/ County Commissioners/Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek funding by 2025
Village of Milan	Develop and provide educational information and promotion of urban and agricultural impacts of stormwater	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek additional funding by 2015
City of Sandusky	Evaluate the need to consider Ice Jams as concern for those communities that are affected directly from these winter flooding hazard	EMA/County/Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
City of Sandusky	Identify high risk areas and evaluate land-use planning techniques to mitigate future events	EMA/County Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
City of Sandusky	Assess and inventory problems with undersized culverts within Erie County	EMA/ Planning Commission/ Engineers Office	Existing Budget	Ongoing-Countywide 2020

City of Sandusky	Develop and provide outreach program for County residents and those in the sensitive/special needs population covering the dangers associated with severe storms.	EMA/County Commissioners	Existing budget	Ongoing Program
City of Sandusky	Construct designated safe shelters that would provide protection from severe weather throughout the County.	EMA/ County Commissioners/Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek funding by 2025
City of Sandusky	Develop and provide educational information and promotion of urban and agricultural impacts of stormwater	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek additional funding by 2015
City of Vermilion	Evaluate the need to consider Ice Jams as concern for those communities that are affected directly from these winter flooding hazard	EMA/County/Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
City of Vermilion	Identify high risk areas and evaluate land-use planning techniques to mitigate future events	EMA/County Commissioners	State and Federal Sources	Ongoing-2025 Estimated Time of Completion
City of Vermilion	Assess and inventory problems with undersized culverts within Erie County	EMA/ Planning Commission/ Engineers Office	Existing Budget	Ongoing-Countywide 2020
City of Vermilion	Develop and provide outreach program for County residents and those in the sensitive/special needs population covering the dangers associated with severe storms.	EMA/County Commissioners	Existing budget	Ongoing Program
City of Vermilion	Construct designated safe shelters that would provide protection from severe weather throughout the County.	EMA/ County Commissioners/Incorporated Jurisdictions	State or Federal Sources	Ongoing-seek funding by 2025
City of Vermilion	Develop and provide educational information and promotion of urban and agricultural impacts of stormwater	EMA/ Planning Commission/ Engineers Office	State or Federal Sources	Ongoing-seek additional funding by 2015

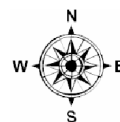
Appendix XI
Map of Erie County Dams



Ohio Dam Locator

Erie County Dams

Ohio Department of Natural Resources, Division of Soil and Water Resources



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