Multi-Hazard Mitigation Plan

Lake County

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Lake County Emergency
Management Agency
2900 West 93rd Street
Crown Point, Indiana
46307-1854

The Polis Center
IUPUI
1200 Waterway Boulevard
Suite 100
Indianapolis, IN 46202

Multi-Hazard Mitigation Plan

Lake County, Indiana

Adoption Date: -- _____ --

Primary Point of Contact

Jodi Richmond
Director
Lake County Emergency Management Agency
2900 West 93rd Street
Crown Point, Indiana 46307-1854
P: 219-755-3549
F: 219-755-3559
lcemajodi@yahoo.com

Secondary Point of Contact

Gerry Scheub
Lake County Commissioner
219-755-3055

Prepared by:

The Polis Center
1200 Waterway Boulevard, Suite 100
Indianapolis, IN 46202
317-274-2455

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1.0 INTRODUCTION

Hazard mitigation is defined as any sustained action to reduce or eliminate long-term risk to human life and property from hazards. The Federal Emergency Management Agency (FEMA) has made reducing hazards one of its primary goals; hazard mitigation planning and the subsequent implementation of resulting projects, measures, and policies is a primary mechanism in achieving FEMA's goal.

The Multi-Hazard Mitigation Plan (MHMP) is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA2K). The development of a local government plan is required in order to maintain eligibility for certain federal disaster assistance and hazard mitigation funding programs. In order for National Flood Insurance Program (NFIP) communities to be eligible for future mitigation funds, they must adopt an MHMP.

In the past decade, FEMA has declared a number of emergencies and disasters for the state of Indiana. Emergency declarations allow states access to FEMA funds for Public Assistance (PA); disaster declarations allow for even more PA funding including Individual Assistance (IA) and the Hazard Mitigation Grant Program (HMGP). Lake County has received federal aid for both PA and IA funding for 12 declared disasters since 1998. Figure 1-1 depicts the disasters and emergencies that have been declared for Lake County within the past decade. Table 1-1 lists more specific information for each declaration.

Figure 1-1: FEMA-Declared Emergencies and Disasters in Lake County (1998-2009)

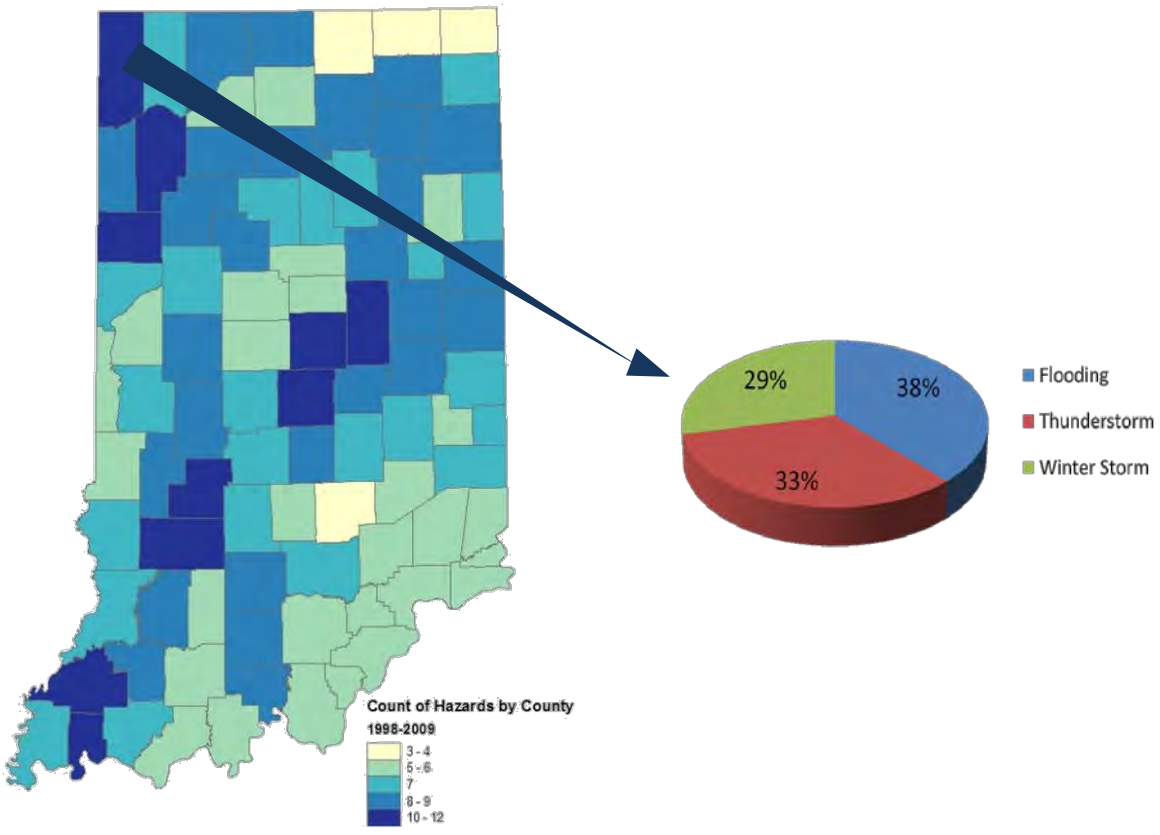


Table 1-1: FEMA-Declared Emergencies in Lake County (1998-2009)

Date of Incident	Date of Declaration	Disaster Description	Type of Assistance
03/09/98 – 03/12/98	05/08/98	Severe Winter Storms	Public
01/01/99 – 01/31/99	01/15/99	Severe Winter Storms	Public
12/11/00 – 12/31/00	01/24/01	Severe Winter Storms	Public
07/04/03 – 08/06/03	07/11/03	Severe Storms, Tornadoes, and Flooding	Individual
05/25/04 – 06/25/04	06/03/04	Severe Storms, Tornadoes, and Flooding	Individual
01/01/05 – 02/11/05	01/21/05	Severe Winter Storms and Flooding	Individual
09/12/06 – 09/14/06	10/06/06	Severe Storms and Flooding	Individual
02/12/07 – 02/14/07	03/12/07	Severe Winter Storms	Public
08/15/07 – 08/27/07	11/30/07	Severe Storms and Flooding	Individual
01/07/08 – 01/31/08	01/30/08	Severe Storms and Flooding	Individual
09/12/08 – 10/06/08	09/23/08	Severe Storms and Flooding	Individual and Public
03/08/09	04/22/09	Severe Storms, Tornadoes, and Flooding	Individual

2.0 PREREQUISITES

It is intended that this plan meet the requirements of the Disaster Mitigation Act of 2000 (DMA2K) and that each incorporated jurisdiction adopt it. Appendix G includes adopting resolutions. Table 2-1 lists the incorporated communities included in this multi-jurisdictional plan.

Table 2-1: Participating Jurisdictions

Jurisdiction Name
County of Lake
Town of Cedar Lake
City of Crown Point
Town of Dyer
City of East Chicago
City of Gary
Town of Griffith
City of Hammond
Town of Highland
City of Hobart
City of Lake Station
Town of Lowell
Town of Merrillville
Town of Munster
Town of New Chicago
Town of Schererville
Town of Schneider
Town of St. John
City of Whiting
Town of Winfield

2.1 MULTI-JURISDICTIONAL PLAN ADOPTION

The draft plan was made available at the public meeting, which was held March 16, 2010, to the planning team and the general public for review. Comments were then accepted. The Lake County hazard mitigation planning team presented and recommended the plan to the city and town officials of each jurisdiction for adoption. Resolution adoptions and adoption dates are included in Appendix G of this plan.

2.2 JURISDICTION PARTICIPATION

It is required that each jurisdiction participates in the planning process. A representative was chosen for each community to attend meetings and serve as the point of contact. Table 2-2 lists each jurisdiction and describes the respective representative's participation in the construction of this plan.

Table 2-2: Jurisdiction Participation

Jurisdiction Name	Participating Member	Participation Description
Lake County	Jodi Richmond	Member, MHMP planning committee
Cedar Lake	Ian Nicolini	Member, MHMP planning committee
Crown Point	Daniel Niksch	Member, MHMP planning committee
Dyer	Brian Lane	Member, MHMP planning committee
East Chicago	Herbie Cruz	Member, MHMP planning committee
Gary	Alan McCoy	Attended meetings, organized resources
Griffith	George Jerome	Attended meetings, offered mitigation strategies
Hammond	Becky McKinley	Member, MHMP planning committee
Highland	Bill Timmer	Attended meetings, offered mitigation strategies
Hobart	Mike Frank	Attended meetings, offered mitigation strategies
Lake Station	Jim Meyer	Attended meetings, offered mitigation strategies
Lowell	Charlie Price	Attended meetings, offered mitigation strategies
Merrillville	Howard Fink	Attended meetings, offered mitigation strategies
Munster	Dave Pelc	Attended meetings, offered mitigation strategies
New Chicago	Dan Sebbens	Attended meetings, offered mitigation strategies
Schererville	Joe Kruzan	Member, MHMP planning committee
Schneider	Richard Wright	Attended meetings, offered mitigation strategies
St. John	Jason Dravet	Attended meetings, offered mitigation strategies
Whiting	Mark Harbin	Attended meetings, offered mitigation strategies
Winfield	Heidi Kendall	Attended meetings, offered mitigation strategies

All members of the MHMP planning committee were actively involved in attending the MHMP meetings, providing available Geographic Information Systems (GIS) data and historical hazard information, reviewing and providing comments on the draft plans, coordinating and participating in the public input process, and coordinating the county's formal adoption of the plan.

3.0 PLANNING PROCESS

The Lake County Emergency Management Agency and The Polis Center (Polis) at Indiana University Purdue University Indianapolis (IUPUI) have joined efforts to develop this mitigation plan, realizing that the recognition of and the protection from hazards impacting the county and its residents contribute to future community and economic development.

The planning process was organized by Polis and facilitated by the Lake County Emergency Management Agency (EMA) and consisted of the following tasks:

Task 1: Organize Resources
The Lake County EMA created a planning team to attend meetings, gather data and historical information, review drafts, and participate in mitigation brainstorming sessions.

Task 2: Risk Assessment
The planning team identified the natural and technological hazards to include in this plan, and Polis developed hazard event profiles to address the possible magnitudes and severities associated with each hazard. Polis then used local resources to inventory the county's assets and estimate losses.

Task 3: Develop Mitigation Strategies
Polis met with representatives of each community to develop and prioritize mitigation strategies and action items that would reduce the costs of disaster response and recovery, protect people and infrastructure, and minimize overall disruption to the county in the event of a disaster.

Task 4: Public Involvement
The public was invited to attend a meeting to review the draft document. Comments were accepted before Polis forwarded the final plan to the Indiana Department of Homeland Security (IDHS) and the Federal Emergency Management Agency (FEMA) for approval.

3.1 PLANNING TEAM

The Lake County Multi-Hazard Mitigation Planning Team is headed by Jodi Richmond, who is the EMA Director and the primary point of contact. Members of the planning team include representatives from various county departments, cities and towns, and public and private utilities. Table 3-1, on the following page, identifies the planning team individuals and the organizations they represent.

Table 3-1: Multi-Hazard Mitigation Planning Team Members

Name	Title	Organization	Jurisdiction
Jodi Richmond	Director	Lake County EMA	Lake County
Gerry Scheub	Commissioner, President	Lake County Commissioners	Lake County
George Van Til	Surveyor	Lake County Surveyor's Office	Lake County
Alice Dahl	Trustee	Cedar Creek Township	Lake County
Ian Nicolini	Town Admin	Town Board	Cedar Lake
Daniel Niksch	GIS Tech	City of Crown Point	Crown Point
Brian Lane	GIS Tech	Town of Dyer	Dyer
Herbie Cruz	Director	East Chicago EMA	East Chicago
Alan McCoy	EMS Coordinator	Calumet Township	Lake County/Gary
Becky McKinley	GIS Manager	Hammond Sanitary District	Hammond
Charlie Price	Chief	Lowell Fire Department	Lowell
Keith Soderquist	Mayor	City of Lake Station	Lake Station
Dave Pelc	EMA	Town of Munster	Munster
Joe Kruzan	Fire Chief	Schererville Fire Department	Schererville
Heidi Kendall	Office Manager/Deputy Clerk-Treasurer	Town of Winfield	Winfield

DMA2K planning regulations stress that planning team members must be active participants. The Lake County MHMP committee members were actively involved on the following components:

- Attending the MHMP meetings
- Providing available GIS data and historical hazard information
- Reviewing and providing comments on the draft plans
- Coordinating and participating in the public input process
- Coordinating the formal adoption of the plan by the county

An MHMP kickoff meeting was held at the Lake County Homeland Security/Emergency Management Agency building on May 29, 2009. Representatives from Polis explained the rationale behind the MHMP program and answered questions from the participants. Polis also described the timeline and the process of the mitigation planning project and presented Lake County with a Memorandum of Understanding (MOU) for sharing data and information.

The Lake County Multi-Hazard Mitigation Planning Committee met several times throughout the planning process in various locations. Because Lake County has so many incorporated jurisdictions, Polis conducted group meetings and meetings with individual communities to ensure that each community had an opportunity to participate. Each meeting was approximately one hour in length. During these meetings, the planning team successfully identified critical facilities, reviewed hazard data and maps, identified and assessed the effectiveness of existing mitigation measures, established mitigation projects, and assisted with preparation of the public participation information. Meeting minutes are available in Appendix A.

3.2 PUBLIC INVOLVEMENT

An effort was made to solicit public input during the planning process, and two public meetings were held on March 16, 2010 to review the county's risk assessment. At the request of the planning team members, and to provide travel options to the public in northern and southern areas of the county, one meeting was held in the City of Gary; the other meeting was held in the City of Crown Point. Appendix A contains the minutes from both public meetings. Appendix B contains the advertisements of the meetings in local newspapers.

3.3 NEIGHBORING COMMUNITY INVOLVEMENT

The Lake County planning team invited participation from various representatives of county government, local city and town governments, community groups, local businesses, and universities. The Northwest Indiana Regional Planning Commission (NIRPC) also played a role in coordinating participation from neighboring communities. NIRPC hosts monthly meetings to discuss strategic planning of transportation, environment, and community in northwest Indiana. Throughout this planning process, the monthly meetings were also an opportunity to discuss Lake County's MHMP and the pre-disaster mitigation program in general. Details of neighboring stakeholders' involvement are summarized in Table 3-2.

Table 3-2: Neighboring Community Participation

Person Participating	Neighboring Jurisdiction	Organization	Participation Description
Ray Chambers	Newton County	Newton County EMA	Reviewed draft of plan; made comments and suggestions
Phil Griffith	Porter County	Porter County EMA	Reviewed draft of plan; made comments and suggestions

3.4 REVIEW OF TECHNICAL AND FISCAL RESOURCES

The MHMP planning team has identified representatives from key agencies to assist in the planning process. Technical data, reports, and studies were obtained from these agencies. The organizations and their contributions are summarized in Table 3-3.

Table 3-3: Key Agency Resources Provided

Agency Name	Resources Provided
Indiana Department of Homeland Security	Provided repetitive loss information
Indiana Department of Natural Resources, Division of Water	Digital Flood maps and levee information
Indiana Geological Survey	GIS data, digital elevation models
United States Geological Survey	Historical flood data and documentation
Lake County Surveyor Office	Local GIS data; historical flood data and documentation

3.5 REVIEW OF EXISTING PLANS

Lake County and its local communities utilized a variety of planning documents to direct community development. These documents include land use plans, comprehensive plans,

emergency response plans, municipal ordinances, and building codes. The planning process also incorporated the existing natural hazard mitigation elements from previous planning efforts. Table 3-4 lists the plans, studies, reports, and ordinances used in the development of the plan.

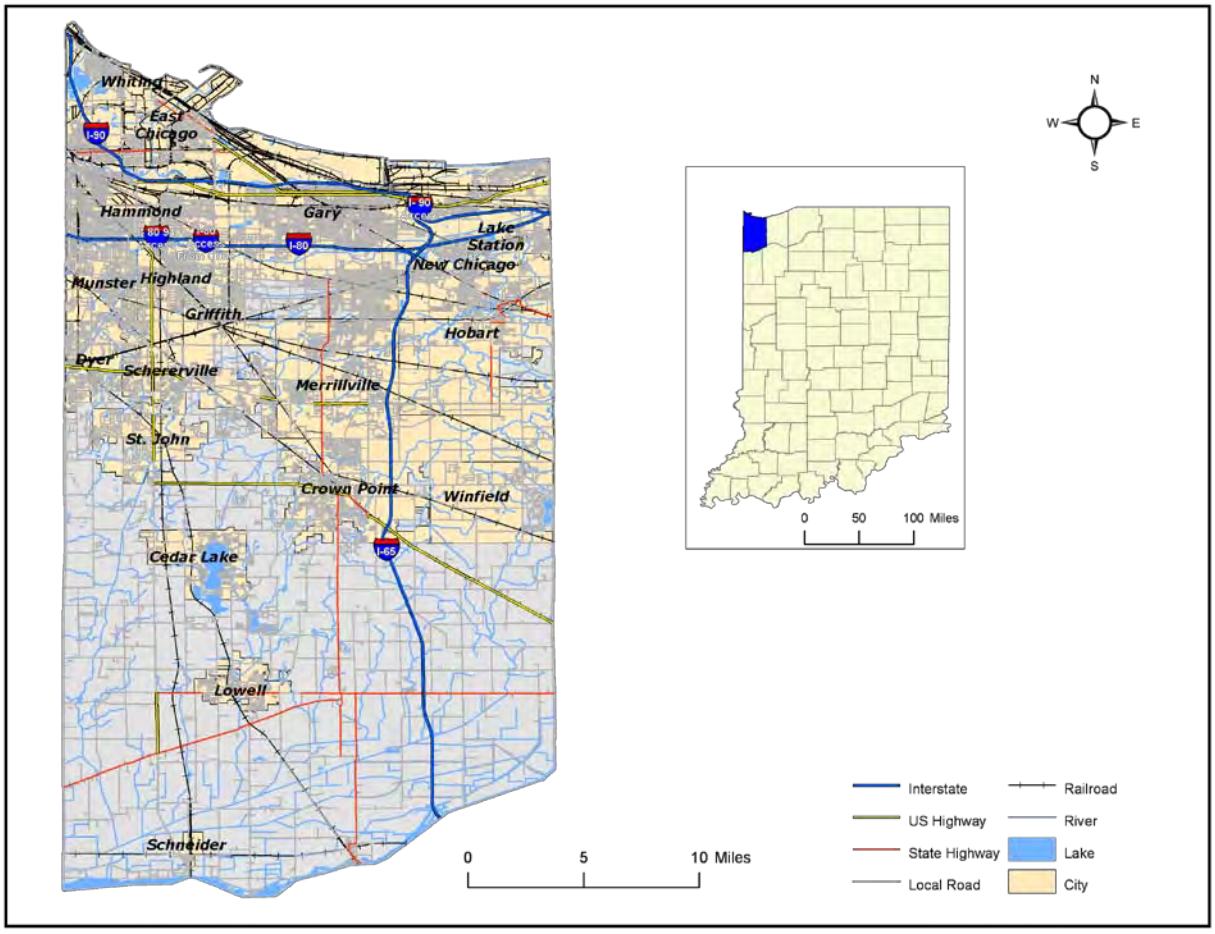
Table 3-4: Planning Documents Used for MHMP Planning Process

Author(s)	Year	Title	Description	Where Used
Lake County Emergency Management Agency	2003	Comprehensive Hazard Analysis	Identifies hazards and provides community profile, risk assessment, and impact analysis	County profile, risk assessment
Lake County Emergency Management Agency	2003	Comprehensive Emergency Management Plan	Addresses response and recovery in the event of hazards	County profile, risk assessment, community capability assessment
Lake County Emergency Management Agency	2003	Comprehensive Plan	Identified existing and future land use	County profile
Christopher B. Burke Engineering, Ltd	2007	Town of Dyer Multi-Hazard Mitigation Plan	Identifies hazards and provides community profile, risk assessment, and impact analysis	County profile, risk assessment, community capability assessment
Christopher B. Burke Engineering, Ltd	2007	City of Hammond Multi-Hazard Mitigation Plan	Identifies hazards and provides community profile, risk assessment, and impact analysis	County profile, risk assessment, community capability assessment
American Structurepoint, Inc.	2009	Lake Station Multi-Hazard Mitigation Plan	Identifies hazards and provides community profile, risk assessment, and impact analysis	County profile, risk assessment, community capability assessment
Little Calumet River Basin Development Commission	2009	N/A	A newsletter providing an update of the Little Calumet River Basin project and its benefits	Risk assessment, mitigation strategies
Town of Munster	2010	Town of Munster Comprehensive Plan	Outlines the Little Calumet River project and its future goals and benefits	Risk assessment, mitigation strategies
Town of Cedar Lake	2007	Cedar Lake Comprehensive Plan	Provides land use description	Section 6.0
City of Crown Point	2008	Crown Point Comprehensive Plan	Provides land use description	Section 6.0
Town of Highland	2009	Highland Redevelopment District Comprehensive Plan	Describes riverfront redevelopment plan and provides maps	Section 6.0
Town of Schererville	2009	Schererville Comprehensive Plan	Describes land use and provides maps	Section 6.0

4.0 COUNTY PROFILE

Lake County, named for Lake Michigan, was organized in 1837; Crown Point is the county seat. The county is part of the Greater Chicago metropolitan area and consists of 19 diverse incorporated communities, as well as a large unincorporated area. Located in the northwestern corner of the state, it is bounded by Cook and Will counties (Illinois) to the west, Porter County to the east, Jasper County to the southeast, Newton County to the south, and Kankakee County (Illinois) to the southwest. Lake Michigan is the northern boundary. A map of Lake County is depicted in Figure 4-1.

Figure 4-1: Lake County, Indiana



4.1 TOPOGRAPHY

Lake Michigan is the most prominent geographical feature of northwest Indiana. It provides both commercial and recreational opportunities for county residents and tourists. To the south, the region is bordered by the Kankakee River, northwest Indiana's largest river. Originally an important transportation and fur trading route, the Kankakee River today serves primarily recreation and irrigation purposes.

Lake County has rich and fertile soil ideal for farming. While much of this land has been encroached upon by residential communities and commercial developments, parts of the region most distant from Chicago and the shores of Lake Michigan are still dominated by farmland.

Source: Lake County Comprehensive Plan

4.2 CLIMATE

In Lake County, mid-summer temperatures can be excessively hot and winter snowfall can vary greatly from one year to the next. Humidity averages 60% for mid-afternoon and rises during the evening with dawn humidity around 80%. The possibility for sunshine is 70% in the summer and 45% in the winter. Rainfall is moderately heavy and averages 45 inches annually, falling mostly during the spring and summer months. The average seasonal snowfall is 39 inches. The prevailing wind is from the south-southwest at an average speed of 10 miles per hour.

Source: http://www.city-data.com/city/Gary-Indiana.html

4.3 DEMOGRAPHICS

Lake County has a population of 493,800. According to STATS Indiana, from 1990–2000, Lake County experienced a population increase of 1.9%. The population is spread through 11 townships including Calumet, Cedar Creek, Center, Eagle Creek, Hanover, Hobart, North, Ross, St. John, West Creek, and Winfield. The breakdown of population by incorporated areas is included in Table 4-1.

Table 4-1: Population by Community

Community	2008 Population	% of County
Cedar Lake	10,981	2.2%
Crown Point	23,376	4.9%
Dyer	15,913	3.2%
East Chicago	29,978	6.1%
Gary	95,920	19.4%
Griffith	16,311	3.3%
Hammond	76,732	15.5%
Highland	22,641	4.6%
Hobart	27,891	5.6%
Lake Station	13,246	2.7%
Lowell	8,405	1.7%
Merrillville	33,057	6.7%
Munster	23,592	4.5%
New Chicago	1,992	0.4%
St. John	12,999	2.6%
Schererville	28,886	5.9%
Schneider	296	0.1%
Whiting	4,751	1.0%
Winfield	4,484	0.9%

Source: STATS Indiana, 2008

4.4 ECONOMY

STATS Indiana reported for 2007 that 87.6% of the workforce in Lake County was employed in the private sector. The breakdown is included in Table 4-2. Health care and social services represent the largest sector, employing approximately 13.6% of the workforce, but manufacturing generates the most profit at approximately 22.1% of the earnings. The 2007 annual per capita income in Lake County is $31,833 compared to an Indiana average of $33,215.

Table 4-2: Industrial Employment by Sector

Industrial Sector	% of County Workforce (2007)
Agriculture, forestry, fishing, hunting, and mining	0.2%
Construction	7.1%
Manufacturing	10.7%
Wholesale trade	2.9%
Retail trade	12.5%
Transportation, warehousing and utilities	4.0%
Information	0.9%
Professional and technical	3.9%
Educational, health, and social services	13.6%
Arts, entertainment, recreation, accommodation and food services	10.7%
Other services(except public administration)	21.2%
Public administration	12.2%

Source: STATS Indiana, 2007

4.5 INDUSTRY

Lake County's major employers and number of employees are listed in Table 4-3. The largest employer is U.S. Steel, which has nearly 5,300 employees. Arcelor Mittal Steel is the second largest with 5,100 full-time employees.

Table 4-3: Major Employers

Company Name	Location	Employees	Type of Business
US Steel	Gary	5,300	Steel manufacture
Arcelor Mittal Steel	East Chicago	5,100	Steel manufacture
Community Hospital	Munster	2,800	Health care
Horseshoe Casino	Hammond	2,800	Recreation
St. Margaret Mercy Health Centers	Hammond	2,600	Health care
Methodist Hospitals	Gary	2,000	Health care
BP	Whiting	1,800	Petroleum refining
Ameristar Casino	East Chicago	1,600	Recreation
Majestic Star Casinos	Gary	1,400	Recreation
NIPSCO	Hammond	1,300	Energy distribution

Source: Lake County Chamber of Commerce, 2006

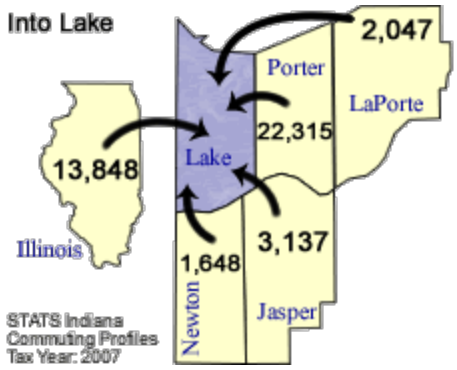
4.6 COMMUTER PATTERNS

According to STATS Indiana information from 2007, Lake County has approximately 302,954 residents who are in the work force. Of these, approximately 240,616 work in the county. Roughly 62,338 residents commute outside the county for work and 45,961 non-residents commute into the county to work. Figure 4-2 depicts the commuting patterns into and out of the top five surrounding jurisdictions.

Figure 4-2: Commuter patterns into and out of Lake County

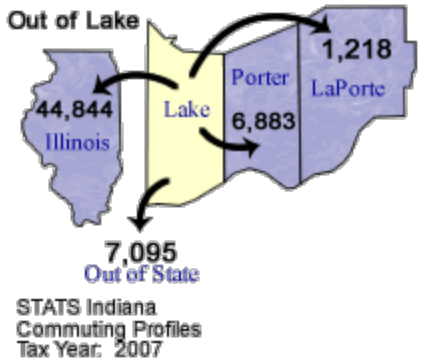
Top five counties sending workers INTO Lake County:

Porter County	22,315
Illinois	13,848
Jasper County	3,137
LaPorte County	2,047
Newton County	1,648
Total of above	42,995 workers
(15.0% of Lake County work force)	



Top five counties receiving workers FROM Lake County:

Illinois	44,844
Out of State	7,095
Porter County	6,883
LaPorte County	1,218
Tippecanoe County	304
Total of above	60,344 workers
(19.9% of Lake County labor force)	



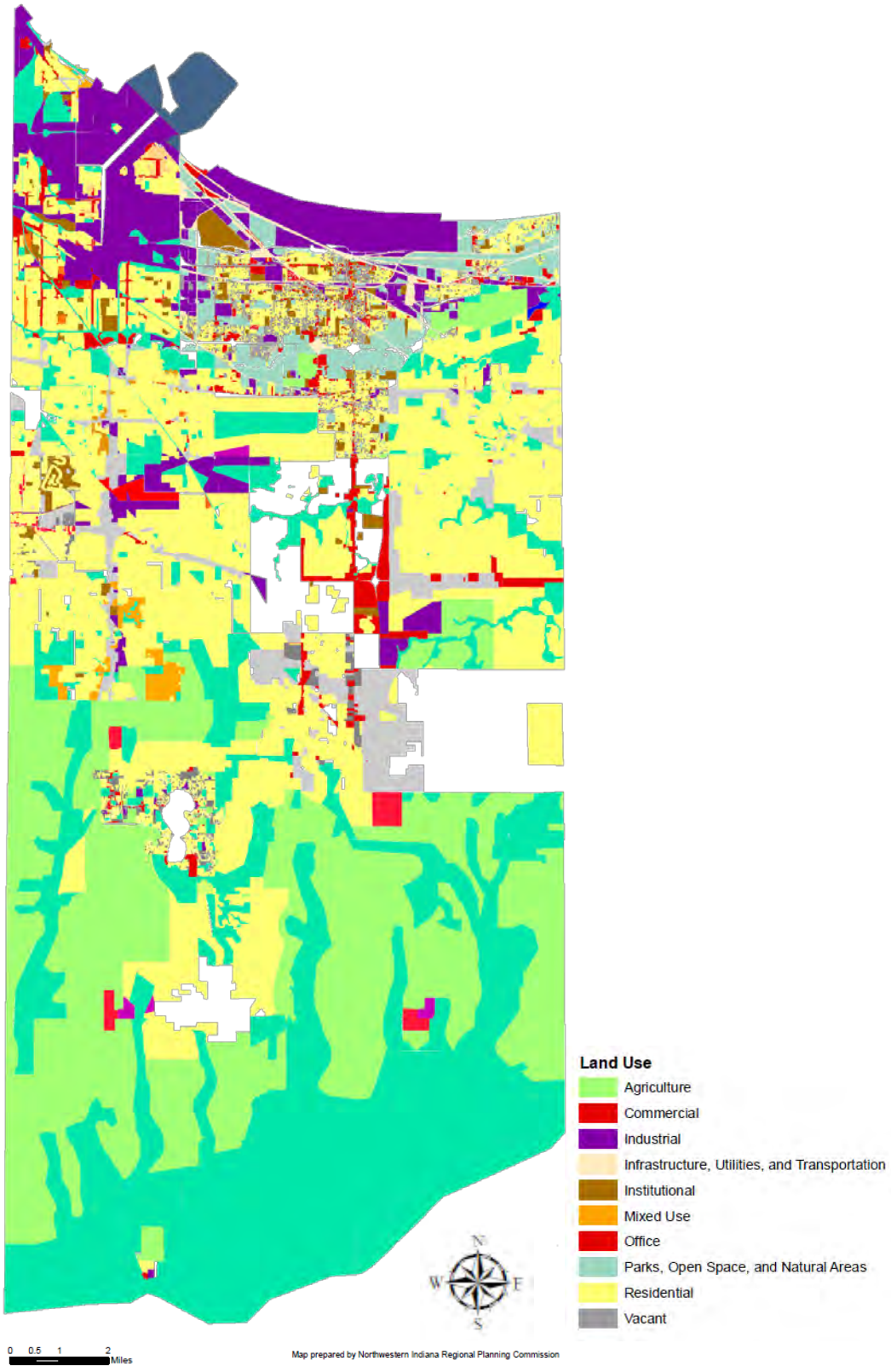
4.7 LAND USE AND DEVELOPMENT TRENDS

Lake County's land area, 328,960 acres, spans approximately 16 miles from east to west and 32 miles from north to south. Major industrial cities are Gary, Hammond, Whiting, and East Chicago. Approximately 50% of the land in Lake County is highly arable and used as farmland, primarily in the southern region. Business and industrial uses along with residential are concentrated in the northern portion.

Lake County is built on former marsh and swampland. Settlers in the mid-nineteenth century drained these marshes with numerous ditches in order to access the fertile loam underneath. This land was then cultivated, with much of the harvest sold to the expanding Chicago metropolitan market. As more land was cleared and urban sprawl crept across state lines, business and residential development took advantage of these cleared spaces to pave and commercialize much of the area.

Figure 4-3 depicts Lake County's existing land use map.

Figure 4-3: Lake County Existing Land Use



Lake County has more than 30 manmade ditches. Each of these ditches exposes nearby communities to the risk of flooding on a yearly basis. Northwest Indiana has been designated a federal disaster area on several occasions throughout its history, primarily for flooding, and is currently listed in two active major disasters areas.

The most significant development in Lake County is the Little Calumet River Basin Development federal project, which was authorized for construction in the 1986 Water Resources Development Act and is designed to provide structural flood protection up to the 200-year level along the Little Calumet River from the Illinois state line to Martin Luther King Drive in Gary. The project is being constructed in eight geographic stages consisting of 29 construction contracts.

The completed project will feature the following:

- 9.7 miles of setback levees in Gary and Griffith
- 12.2 miles of levees and floodwalls in Hammond, Highland, and Munster
- Flow diversion structure at Hart Ditch confluence in Hammond/Munster
- Modification of four major highway bridges along the river corridor to permit better flow
- 16.8 miles of recreational hiking/bicycle trails

The project's outcome will protect more than 9,500 structures, set within 3,500 acres of land, from flooding. It will create a 2,000-acre river/recreation corridor system and allow more than 1,500 acres of land to be reclaimed for economic development uses along the Borman corridor. And finally, it will mitigate costly flood-related damages and bring more than $65 million in federal construction/improvement contract to northwest Indiana.

Source: Little Calumet River Basin Development Commission, January 20, 2009

The figure to the right depicts Stage VIII of the Little Calumet flood control project. This stage, expected to be completed in mid-2011, consists of the construction of earthen levees, sheet pile walls, concrete and sheet pile floodwalls, access ramps and roads, gatewell structures, outlet improvements, drainage ditches, riprap for erosion control, and other miscellaneous tasks. The location of Stage VIII is between the Indiana-Illinois state line and Columbia Avenue.

Source: U.S. Army Corps of Engineers, http://www.lrc.usace.army.mil/projects/little_cal/stage_8.htm

4.8 MAJOR LAKES, RIVERS, AND WATERSHEDS

Lake County is bounded on the north by Lake Michigan and has a number of smaller lakes, rivers, and streams including, but not limited to, Cedar Lake, Lake Dalecarlia, Lake Holiday and Lake George; the Grand Calumet and Little Calumet rivers; Turkey Creek, Deep River, and North Creek.

The county crosses three HUC08 watersheds: Little Calumet-Galien, Chicago, and Kankakee. A list of 14-digit Hydrologic Unit Code (HUC) watersheds is included in Table 4-4.

Source: http://water.usgs.gov

Table 4-4: Watersheds

Watershed Name	HUC Code
Lake Michigan Shoreline-Ind Harbor Canal	04040001020010
Grand Calumet River-Gary	04040001020020
Turkey Creek-Headwaters (Lake)	04040001030010
Turkey Creek-Merrillville	04040001030020
Main Beaver Dam Ditch-Headwaters	04040001030030
Main Beaver Dam Ditch-Niles Ditch	04040001030040
Deep River-Deer Creek	04040001030050
Deep River-Lake George Dam	04040001030060
Duck Creek (Lake)	04040001040010
Deep River-Little Calumet River	04040001040020
Burns Ditch-Willow Creek	04040001040030
Lake Michigan-Its Waters, Bays & Islands	04060200010010
Cobb Creek-Breyfogel Ditch	07120001090150
Kankakee River-Brown Levee Ditch	07120001110020
Kankakee River-Roselawn	07120001110030
Kankakee River-Beaver(lower)/Best Ditches	07120001120040
Dike Ditch (Williams Ditch-ILL)	07120001120050
East Branch Stony Run	07120001130010
Eagle Creek-Stony Run	07120001130020
Singleton Ditch-Bryant Ditch	07120001130030
Spring Run	07120001130040
Greisel Ditch	07120001130050
Lake Dalecarlia-Cedar Lake	07120001130060
Singleton Ditch-Cedar Creek Ditch	07120001130070
Singleton Ditch-Bruce/Bailey Ditches	07120001130080
Brown Ditch (Lake)	07120001130090
West Creek-Bull Run	07120001140010
West Creek-Klaasville	07120001140020
West Creek-Singleton Ditch	07120001140030
Singleton Ditch-Bull Creek-Hayden Ditch	07120001150020
Singleton Ditch-Bull Creek-Hayden Ditch	07120001150020
Plum Creek-Klemme Creek	07120003030020

Watershed Name	HUC Code
Hart Ditch (Plum Creek)-Dyer Ditch	07120003030030
Cady Marsh Ditch	07120003030040
Little Calumet River (E-W Split)	07120003030050
Little Calumet River-Indiana/Illinois Line	07120003030060
Thorn Creek-North Creek	07120003040040
Grand Calumet River - West	07120003050010

Source: U.S. Geological Survey HUC14 Watersheds, 2006

5.0 RISK ASSESSMENT

The goal of mitigation is to reduce the future impacts of a hazard including loss of life, property damage, disruption to local and regional economies, and the expenditure of public and private funds for recovery. Sound mitigation must be based on sound risk assessment. A risk assessment involves quantifying the potential loss resulting from a disaster by assessing the vulnerability of buildings, infrastructure, and people.

In recognition of the importance of planning in mitigation activities, FEMA created **Ha**zards **US**A **M**ulti-**H**azard (HAZUS-MH), a powerful geographic information system (GIS)-based disaster risk assessment tool. This tool enables communities of all sizes to predict estimated losses from floods, hurricanes, earthquakes, and other related phenomena and to measure the impact of various mitigation practices that might help reduce those losses. The Indiana Department of Homeland Security has determined that HAZUS-MH should play a critical role in Indiana's risk assessments. The Polis Center (Polis) at Indiana University Purdue University-Indianapolis (IUPUI) assisted Lake County planning staff with performing the hazard risk assessment. This assessment identifies the characteristics and potential consequences of a disaster, how much of the community could be affected by a disaster, and the impact on community assets. A risk assessment consists of three components—hazard identification, vulnerability analysis, and risk analysis.

5.1 IDENTIFYING HAZARDS

5.1.1 Existing Plans

To facilitate the planning process, pre-existing plans were used for this risk assessment section. These existing plans included Lake County Comprehensive Emergency Management Plan (CEMP) and Hazard Analysis (November 2003) and Indiana digital flood maps.

Previous planning efforts associated with the development of the 2003 Lake County Hazard Analysis identified the principal natural hazards to Lake County (in order of likelihood): 1) thunderstorm hazards, including lightning, severe winds, and tornadoes; and 2) severe winter weather, including ice and sleet storms and snowstorms.

The plan also identified Lake County's principal technological hazards (in order of likelihood): 1) hazardous materials events, both fixed-site and transportation-related; and 2) petroleum/natural gas pipeline accidents.

5.1.2 National Climatic Data Center (NCDC) Records

To assist the planning team in identifying hazards, historical storm event data was compiled from the National Climatic Data Center (NCDC). NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather events.

The NCDC data included 306 reported events in Lake County between January 1, 1960 and October 1, 2009. A summary table of events related to each hazard type is included in the hazard profile sections that follow. A full table listing all events, including additional details, is included as Appendix C. In addition to NCDC data, Storm Prediction Center (SPC) data associated with tornadoes, strong winds, and hail were plotted using SPC recorded latitude and longitude. These events are plotted and included as Appendix D. NCDC hazards are included in Table 5-1.

Table 5-1: Climatic Data Center Historical Hazards

Hazard
Tornadoes
Severe Thunderstorms
Drought/Extreme Heat
Winter Storms
Flood/Flash flood

5.1.3 Hazard Ranking Methodology

During the mitigation meeting held on July 27, 2009, the planning team reviewed historical hazards information and participated in a risk analysis using a projector and Excel spreadsheet. The spreadsheet listed the compiled NCDC data for each community. Because there were few records of significant occurrences of drought and/or extreme heat, the planning team chose not to address them as a potential disaster in this multi-hazard mitigation plan.

The spreadsheet calculated the probability rating (Low, Medium, High) of each hazard based on the number of events that have occurred in the county within the past 50 years. Throughout the planning process, the MHMP team had the opportunity to add more accurate local information. For example, the NCDC records often list the locations of hazards such as floods under the county, not accounting for how the individual communities were affected. In such situations, the local community planning representative adjusted the probability rating assigned to the county based on specific jurisdiction considerations.

Team consensus was also important in determining the probability of hazards not recorded by NCDC, e.g. dam and levee failure and hazardous materials spills. The probabilities for these hazardous events were determined by the planning team's estimation, derived from local experience and records, of the number of historical events that have occurred within the past 50 years. The probability ratings are based on the following guidelines:

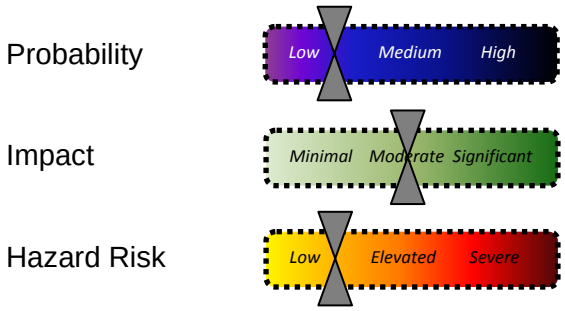
- Low = 0-5 events
- Medium = 6-15 events
- High = 16+ events

The team determined each hazard's potential impact on the communities. The impact rating (Minimal, Moderate, Significant) was based on the following guidelines.

- Minimal = Few injuries
  Critical facilities shut down for 24 hours
  Less than 15% of property damage
- Moderate = Multiple injuries
  Critical facilities shut down for 1-2 weeks
  At least 30% of property damaged
- Significant = Multiple deaths
  Critical facilities shut down for more than 1 month
  More than 50% of property damaged

Finally, the overall hazard risk was determined by multiplying probability and impact. It is important to consider both probability and impact when determining risk. For example, if an asteroid were to collide with Earth, the impact would be extreme; but the probability of an asteroid strike (has not happened in billions of years) is so negligibly small that the overall risk is extremely low. There has never been a situation in human history in which a person was killed by a meteor. In contrast, other potentially damaging events like thunderstorms and floods are relatively less severe, but have occurred regularly in many places.

Each hazard addressed within the plan will use sliding scales to represent the probability, impact, and overall risk ratings. The scales will be depicted as follows:



The planning team identified flooding, thunderstorms, and winter storms as the three most significant hazards affecting Lake County. The hazard rankings are listed in Table 5-2.

Table 5-2: Lake County Hazards

HAZARD CATEGORIES	HAZARD PROBABILITY	HAZARD IMPACT	HAZARD RISK
	Low, Medium, High	Minimal, Moderate, Significant	Low, Elevated, Severe
Lake County (ALL)			
Tornado	High	Significant	Severe
Flood	High	Significant	Severe
Dam/Levee Failure	Medium	Moderate	Elevated
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	High	Significant	Severe
Structural Failure & Fires	High	Moderate	Severe
Cedar Lake			
Tornado	High	Significant	Severe
Flood	High	Moderate	Severe
Dam/Levee Failure	Low	Moderate	Low
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Medium	Moderate	Elevated
Structural Failure & Fires	High	Minimal	Low
Crown Point			
Tornado	High	Significant	Severe
Flood	Medium	Moderate	Elevated
Dam/Levee Failure	Low	Minimal	Low
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Medium	Moderate	Elevated
Structural Failure & Fires	High	Moderate	Severe
Dyer			
Tornado	High	Significant	Severe
Flood	High	Moderate	Severe
Dam/Levee Failure	Low	Minimal	Low
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Medium	Moderate	Elevated
Structural Failure & Fires	High	Moderate	Severe
East Chicago			
Tornado	High	Significant	Severe
Flood	High	Moderate	Severe
Dam/Levee Failure	Low	Minimal	Low
Earthquake	Low	Moderate	Low

HAZARD CATEGORIES	HAZARD PROBABILITY	HAZARD IMPACT	HAZARD RISK
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	High	Significant	Severe
Structural Failure & Fires	High	Significant	Severe
Gary			
Tornado	High	Significant	Severe
Flood	High	Moderate	Severe
Dam/Levee Failure	Low	Significant	Elevated
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	High	Significant	Severe
Structural Failure & Fires	High	Significant	Severe
Griffith			
Tornado	High	Significant	Severe
Flood	High	Significant	Severe
Dam/Levee Failure	Low	Significant	Elevated
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Significant	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Medium	Significant	Elevated
Structural Failure & Fires	Medium	Moderate	Elevated
Hammond			
Tornado	High	Significant	Severe
Flood	High	Significant	Severe
Dam/Levee Failure	Low	Significant	Elevated
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	High	Significant	Elevated
Structural Failure & Fires	High	Moderate	Severe
Highland			
Tornado	High	Significant	Severe
Flood	High	Significant	Severe
Dam/Levee Failure	Low	Significant	Elevated
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Medium	Significant	Elevated
Structural Failure & Fires	Medium	Moderate	Elevated
Hobart			
Tornado	High	Significant	Severe
Flood	High	Significant	Severe

HAZARD CATEGORIES	HAZARD PROBABILITY	HAZARD IMPACT	HAZARD RISK
Dam/Levee Failure	Medium	Significant	Elevated
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Medium	Moderate	Elevated
Structural Failure & Fires	Medium	Moderate	Elevated
Lake Station			
Tornado	High	Significant	Severe
Flood	High	Significant	Severe
Dam/Levee Failure	High	Significant	Severe
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	High	Significant	Severe
Structural Failure & Fires	Medium	Moderate	Elevated
Lowell			
Tornado	High	Significant	Severe
Flood	High	Significant	Severe
Dam/Levee Failure	Medium	Significant	Elevated
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Medium	Moderate	Elevated
Structural Failure & Fires	Medium	Moderate	Elevated
Merrillville			
Tornado	High	Significant	Severe
Flood	High	Significant	Severe
Dam/Levee Failure	Low	Moderate	Low
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Medium	Moderate	Elevated
Structural Failure & Fires	Medium	Moderate	Elevated
Munster			
Tornado	High	Significant	Severe
Flood	High	Significant	Severe
Dam/Levee Failure	Medium	Significant	Elevated
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Medium	Moderate	Elevated
Structural Failure & Fires	Medium	Moderate	Elevated

HAZARD CATEGORIES	HAZARD PROBABILITY	HAZARD IMPACT	HAZARD RISK
New Chicago			
Tornado	Medium	Significant	Elevated
Flood	Medium	Moderate	Elevated
Dam/Levee Failure	Low	Minimal	Low
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Low	Moderate	Low
Structural Failure & Fires	Low	Moderate	Low
Schererville			
Tornado	High	Significant	Severe
Flood	High	Significant	Severe
Dam/Levee Failure	Low	Minimal	Low
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Medium	Moderate	Elevated
Structural Failure & Fires	Medium	Moderate	Elevated
Schneider			
Tornado	High	Significant	Severe
Flood	Medium	Moderate	Elevated
Dam/Levee Failure	Low	Significant	Elevated
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Low	Moderate	Low
Structural Failure & Fires	Medium	Moderate	Elevated
St. John			
Tornado	High	Significant	Severe
Flood	Medium	Moderate	Elevated
Dam/Levee Failure	Low	Minimal	Low
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Low	Moderate	Low
Structural Failure & Fires	Low	Minimal	Low
Whiting			
Tornado	High	Significant	Severe
Flood	Medium	Minimal	Low
Dam/Levee Failure	Low	Minimal	Low
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe

HAZARD CATEGORIES	HAZARD PROBABILITY	HAZARD IMPACT	HAZARD RISK
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Medium	Significant	Elevated
Structural Failure & Fires	Medium	Significant	Elevated
Winfield			
Tornado	High	Significant	Severe
Flood	Medium	Moderate	Elevated
Dam/Levee Failure	Low	Significant	Elevated
Earthquake	Low	Moderate	Low
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Moderate	Severe
Winter Weather (snow & ice)	High	Significant	Severe
Hazardous Materials Release	Low	Moderate	Low
Structural Failure & Fires	Medium	Moderate	Elevated

5.1.4 GIS and HAZUS-MH

The risk assessment quantifies the risk to the county's population, infrastructure, and economy. Where possible, the hazards were quantified using GIS analyses and HAZUS-MH. This process reflects a Level 2 approach to analyzing hazards, which includes substitution of selected default data with local data. This process improved the accuracy of the model predictions.

HAZUS-MH generates a combination of site-specific and aggregated loss estimates depending upon the analysis options that are selected and the input that is provided by the user. Aggregate inventory loss estimates, which include building stock analysis, are based upon the assumption that building stock is evenly distributed across census blocks/tracts. Therefore, it is possible that overestimates of damage will occur in some areas while underestimates will occur in other areas. Therefore, total losses tend to be more reliable over larger geographic areas than for individual census blocks/tracts. It is important to note that HAZUS-MH is not intended to be a substitute for detailed engineering studies. Rather, it is intended to serve as a planning aid for communities interested in assessing their risks to flood-, earthquake-, and hurricane-related hazards. This documentation does not provide full details on the processes and procedures completed in the development of this project. It is only intended to highlight the major steps that were followed during the project.

Site-specific analysis is based upon loss estimations for individual structures. For flooding, analysis of site-specific structures takes into account the depth of water in relation to the structure. HAZUS-MH also considers the actual dollar exposure to the structure for the costs of building reconstruction, content, and inventory. However, damages are based upon the assumption that each structure will fall into a structural class, and structures in each class will respond in a similar fashion to a specific depth of flooding or ground shaking.

Site-specific analysis is also based upon a point location rather than a polygon; therefore, the model does not account for the percentage of a building that is inundated. These assumptions suggest that the loss estimates for site-specific structures as well as for aggregate structural losses need to be viewed as approximations of losses that are subject to considerable variability rather than as exact engineering estimates of losses to individual structures.

The following events were analyzed for Lake County. The parameters for these scenarios were created though GIS, HAZUS-MH, and historical information to predict which communities would be at risk.

Using HAZUS-MH
1. 100-year overbank flooding
2. Earthquake scenarios

Using GIS
1. Tornado
2. Hazardous material release

Using Historical Information
1. Tornado
2. Flood and Dam/Levee
3. Earthquake
4. Thunderstorm
5. Winter Storm
6. Fire

5.2 ASSESSING VULNERABILITY

The HAZUS-MH data is based on best available national data sources. The initial step involved updating the default HAZUS-MH data using State of Indiana data sources. At the first mitigation meeting, the planning team members were provided with a plot and report of all HAZUS-MH critical facilities. The planning team took GIS data provided by The Polis Center; verified the datasets using local knowledge, and allowed The Polis Center to use their local GIS data for additional verification. Polis GIS analysts made these updates and corrections to the HAZUS-MH data tables prior to performing the risk assessment. These changes to the HAZUS-MH inventory reflect a Level 2 analysis. This update process improved the accuracy of the model predictions.

The default HAZUS-MH data has been updated as follows:

- The HAZUS-MH defaults, critical facilities, and essential facilities have been updated based on the most recent available data sources. Critical and essential point facilities have been reviewed, revised, and approved by local subject matter experts at each county.
- The critical facility updates (schools, medical care facilities, fire stations, police stations, and EOCs) have been applied to the HAZUS-MH model data. HAZUS-MH reports of essential facility losses reflect updated data.

The default aggregate building inventory tables have been replaced with the most recent Assessor records. Lake County provided the parcel boundaries to The Polis Center, and Indiana Department of Local Government and Finance provided the Lake County Assessor records. Records without improvements were deleted. The parcel boundaries were converted to parcel points located in the centroids of each parcel boundary. Each parcel point was linked to an Assessor record based upon matching parcel numbers. The generated building inventory points

represent the approximate locations (within a parcel) of building exposure. The parcel points were aggregated by census block.

Parcel-matching results for Lake County are listed in Table 5-3.

Table 5-3: Parcel-Matching for Lake County

Data Source	Count
Assessor Records	252,235
County Provided Parcels	250,759
Assessor Records with Improvements	197,870
Matched Parcel Points	181,474

The following assumptions were made during the analysis:

- The building exposure is determined from the Assessor records. It is assumed that the population and the buildings are located at the centroid of the parcel.
- The algorithm used to match county-provided parcel point locations with the Assessor records is not perfect. The results in this analysis reflect matched parcel records only. The parcel-matching results for Lake County are included in Table 5-3.
- Population counts are based upon 2.5 persons per household. Only residential occupancy classes are used to determine the impact on the local population. If the event were to occur at night, it would be assumed that people are at home (not school, work, or church).
- The analysis is restricted to the county boundaries. Events that occur near the county boundaries do not contain damage assessments from adjacent counties.

5.2.1 Essential Facilities List

Table 5-4 identifies the essential facilities that were added or updated for the analysis. Essential facilities are a subset of critical facilities. Maps of critical facilities are included as Appendix E.

Table 5-4: Essential Facilities List

Facility	Number of Facilities
Care Facilities	75
Emergency Operations Centers	13
Fire Stations	44
Police Stations	32
Schools	199

5.2.2 Facility Replacement Costs

Facility replacement costs and total building exposure are identified in Table 5-5. The replacement costs have been updated by local data. Table 5-5 also includes the estimated number of buildings within each occupancy class.

The Assessor records often do not distinguish parcels by occupancy class when the parcels are not taxable; therefore, the total number of buildings and the building replacement costs for government, religious/non-profit, and education may be underestimated.

Table 5-5: Building Exposure

General Occupancy	Estimated Total Buildings	Total Building Exposure (X 1000)
Agricultural	1,107	$218,672
Commercial	9,212	$6,347,013
Education	196	$1,647,544
Government	1,255	$1,262,028
Industrial	1,533	$9,883,870
Religious/Non-Profit	1,982	$1,166,546
Residential	165,653	$34,137,060
Total	**180,938**	**$54,662,733**

5.3 PROFILING HAZARDS

5.3.1 TORNADO HAZARD

Hazard Definition

Tornadoes pose a great risk to the state of Indiana and its citizens. Tornadoes can occur at any time during the day or night. They can also happen during any month of the year. The unpredictability of tornadoes makes them one of Indiana's most dangerous hazards. Their extreme winds are violently destructive when they touch down in the region's developed and populated areas. Current estimates place the maximum velocity at about 300 miles per hour, but higher and lower values can occur. A wind velocity of 200 miles per hour will result in a wind pressure of 102.4 pounds per square foot of surface area—a load that exceeds the tolerance limits of most buildings. Considering these factors, it is easy to understand why tornadoes can be so devastating for the communities they hit.

Tornadoes are defined as violently-rotating columns of air extending from thunderstorms to the ground. Funnel clouds are rotating columns of air not in contact with the ground; however, the violently-rotating column of air can reach the ground very quickly and become a tornado. If the funnel cloud picks up and blows debris, it has reached the ground and is a tornado.

Tornadoes are classified according to the Fujita tornado intensity scale. The tornado scale ranges from low intensity F0 with effective wind speeds of 40 to 70 miles per hour to F5 tornadoes with effective wind speeds of over 260 miles per hour. The Fujita intensity scale is included in Table 5-6.

Table 5-6: Fujita Tornado Rating

Fujita Number	Estimated Wind Speed	Path Width	Path Length	Description of Destruction
0 *Gale*	40-72 mph	6-17 yards	0.3-0.9 miles	Light damage, some damage to chimneys, branches broken, sign boards damaged, shallow-rooted trees blown over.
1 *Moderate*	73-112 mph	18-55 yards	1.0-3.1 miles	Moderate damage, roof surfaces peeled off, mobile homes pushed off foundations, attached garages damaged.
2 *Significant*	113-157 mph	56-175 yards	3.2-9.9 miles	Considerable damage, entire roofs torn from frame houses, mobile homes demolished, boxcars pushed over, large trees snapped or uprooted.
3 *Severe*	158-206 mph	176-566 yards	10-31 miles	Severe damage, walls torn from well-constructed houses, trains overturned, most trees in forests uprooted, heavy cars thrown about.
4 *Devastating*	207-260 mph	0.3-0.9 miles	32-99 miles	Complete damage, well-constructed houses leveled, structures with weak foundations blown off for some distance, large missiles generated.
5 *Incredible*	261-318 mph	1.0-3.1 miles	100-315 miles	Foundations swept clean, automobiles become missiles and thrown for 100 yards or more, steel-reinforced concrete structures badly damaged.

Source: NOAA Storm Prediction Center

Previous Occurrences for Tornado Hazard

There have been several occurrences of tornadoes within Lake County during the past few decades. The NCDC database reported 22 tornadoes/funnel clouds in Lake County since 1950. On August 4, 2008, the Town of Griffith was struck hard by an F2 tornado, which touched down northeast of the intersection of Ridge Road and Cline Avenue. Damage was reported to residences, businesses, and vegetation. At the Griffith Park Plaza Mall, windows were blown out of a row of stores and a portion of a roof was blown off a vacant store. The area east of the mall in the subdivision along and north of 37th Avenue near Lafayette Avenue and Rensselaer Avenue sustained some of the strongest wind damage from this tornado.

August 2008 tornado in Griffith,
Source: Town of Highland Community Blog

The Lake County NCDC recorded tornadoes are identified in Table 5-7. Additional details for NCDC events are included in Appendix C.

Table 5-7: Lake County Tornadoes*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Lake	11/13/1951	Tornado	F2	0	0	250K	0
Lake	6/1/1954	Tornado	F2	0	0	25K	0
Lake	3/14/1957	Tornado	F1	0	0	25K	0
Lake	7/12/1957	Tornado	F2	0	0	250K	0
Lake	6/16/1960	Tornado	F1	0	0	3K	0
Lake	4/23/1961	Tornado	F3	0	0	25K	0
Lake	6/22/1961	Tornado	F1	0	1	3K	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Lake	7/20/1962	Tornado	F2	0	0	25K	0
Lake	11/12/1965	Tornado	F3	0	14	250K	0
Lake	7/13/1966	Tornado	F2	0	0	25K	0
Lake	6/20/1974	Tornado	F3	0	5	250K	0
Lake	3/4/1976	Tornado	F1	0	0	25K	0
Lake	3/12/1976	Tornado	F2	0	0	3K	0
Lake	6/29/1976	Tornado	F0	0	0	3K	0
Lake	6/30/1977	Tornado	F2	0	1	2.5M	0
Lake	6/30/1977	Tornado	F1	0	0	3K	0
Lake	6/8/1981	Tornado	F1	0	0	250K	0
Lake	10/17/1981	Tornado	F1	0	0	25K	0
Beecher II	4/25/1994	Tornado	F1	0	0	50K	0
Merrillville	8/25/2001	Tornado	F1	0	2	100K	0
Hammond	5/30/2003	Tornado	F0	0	0	0	0
Griffith	8/4/2008	Tornado	F2	0	0	1.0M	0K

** NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.*

Geographic Location for Tornado Hazard

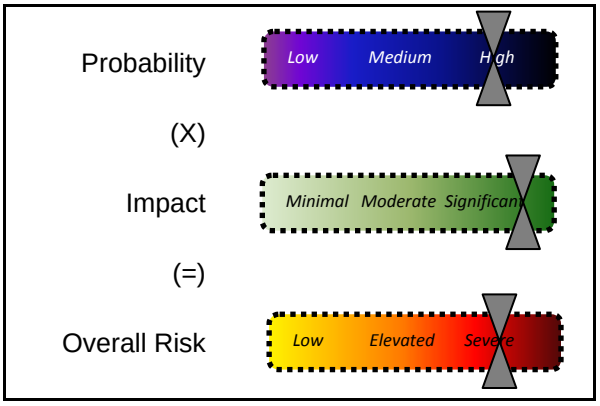
The majority of the county has the same risk for occurrence of tornadoes; however, the area adjacent to Lake Michigan has a lower incidence of tornadoes due to lake effects.

Hazard Extent for Tornado Hazard

The historical tornadoes generally moved from southwest to northeast across the county. The extent of the hazard varies both in terms of the extent of the path and the wind speed.

Risk Identification for Tornado Hazard

Based on historical information, the probability of a tornado is high Tornadoes with varying magnitudes are expected to happen. In Meeting #2, the planning team determined that the potential impact of a tornado is significant; therefore, the overall risk of a tornado hazard for Lake County is severe.



Vulnerability Analysis for Tornado Hazard

Tornadoes can occur within any area in the county; therefore, the entire county population and all buildings are vulnerable to tornadoes. To accommodate this risk, this plan will consider all

buildings located within the county as vulnerable. The existing buildings and infrastructure in Lake County are discussed in Table 5-5.

Critical Facilities

All critical facilities are vulnerable to tornadoes. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts will vary based on the magnitude of the tornado but can include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Table 5-4 lists the types and numbers of all of the essential facilities in the area. Critical facility names and locations are included in Appendix E.

Building Inventory

The building exposure in terms of types and numbers of buildings for the entire county is listed in Table 5-5. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, and loss of building function (e.g. damaged home will no longer be habitable causing residents to seek shelter).

Infrastructure

During a tornado the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable, it is important to emphasize that any number of these items could become damaged during a tornado. The impacts to these items include broken, failed, or impassable roadways, broken or failed utility lines (e.g. loss of power or gas to community), and railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic.

HAZUS-MH Tornado Analysis

For Lake County, The Polis Center conducted two analyses in HAZUS-MH: one with a tornado path through northern Lake County; one through southern Lake County. The following analyses gauge the anticipated impacts of tornadoes in the county, in terms of numbers and types of buildings and infrastructure.

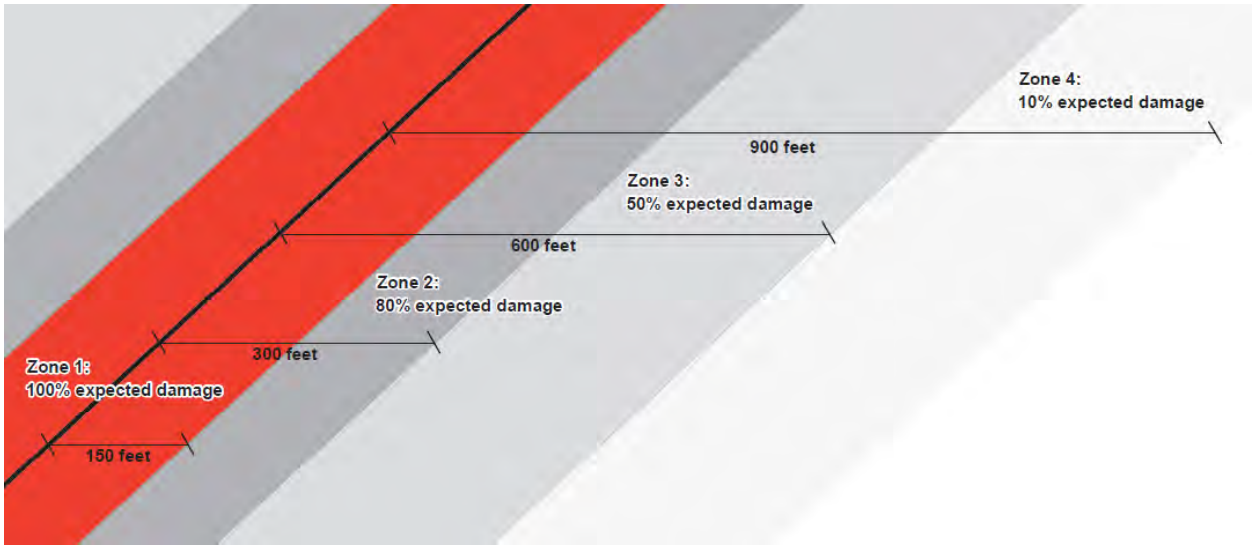
Both analyses used GIS overlay modeling to determine the potential impacts of an F4 tornado. The selected widths were modeled after a recreation of the Fujita-Scale guidelines based on conceptual wind speeds, path widths, and path lengths. There is no guarantee that every tornado will fit exactly into one of these six categories. Table 5-8 depicts tornado damage curves as well as path widths.

Table 5-8: Tornado Path Widths and Damage Curves

Fujita Scale	Path Width (feet)	Maximum Expected Damage
F-5	3000	100%
F-4	2400	100%
F-3	1800	80%
F-2	1200	50%
F-1	600	10%
F-0	300	0%

Within any given tornado path there are degrees of damage. The most intense damage occurs within the center of the damage path with a decreasing amount of damage away from the center of the path. This natural process was modeled in GIS by adding damage zones around the tornado path. Figure 5-1 and Table 5-9 describe the zone analysis.

Figure 5-1: GIS Analysis Using Tornado Buffers



Once the hypothetical route is digitized on the map, several buffers are created to model the damage functions within each zone.

An F4 tornado has four damage zones. Total devastation is estimated within 150 feet of the tornado path. The outer buffer is 900 feet from the tornado path, within which buildings will experience 10% damage.

Table 5-9: Tornado Zones and Damage Curves

Zone	Buffer (feet)	Damage Curve
1	0-150	100%
2	150-300	80%
3	300-600	50%
4	600-900	10%

Tornado Analysis in Northern Lake County

The first analysis used a hypothetical path based upon an F4 tornado event that ran for 6.3 miles through the communities of Munster and Griffith. The selected hypothetical tornado path is depicted in Figure 5-2, and a section of the damage curve buffers are shown in Figure 5-3.

Figure 5-2: Hypothetical F4 Tornado Path in Lake County

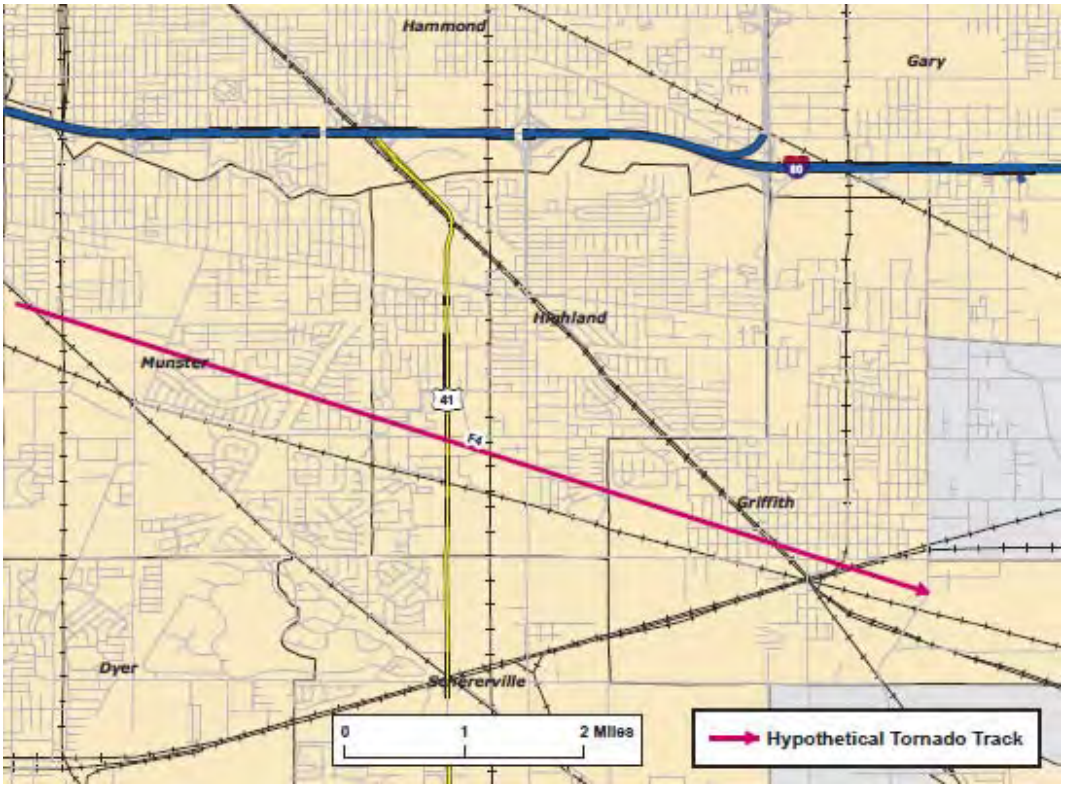
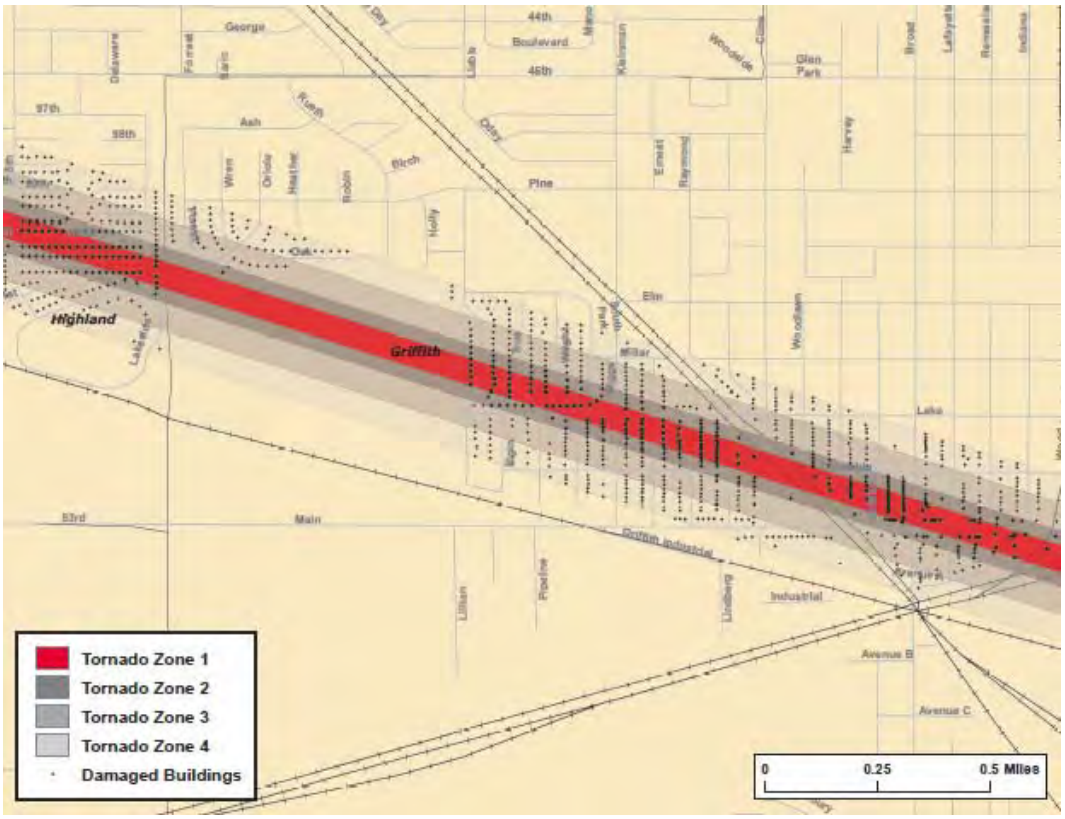


Figure 5-3: Modeled F4 Tornado Damage Buffers in Lake County



The results of the analysis are depicted in Tables 5-10 and 5-11. The GIS analysis estimates that 2,918 buildings will be damaged. The estimated building losses were $1.1 billion. The building losses are an estimate of building replacement costs multiplied by the percentages of damage. The overlay was performed against parcels provided by Lake County that were joined with Assessor records showing property improvement.

The Assessor records often do not distinguish parcels by occupancy class if the parcels are not taxable. For purposes of analysis, the total number of buildings and the building replacement costs for government, religious/non-profit, and education should be lumped together.

Table 5-10: Estimated Numbers of Buildings Damaged by Occupancy Type

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	489	435	884	820
Commercial	77	35	82	52
Industrial	6	5	6	5
Agriculture	0	0	0	0
Religious	2	0	4	6
Government	3	2	0	1
Education	2	0	0	2
Total	**579**	**477**	**976**	**886**

Table 5-11: Estimated Building Losses by Occupancy Type (x1000)

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$217,183	$158,376	$372,738	$20,926
Commercial	$150,643	$16,556	$106,720	$3,532
Industrial	$1,355	$12,865	$2,287	$577
Agriculture	$0	$0	$0	$0
Religious	$0	$0	$1,278	$5,390
Government	$1,003	$2,091	$0	$43
Education	$6,723	$0	$0	$1,586
Total	**$376,907**	**$189,887**	**$483,024**	**$32,054**

There are 16 critical facilities located within 900 feet of the hypothetical tornado path. The model predicts that four medical care facilities, three communications, two EOCs, two fire departments, one hazardous material, one police department, and three schools that would be damaged. The affected facilities are identified in Table 5-12, and their geographic locations are shown in Figures 5-4 and 5-5.

Table 5-12: Estimated Critical Facilities Affected

Exposed Critical Facilities	
Care Facilities	Community Hospital, Munster
	Community Surgery Center, LLC, Munster
	The Community Hospital (Ambulance), Munster
	Transitional Care Center at Community, Munster
Communication Facilities	Police Department, Griffith
	Unknown Cell Tower, Munster
	Central Fire Station, Griffith
EOC Facilities	Griffith EOC
	Munster Public Works
Fire Departments	Griffith Station #1
	Munster Fire Department Station II
Hazardous Materials Sites	LaSalle Steel Co. – Fluid Power Ops
Police Departments	Griffith Police Department
Schools	Franklin Elementary School, Griffith
	Allen J Warren Elementary School, Highland
	Frank H Hammond Elementary School, Munster

Figure 5-4: Critical Facilities within Tornado Path in Munster

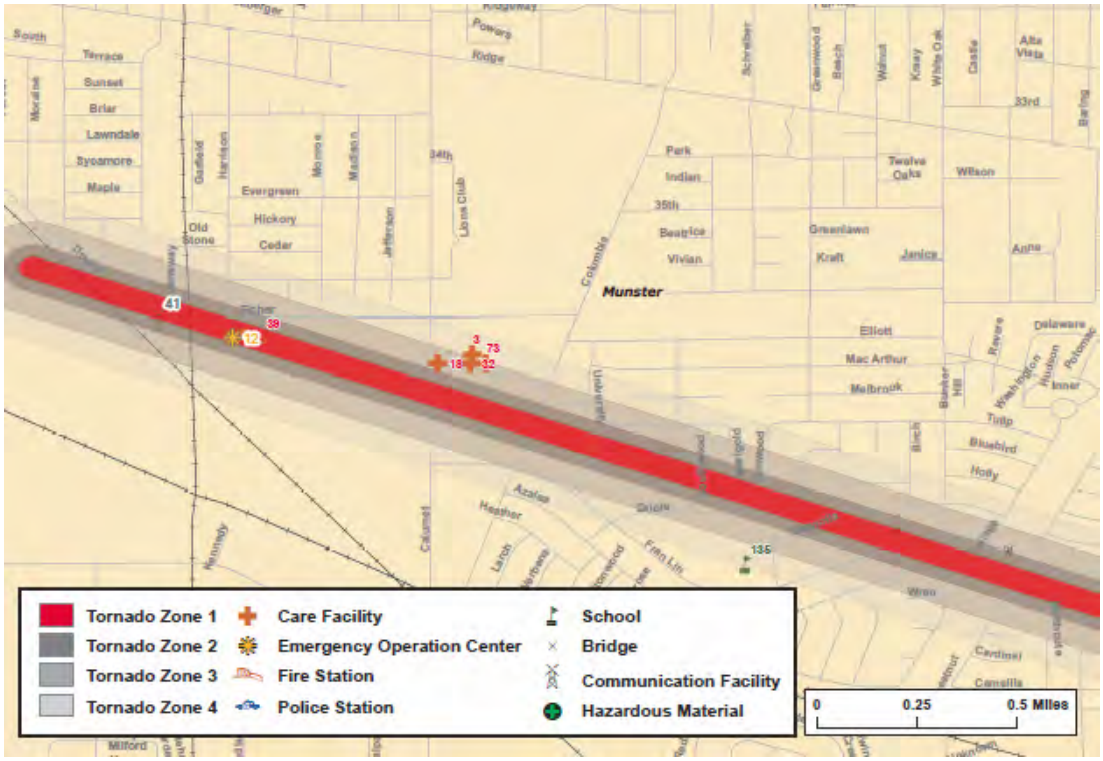
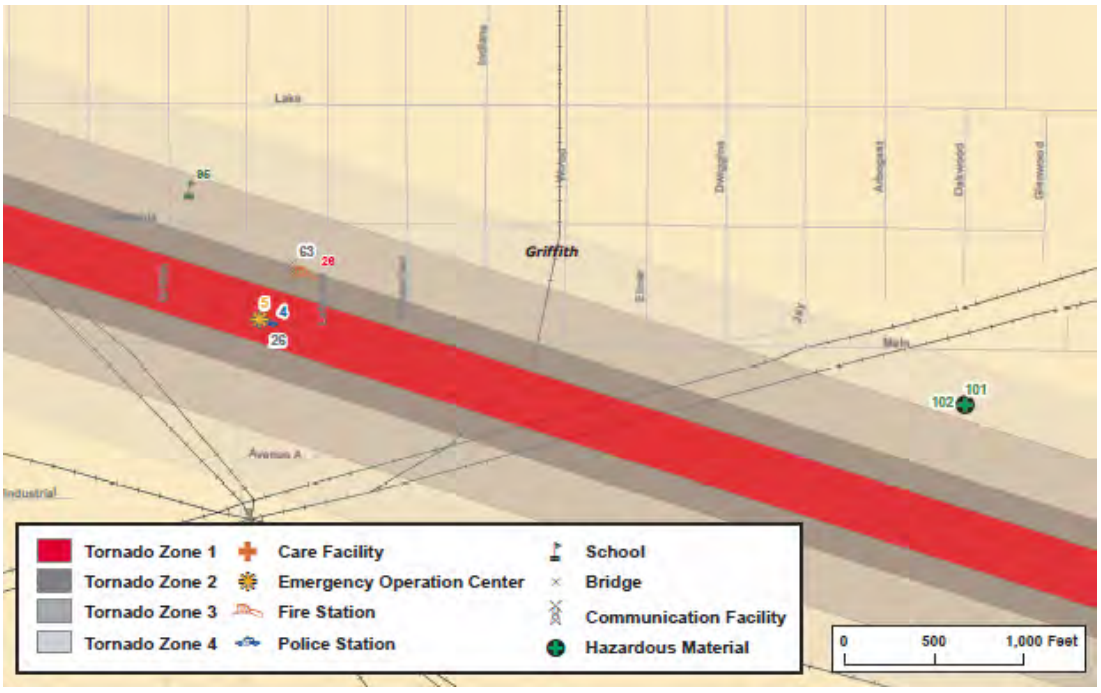


Figure 5-5: Critical Facilities within Tornado Path in Griffith



Tornado Analysis in Southern Lake County

The second analysis used a hypothetical path based upon an F4 tornado event that ran for 14 miles through the communities of Lowell and Crown Point. The selected hypothetical tornado path is depicted in Figure 5-6, and a section of the damage curve buffers is shown in Figure 5-7.

Figure 5-6: Hypothetical F4 Tornado Path in Lake County

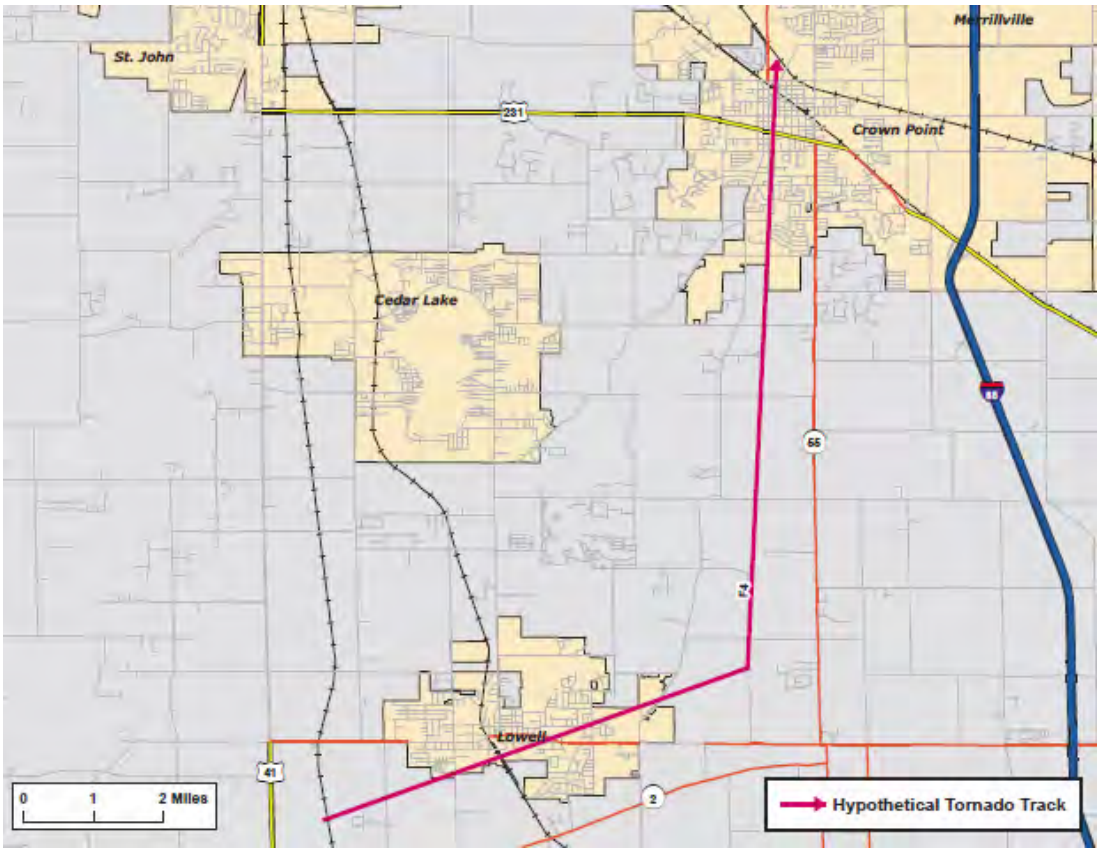
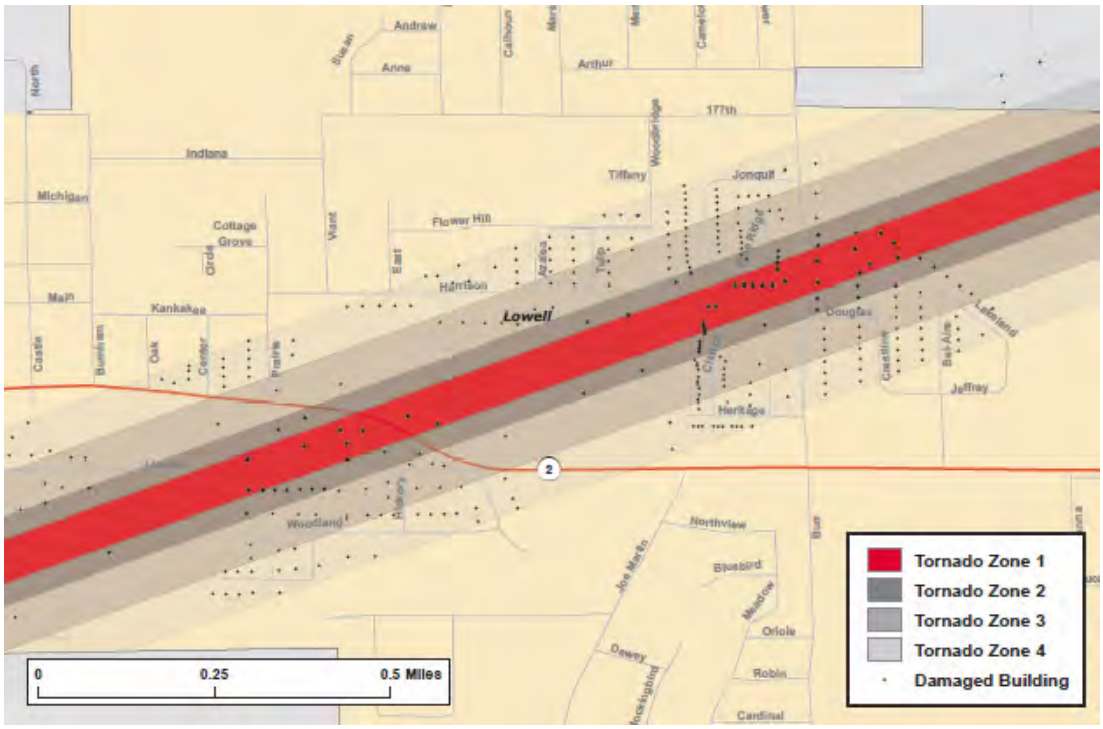


Figure 5-7: Modeled F4 Tornado Damage Buffers in Lowell



The results of the analysis are depicted in Tables 5-13 and 5-14. The GIS analysis estimates that 1,842 buildings will be damaged. The estimated building losses were $250 million. The building losses are an estimate of building replacement costs multiplied by the percentages of damage. The overlay was performed against parcels provided by Lake County that were joined with Assessor records showing property improvement.

The Assessor records often do not distinguish parcels by occupancy class if the parcels are not taxable. For purposes of analysis, the total number of buildings and the building replacement costs for government, religious/non-profit, and education should be lumped together.

Table 5-13: Estimated Numbers of Buildings Damaged by Occupancy Type

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	205	197	448	671
Commercial	33	58	106	78
Industrial	0	3	2	1
Agriculture	4	1	4	3
Religious	0	2	3	1
Government	7	5	1	5
Education	1	0	2	1
Total	**250**	**266**	**566**	**760**

Table 5-14: Estimated Building Losses by Occupancy Type (x1000)

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$39,109	$21,929	$39,287	$25,421
Commercial	$21,409	$26,056	$41,278	$4,651
Industrial	$0	$10,779	$462	$13
Agriculture	$603	$132	$307	$33
Religious	$0	$1,247	$0	$0
Government	$3,231	$4,726	$9	$99
Education	$6,063	$0	$2,556	$488
Total	**$70,416**	**$64,869**	**$83,899**	**$30,706**

There are 14 critical facilities located within 900 feet of the hypothetical tornado path. The model predicts that four medical care facilities, one communications facility, two fire departments, two police departments, and five schools that would be damaged. The affected facilities are identified in Table 5-15, and their geographic locations are shown in Figures 5-8 and 5-9.

Table 5-15: Estimated Critical Facilities Affected

Exposed Critical Facilities	
Care Facilities	St Anthony Medical Center of Crown Point
	APAC Surgery Center II, Crown Point
	St. Anthony Medical Center (Ambulance), Crown Point
	St Anthony Home, Crown Point
Communication Facilities	Fire Station (siren), Lowell
Fire Departments	Crown Point City Fire Department
	Lowell Fire Department
Police Departments	Lowell Police Department
	Crown Point Police Department
Schools	Oak Hill Elementary School, Lowell
	Lowell Middle School, Lowell
	Robert Taft Middle School, Crown Point
	Dwight D Eisenhower Elementary School, Crown Point
	Saint Mary School, Crown Point

Figure 5-8: Critical Facilities within Tornado Path (Lowell)

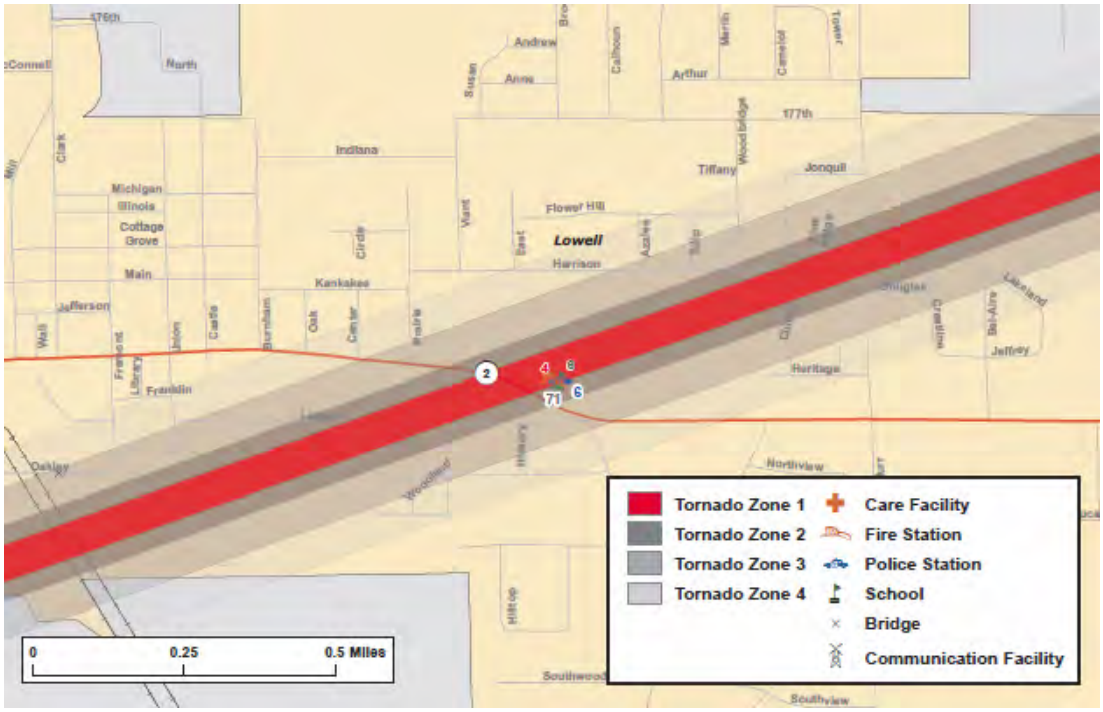
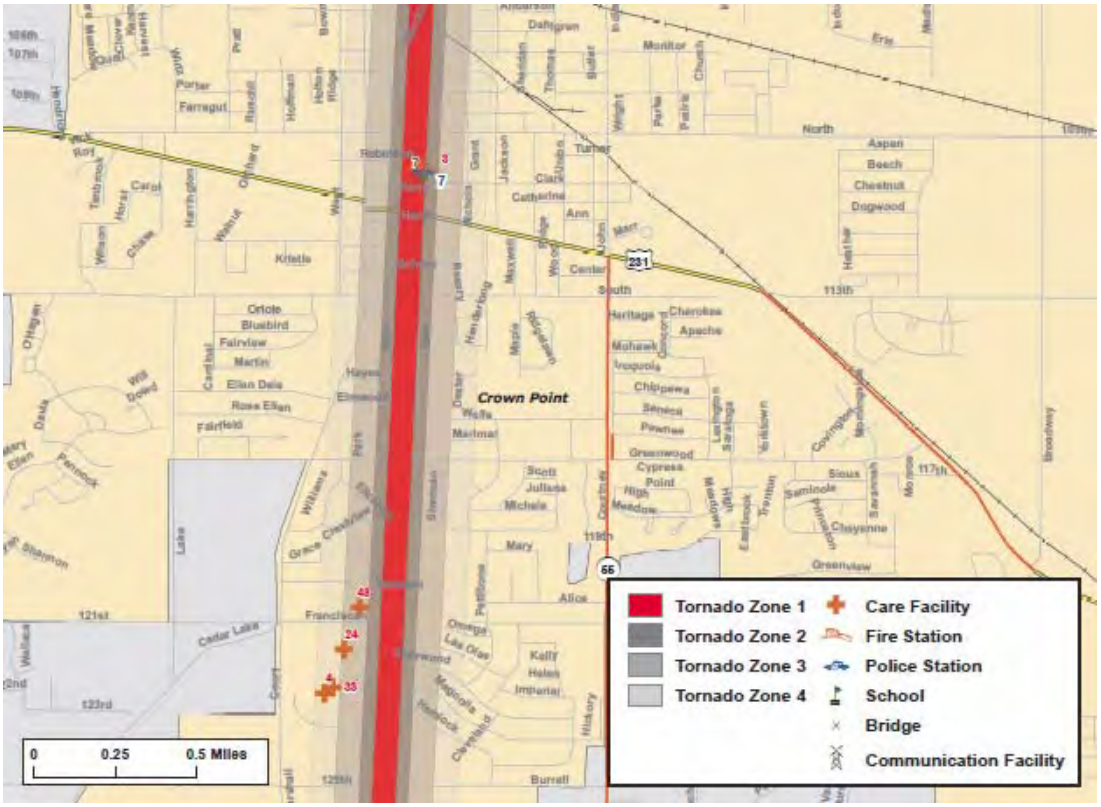


Figure 5-9: Critical Facilities within Tornado Path (Crown Point)



Vulnerability to Future Assets/Infrastructure for Tornado Hazard

The entire population and buildings within Lake County have been identified as at risk because tornadoes can occur anywhere within the state of Indiana, at any time of the day, and during any month of the year. Furthermore, any future development in terms of new construction within the county will be at risk. The building exposure for Lake County is included in Table 5-5.

All critical facilities in the county and communities within the county are at risk. Critical facility names and locations are included in Appendix E.

Analysis of Community Development Trends

Preparing for severe storms will be enhanced if officials sponsor a wide range of programs and initiatives to address the overall safety of county residents. New structures need to be built with more sturdy construction, and those structures already in place need to be hardened to lessen the potential impacts of severe weather. Community warning sirens to provide warnings of approaching storms are also vital to preventing the loss of property and ensuring the safety of Lake County residents.

5.3.2 FLOOD HAZARD

Hazard Definition

Flooding is a significant natural hazard throughout the United States. The type, magnitude, and severity of flooding are functions of the amount and distribution of precipitation over a given area, the rate at which precipitation infiltrates the ground, the geometry and hydrology of the catchment, and flow dynamics and conditions in and along the river channel. Floods can be classified as one of two types: upstream floods or downstream floods. Both types of floods are common in Indiana.

Upstream floods, also called flash floods, occur in the upper parts of drainage basins and are generally characterized by periods of intense rainfall over a short duration. These floods arise with very little warning and often result in locally intense damage, and sometimes loss of life, due to the high energy of the flowing water. Flood waters can snap trees, topple buildings, and easily move large boulders or other structures. Six inches of rushing water can upend a person; another 18 inches might carry off a car. Generally, upstream floods cause damage over relatively localized areas, but they can be quite severe in the local areas in which they occur. Urban flooding is a type of upstream flood. Urban flooding involves the overflow of storm drain systems and can be the result of inadequate drainage combined with heavy rainfall or rapid snowmelt. Upstream or flash floods can occur at anytime of the year in Indiana, but they are most common in the spring and summer months.

Downstream floods, sometimes called riverine floods, refer to floods on large rivers at locations with large upstream catchments. Downstream floods are typically associated with precipitation events that are of relatively long duration and occur over large areas. Flooding on small tributary streams may be limited, but the contribution of increased runoff may result in a large flood

downstream. The lag time between precipitation and time of the flood peak is much longer for downstream floods than for upstream floods, generally providing ample warning for people to move to safe locations and, to some extent, secure some property against damage. Riverine flooding on the large rivers of Indiana generally occurs during either the spring or summer.

Hazard Definition for Dam and Levee Failure

Dams are structures that retain or detain water behind a large barrier. When full or partially full, the difference in elevation between the water above the dam and below creates large amounts of potential energy, creating the potential for failure. The same potential exists for levees when they serve their purpose, which is to confine flood waters within the channel area of a river and exclude that water from land or communities land-ward of the levee. Dams and levees can fail due to either 1) water heights or flows above the capacity for which the structure was designed; or 2) deficiencies in the structure such that it cannot hold back the potential energy of the water. If a dam or levee fails, issues of primary concern include loss of human life/injury, downstream property damage, lifeline disruption (of concern would be transportation routes and utility lines required to maintain or protect life), and environmental damage.

Many communities view both dams and levees as permanent and infinitely safe structures. This sense of security may well be false, leading to significantly increased risks. Both downstream of dams and on floodplains protected by levees, security leads to new construction, added infrastructure, and increased population over time. Levees in particular are built to hold back flood waters only up to some maximum level, often the 100-year (1% annual probability) flood event. When that maximum is exceeded by more than the design safety margin, the levee will be overtopped or otherwise fail, inundating communities in the land previously protected by that levee. It has been suggested that climate change, land-use shifts, and some forms of river engineering may be increasing the magnitude of large floods and the frequency of levee failure situations.

In addition to failure that results from extreme floods above the design capacity, levees and dams can fail due to structural deficiencies. Both dams and levees require constant monitoring and regular maintenance to assure their integrity. Many structures across the U.S. have been under-funded or otherwise neglected, leading to an eventual day of reckoning in the form either of realization that the structure is unsafe or, sometimes, an actual failure. The threat of dam or levee failure may require substantial commitment of time, personnel, and resources. Since dams and levees deteriorate with age, minor issues become larger compounding problems, and the risk of failure increases.

Previous Occurrences for Flooding

The NCDC database reported 31 flood events in Lake County since 1950, recorded in Table 5-16. 2008 was a record year for flooding in northwest Indiana. On January 8, 2008, floods from melting snow caused many roads to close and basements to flood. Creeks and streams overflowed their banks. The Broadfield subdivision in Merrillville suffered significant flooding. Lowell measured 2.81 inches of rainfall.

Griesel Ditch Breach in Cedar Creek Township; September 2008;
Source: Lake County Surveyor

In September 2008, significant flooding occurred again as a result of heavy rains that fell on top of already saturated soil. Interstate 80/94 at Kennedy Avenue was flooded with all eastbound lanes closed and two westbound lanes closed. In Merrillville, the Broadfield subdivision was flooded again—several feet deep after retention ponds overflowed. Across northern Lake County, hundreds of basements were flooded and numerous roads were closed. Multiple locations received 3 to 5 inches of rain.

Additional details for NCDC events are included in Appendix C. In addition, USGS stream gauge data of historical crests are listed in Appendix F.

Table 5-16: Lake County Previous Occurrences of Flooding*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Lake	1/1/1993	Flood	N/A	0	0	5.0M	0
Lake	10/17/1993	Flood	N/A	0	0	500K	500K
Lake	6/13/1994	Urban Flood	N/A	0	0	0	0
Northern	5/9/1996	Flash Flood	N/A	0	0	0	0
Lake	7/17/1996	Flash Flood	N/A	0	0	0	0
Lake	7/17/2003	Flash Flood	N/A	0	0	0	0
Lake	7/21/2003	Flash Flood	N/A	0	0	0	0
Lake	7/27/2003	Flash Flood	N/A	0	0	0	0
Merrillville	5/14/2004	Flash Flood	N/A	0	0	0	0
East Chicago	5/22/2004	Flash Flood	N/A	0	0	0	0
Highland	7/21/2004	Flash Flood	N/A	0	0	0	0
Lake	1/13/2005	Flood	N/A	0	0	0	0
Lake	2/16/2005	Flood	N/A	0	0	0	0
Lake	6/4/2005	Flash Flood	N/A	0	0	0	0
Schererville	7/27/2006	Flood	N/A	0	0	0	0
Lake	9/13/2006	Flash Flood	N/A	0	0	8.0M	0
East Chicago	9/13/2006	Flood	N/A	0	0	0	0
Lowell	4/25/2007	Flood	N/A	0	0	0K	0K
Munster	4/25/2007	Flood	N/A	0	0	0K	0K
Hammond	7/26/2007	Flash Flood	N/A	0	0	500K	0K
Merrillville	8/15/2007	Flood	N/A	0	0	0K	0K
St John	8/23/2007	Flash Flood	N/A	0	0	0K	0K
Hammond	8/24/2007	Flood	N/A	0	0	1.0M	0K
Dyer	8/24/2007	Flood	N/A	0	0	4.0M	0K
Schneider	1/8/2008	Flood	N/A	0	0	1.0M	0K
Munster	9/13/2008	Flash Flood	N/A	0	0	500K	0K
Artesian Wells	9/13/2008	Flash Flood	N/A	0	0	0K	0K
Illinois	9/14/2008	Flash Flood	N/A	0	0	10.0M	0K
Munster	9/14/2008	Flood	N/A	0	0	15.0M	0K
Illinois	9/14/2008	Flood	N/A	0	0	0K	0K
Shelby	9/15/2008	Flood	N/A	0	0	1.0M	0K

** NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.*

Previous Occurrences for Dam and Levee Failure

According to the Lake County planning team, there have been a number of dam/levee failures in the county. For example, in 1991 a dike containment system failed on the Little Calumet, damaging approximately 400 homes in Highland. In September 2008, the Cedar Creek Dam overtopped, causing significant damage to surrounding communities such as the Town of Lowell. The Little Calumet River Basin Project seeks to mitigate future dam and levee failure by reinforcing existing and constructing new structures.

Repetitive Loss Properties

FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the NFIP, which has suffered flood loss damage on two occasions during a 10-year period that ends on the date of the second loss, in which the cost to repair the flood damage is 25% of the market value of the structure at the time of each flood loss.

FEMA was contacted to determine the numbers of repetitive loss structures. According to the BureauNet report, as of May 31, 2010 Lake County had 167 repetitive loss structures, and the total amount of losses was approximately $7.1 million. Table 5-17 lists further detail by community.

Table 5-17: Lake County Repetitive Loss Structures

Jurisdiction	Total Number of Properties	Insured Properties	Total Number of Losses	Insured Losses	Amount of Losses	Insured Losses
Lake County	13	6	34	14	$271,973.89	$119,477.72
Crown Point	2	1	6	3	$99,024.37	$13,331.70
Dyer	11	8	26	19	$211,026.15	187,829.13
East Chicago	1	1	2	2	$71,680.47	$71,680.47
Gary	5	2	14	6	$87,313.37	$32,870.62
Griffith	22	17	63	46	$1,118,278.41	$967,168.72
Hammond	29	26	64	58	$360,380.86	$339,437.78
Highland	27	20	58	42	$586,893.14	$500,589.92
Lake Station	17	11	38	25	$1,017,898.92	$699,124.75
Merrillville	11	6	38	21	$392,701.48	$239,004.37
Munster	27	24	57	49	$2,809,754.19	$2,526,976.70
Schererville	1	1	2	2	$29,907.50	$29,907.50
Schneider	1	0	2	0	$11,403.38	$0.00
Totals	**167**	**123**	**404**	**287**	**$7,068,236.13**	**$5,727,399.38**

Geographic Location for Flooding

Most river flooding occurs in early spring and is the result of excessive rainfall and/or the combination of rainfall and snowmelt. Severe thunderstorms may cause flooding during the summer or fall, but tend to be localized. The Lake County Hazard Analysis lists the primary sources of river flooding in the county as the Kankakee River and Little Calumet River.

Flash floods, brief heavy flows in small streams or normally dry creek beds, also occur within the county. Flash flooding is typically characterized by high-velocity water, often carrying large amounts of debris. Urban flooding involves the overflow of storm drain systems and is typically the result of inadequate drainage following heavy rainfall or rapid snowmelt.

IDNR recently prepared the paper FEMA Flood Insurance Rate Maps (FIRM). These digital files, although not official FIRMs, provided the boundary which was the basis for this analysis. The overbank flooding areas are depicted on the map in Appendix D. Flash flooding may occur countywide.

The National Oceanic and Atmospheric Administration (NOAA) Advanced Hydrologic Prediction Service provides information from gauge locations at points along various rivers across the United States. For Lake County, data is provided for two points: Little Calumet River at Munster and Kankakee River at Shelby. Appendix F lists information pulled from the NOAA website, which includes flood categories, historical crests, and details about anticipated impacts to agricultural lands, dams, levees, and other built structures at significant flood crest levels.

Geographic Location for Dam and Levee Failure

The National Inventory of Dams identified seven dams in Lake County; the county's dams are illustrated in Appendix E. Table 5-18 summarizes the National Inventory of Dams information.

Table 5-18: National Inventory of Dams

Dam Name	River	Hazard	EAP
Lake of the Four Seasons Dam	Unnamed Tributary Stony Run	S	N
Lake George Dam	Deep River	H	N
Lake Dalecarlia Dam (East)	Cedar Creek	H	N
Lake Dalecarlia Dam (West)	Cedar Creek	H	N
Lakewood Estates Dam	Unnamed Tributary Cedar Creek	S	N
Doubletree Lake Estates Dam (North)	Unnamed Tributary Deep River	S	N
Doubletree Lake Estates Dam (West)	Unnamed Tributary Deep River	S	N
Lake Hills Dam	Lake Hills	N/A	N/A

A review of the Indiana Department of Natural Resource's files identified eight levees, listed in Table 5-19. These levees are from historical IDNR data; their physical presence was not confirmed and some may no longer exist.

Table 5-19: Lake County Levees

Name	Location
George Meyers Levee	Grand Calumet River near Highland
Griffith Little Calumet Levee	Left bank of Little Calumet River in Griffith
Hammond Little Calumet Levee	Left bank of Little Calumet River in Hammond
Munster Little Calumet Levee	Left bank of Little Calumet River in Munster
Highland Little Calumet Levee	Left bank of Little Calumet River in Highland
Schererville Levee	Schererville
Wicker Park Levee	Little Calumet River Basin in Highland

** The dams and levees listed in this multi-hazard mitigation plan are recorded from historical IDNR data. Their physical presences were not confirmed; therefore, new or unrecorded structures may exist.*

Hazard Extent for Flooding

The HAZUS-MH flood model is designed to generate a flood depth grid and flood boundary polygon by deriving hydrologic and hydraulic information based on user-provided elevation data or by incorporating selected output from other flood models. HAZUS-MH also has the ability to clip a Digital Elevation Model (DEM) with a user-provided flood boundary, thus creating a flood depth grid. For Lake County, HAZUS-MH was used to extract flood depth by clipping the DEM with the IDNR FIRMs Base Flood Elevation (BFE) boundary. The BFE is defined as the area that has a 1% chance of flooding in any given year.

Flood hazard scenarios were modeled using GIS analysis and HAZUS-MH. The flood hazard modeling was based on historical occurrences and current threats. Existing IDNR flood maps were used to identify the areas of study. These digital files, although not official DFIRMs, provided the boundary which was the basis for this analysis. Planning team input and a review of historical information provided additional information on specific flood events.

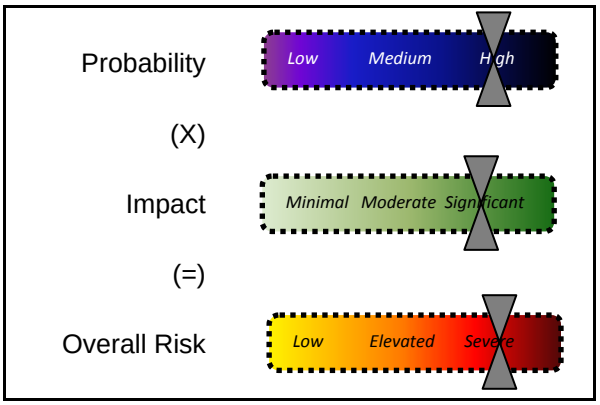
Hazard Extent for Dam and Levee Failure

When dams are assigned the low (L) hazard potential classification, it means that failure or incorrect operation of the dam will result in no human life losses and no economic or environmental losses. Losses are principally limited to the owner's property. Dams assigned the significant (S) hazard classification are those dams in which failure or incorrect operation results in no probable loss of human life; however it can cause economic loss, environment damage, and disruption of lifeline facilities. Dams classified as significant hazard potential dams are often located in predominantly rural or agricultural areas, but could be located in populated areas with a significant amount of infrastructure. Dams assigned the high (H) hazard potential classification are those dams in which failure or incorrect operation has the highest risk to cause loss of human life and significant damage to buildings and infrastructure.

According to the IDNR and the National Inventory of Dams, two dams are classified as high hazard dams. No dams have an Emergency Action Plan (EAP). An EAP is not required by the State of Indiana but is strongly recommended in the 2003 Indiana Dam Safety & Inspection Manual.

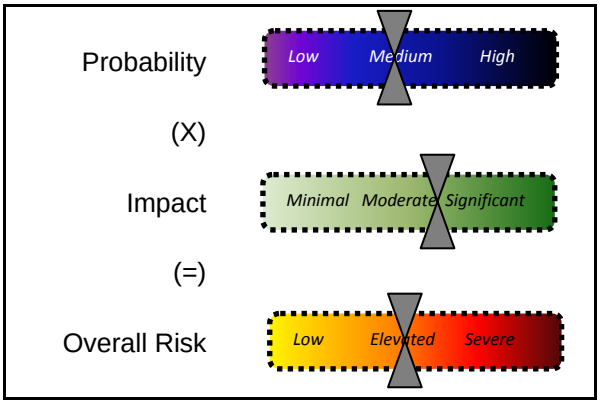
Accurate mapping of the risks of flooding behind levees depends on knowing the condition and level of protection the levees actually provide. FEMA and the U.S. Army Corps of Engineers are working together to make sure that flood hazard maps clearly reflect the flood protection capabilities of levees, and that the maps accurately represent the flood risks posed to areas situated behind them. Levee owners—usually states, communities, or in some cases private individuals or organizations—are responsible for ensuring that the levees they own are maintained according to their design. In order to be considered creditable flood protection structures on FEMA's flood maps, levee owners must provide documentation to prove the levee meets design, operation, and maintenance standards for protection against the one-percent-annual chance flood.

Risk Identification for Flood Hazard



Based on historical information, the probability of a flood is high. In Meeting #2, the planning team determined that the potential impact of a flood is significant; therefore, the overall risk of a flood hazard for Lake County is severe.

Risk Identification for Dam/Levee Failure



Based on historical information, the probability of dam/levee failure is medium. In Meeting #2, the planning team determined that the potential impact of dam/levee failure is moderate; therefore, the overall risk of dam/levee failure for Lake County is elevated.

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HAZUS-MH Analysis Using 100-Year Flood Boundary and County Parcels

Because Lake County faces such extensive flood risks, and the risks vary by community, Polis conducted HAZUS-MH flood analyses for the county as a whole; then for the individual communities as well.

HAZUS-MH generated the flood depth grid for a 100-year return period by clipping the IGS 1/3 ArcSecond (approximately 10 meters) Digital Elevation Model (DEM) to the Lake County flood boundary. Next, HAZUS-MH utilized a user-defined analysis of Lake County with site-specific parcel data provided by the county.

****NOTE: The HAZUS-MH analysis was based on best available flood maps; however, these are not official Digital Flood Insurance Rate Maps.*

Lake County (Incorporated and Unincorporated)

Historical Flooding

Many areas of unincorporated Lake County are vulnerable to flooding due to inadequate drainage, poor flood protection structures, or little ability to protect from massive runoff in the event of significant flood disasters. Areas of Calumet Township along the Little Calumet River suffer flood damage; areas of St. John Township near the Illinois State Line and the entire length of the Kankakee River floodplain can sustain damage in any single large event. Mitigation strategies discussed in Section 6.0 may help to address these problems.

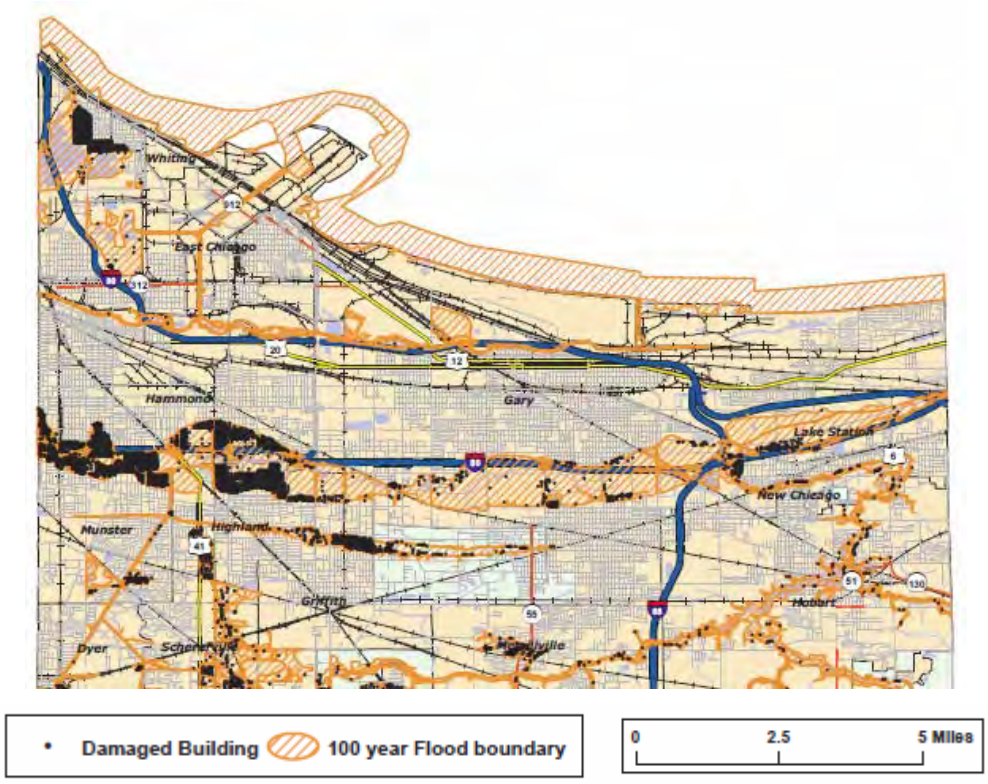
Flood Analysis

HAZUS-MH estimates the 100-year flood would damage 9,791 buildings at a replacement cost of $127.3 million. The total estimated numbers of damaged buildings are given in Table 5-20. Figures 5-10, 5-11, and 5-12 depict the Lake County parcel points that fall within the 100-year floodplain. Each figure highlights a different section of the county: north, central, south.

Table 5-20: Lake County HAZUS-MH Building Damage

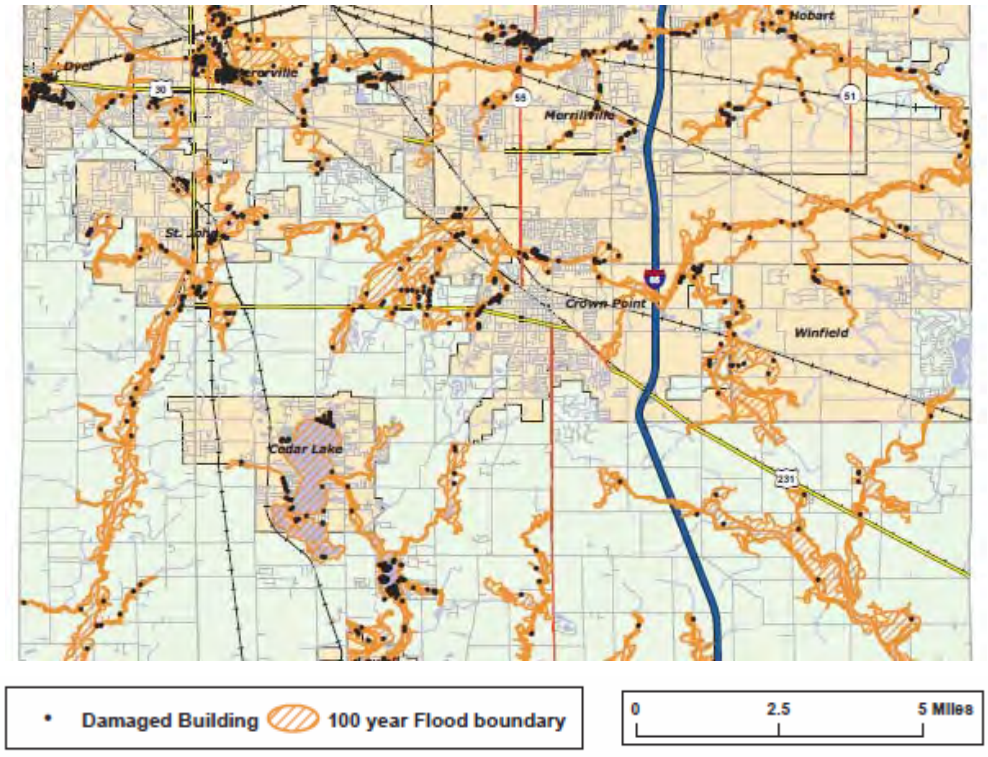
General Occupancy	Number of Buildings Damaged	Total Building Damage (x1000)
Residential	8,951	$110,755
Commercial	351	$7,906
Industrial	154	$5,403
Agricultural	161	$889
Religious	81	$1,812
Government	84	$400
Education	9	$110
Total	**9,791**	**$127,274**

Figure 5-10: Lake County Buildings in Floodplain (100-Year Flood; Northern Portion of County)



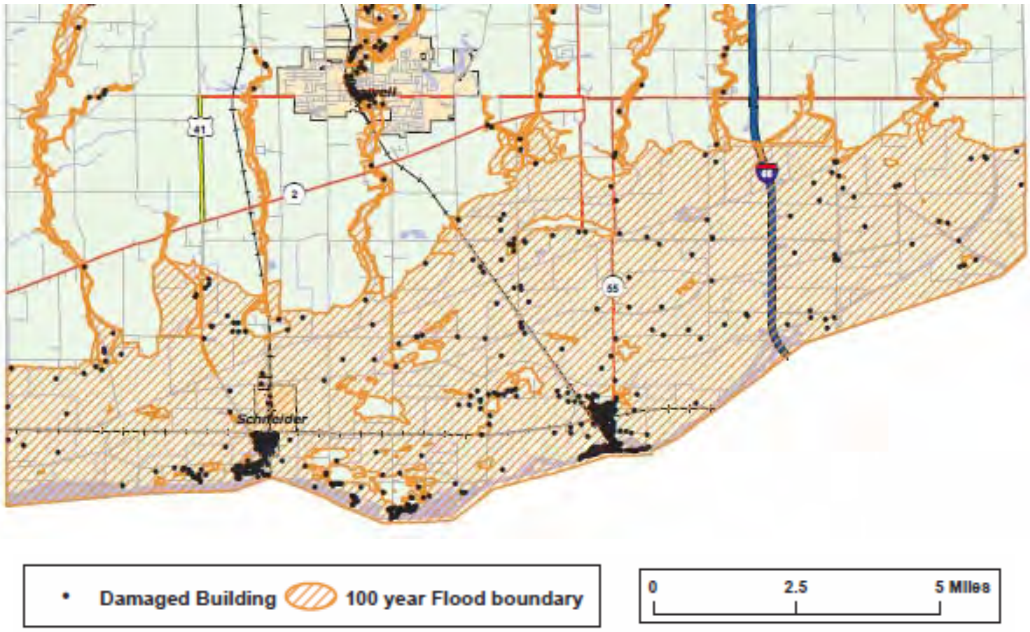
NOTE: Analysis did not use official DFIRMS

Figure 5-11: Lake County Buildings in Floodplain (100-Year Flood; Central Portion of County)



NOTE: Analysis did not use official DFIRMS

Figure 5-12: Lake County Buildings in Floodplain (100-Year Flood; Southern Portion of County)



NOTE: Analysis did not use official DFIRMS

A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The analysis identified three care facilities, one emergency operations center, five fire departments, two police departments, six schools, six communication facilities, two electric power facility, eight hazardous material facilities, two natural gas facilities, two oil facilities, eleven port facilities, ten potable water facilities, two user-defined facilities, and four wastewater facilities that may be subject to flooding. A list of the critical facilities potentially at risk to flooding within Lake County is given in Table 5-21.

Table 5-21: Lake County Damaged Critical Facilities

Facility Type	Facility Name
Care Facilities	Hammond Lakeview Ambulatory Center
	Munster Calumet Surgery Center
	Munster Med-Inn
Communication Facilities	Dyer Emergency Siren (Police Department)
	East Chicago Cell Tower
	Gary WLTH
	Highland Emergency Siren (Bradley Pumpkin Store)
	Schneider Emergency Siren (Fire Station)
	Shelby Emergency Siren (Shelby Fire Station)
	St John Emergency Siren (Fire Training Site)
Electric Power Facilities	Hammond Commonwealth Edison

Facility Type	Facility Name
	Highland NIPSCO Sub Station
Emergency Operations Facility	Highland Civil Defense
Fire Departments	Dyer Fire Department Hammond Fire Station #2 Munster Fire Department Station III Schneider West Creek Township Fire Department Shelby Fire Department
Hazardous Materials Sites	East Chicago Union Tank Car Company Hammond Calumet Container Hammond Cerestar USA Hammond Illco Hammond SBC Hammond Speedway #8332 Hammond Wolverine Pipeline Company Schererville Avery Dennison
Natural Gas Facilities	Griffith Texas Easter Trans Compressor Station Griffith Texas Eastern Products
Oil Facilities	Griffith Marathon Oil Company Schererville Laketon Refining Corporation
Police Departments	Hammond Police Department Schneider Police Department
Port Facilities	East Chicago American Terminals, North Dock East Chicago American Terminals, South Dock East Chicago Inland Steel Company, No. 4 Dock East Chicago Inland Steel Company, No. 6 Dock East Chicago LTV Steel Company East Chicago Mobil Oil Corporation East Chicago Northern Indiana Dock Company East Chicago Service Waste, East Chicago Dock East Chicago United States Gypsum Gary USX Corporation, East Dock Gary USX Corporation, West Dock
Potable Water Facilities	Gary 28th & Madison Gary 3212 Georgia St Highland Jr Bradley Pump Station Highland Kennedy Ave Storage Munster Calumet Pump Station Munster River Bend Pump Station Munster Water Tanks Munster Water Tanks St John Well #4 St. John Water Works
School Facilities	Gary George Washington Carver School Gary Lighthouse Charter School Hammond Sawyer College Hammond Woodland Childcare

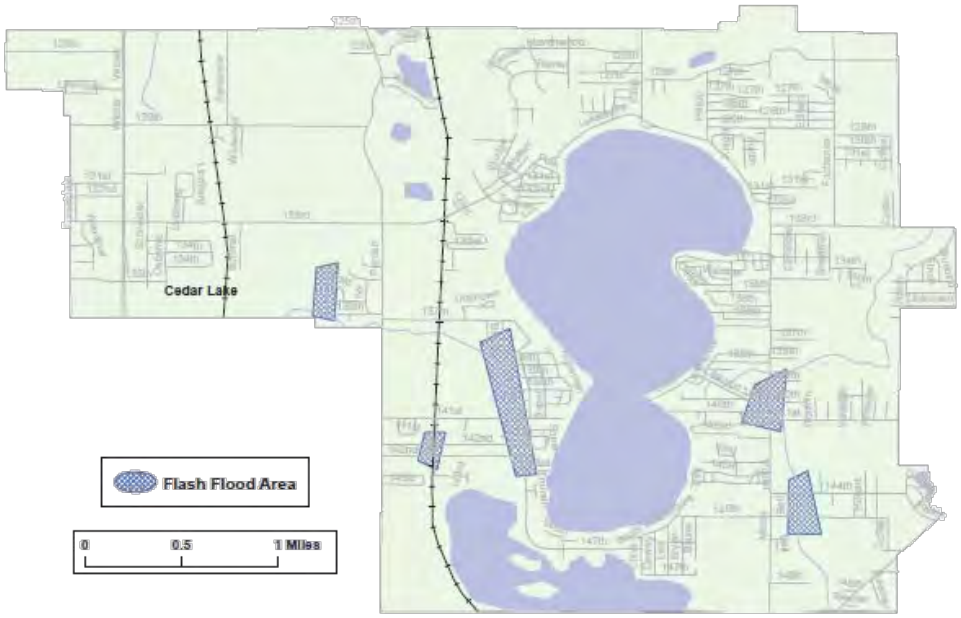
Facility Type	Facility Name
	Highland Judith Morton Johnston Elementary
	Lowell Christian Academy
User Defined Facilities	Hammond Jean Shepherd Community Center
	Munster Centennial Park
Waste Water Facilities	Dyer Wastewater Facility
	Griffith Sanitary Pump Station
	Schererville Wastewater Facility
	Schneider Wastewater Facility

Town of Cedar Lake

Historical Flooding

The interviews with Cedar Lake planning team members identified flash flooding problems in the community related to field tiles that drain 142 acres into the community. Several flash flooding areas are depicted in Figure 5-13. Section 6.0 identifies specific mitigation strategies.

Figure 5-13: Cedar Lake Flash Flood Areas



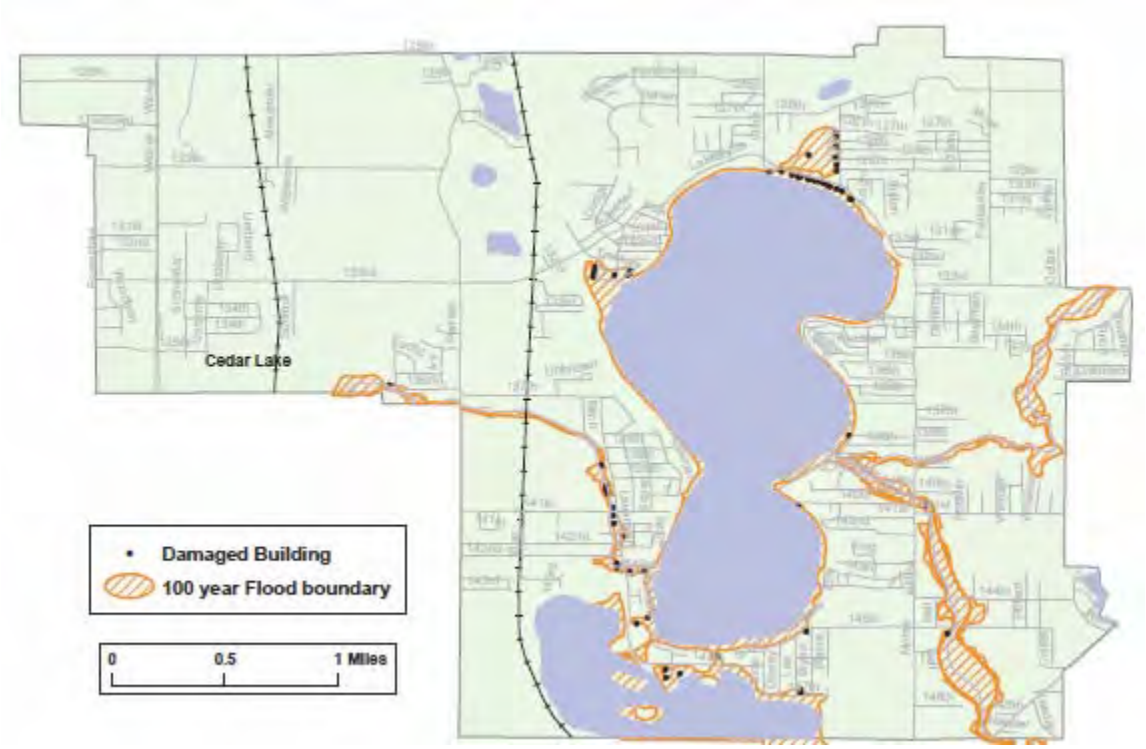
Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 56 buildings at a replacement cost of $6 million. The total estimated numbers of potentially damaged buildings in Cedar Lake are listed in Table 5-22. Figure 5-14 depicts the Cedar Lake parcel points that fall within the 100-year floodplain.

Table 5-22: Cedar Lake Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	49	$4,754
Commercial	6	$1,193
Government	1	$60
Total	**56**	**$6,007**

Figure 5-14: Cedar Lake Buildings in Floodplain (100-Year Flood)

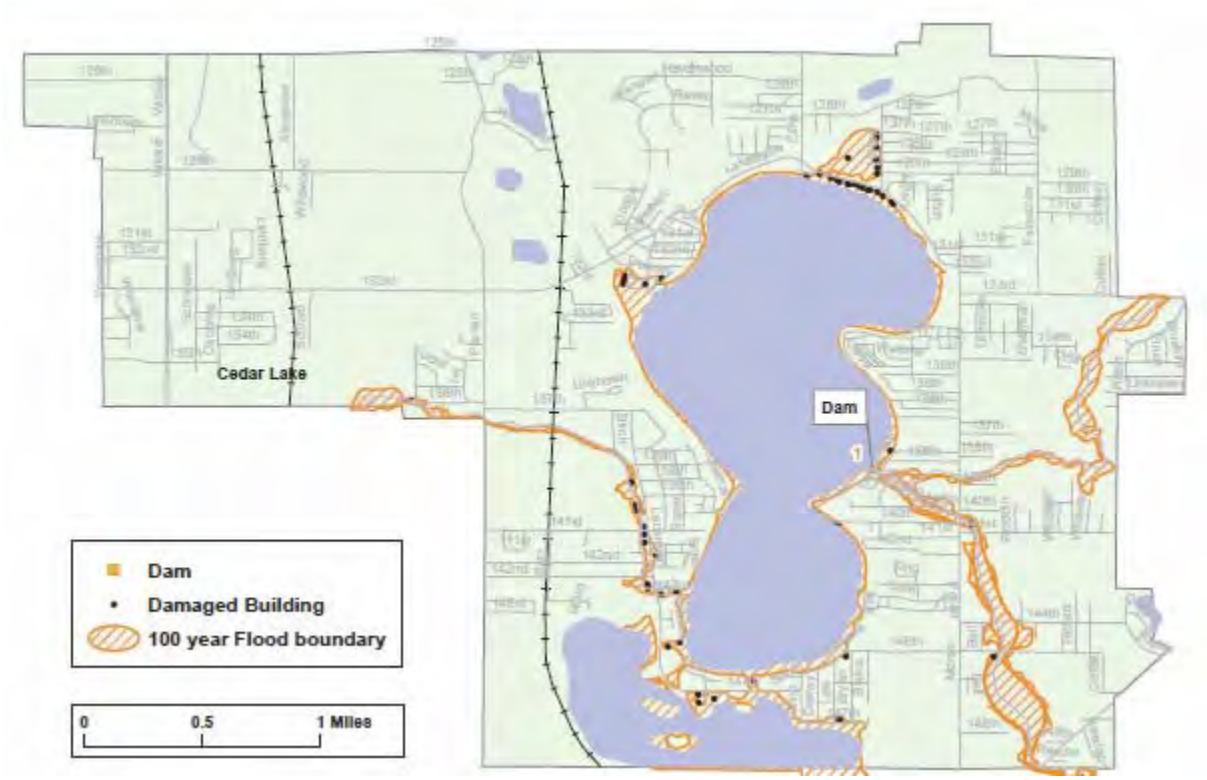


NOTE: Analysis did not use official DFIRMS

A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The analysis identified one dam that may be subject to flooding. Its location is shown in Figure 4-6.

Figure 4-6: Boundary of 100-Year Flood Overlaid with Critical Facilities



NOTE: Analysis did not use official DFIRMS

City of Crown Point

Historical Flooding

Crown Point, September 15, 2008; *Source: Weather Underground*

The City of Crown Point has minimal street flooding due to larger rain events and slow runoff. The city has flood protection developed along the Beaver Dam Ditch which has eliminated much of the city's flooding; however, like the rest of the county, Crown Point experienced heavy flooding in 2008.

Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 109 buildings at a replacement cost of $24.9 million. The total estimated numbers of potentially damaged buildings are given in Table 5-23. Figure 5-15 depicts the Crown Point parcel points that fall within the 100-year floodplain.

Table 5-23: Crown Point Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	92	$14,191
Commercial	7	$8,056
Industrial	2	$2,043
Agricultural	7	$616
Government	1	$2
Total	**109**	**$24,908**

Figure 5-15: Crown Point Buildings in Floodplain (100-Year Flood)

NOTE: Analysis did not use official DFIRMS

The flood analysis estimates that there will be no critical facilities affected within Crown Point.

Town of Dyer

Historical Flooding

In Dyer, localized flooding problems have commonly occurred along both Dyer Ditch and Hart Ditch, during all seasons of the year. There are frequent flooding problems in the southwest portion of the town associated with Plum Creek/ Hart Ditch as it travels through the Plum Creek Forest Preserve, across the Indiana-Illinois State Line, and into Dyer. Once Plum Creek crosses into Dyer's jurisdiction it is referred to as Hart Ditch. Flooding in this area has affected residents along Plum Creek and Hart Ditch from just south of the intersection of Forest Park Drive and Schmidt Drive north to Plum Creek Drive. This area is commonly referred to as the Beren's Monaldi neighborhood.

Source: Town of Dyer Multi-Hazard Mitigation Plan, 2007

Aerial view following flood event; *Source: Town of Dyer Multi-Hazard Mitigation Plan*

Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 185 buildings at a replacement cost of $98.1 million. The total estimated numbers of potentially damaged buildings are given in Table 5-24. Figure 5-16 depicts the Dyer parcel points that fall within the 100-year floodplain.

Table 5-24: Dyer Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	177	$92,262
Commercial	2	$1,221
Religious	3	$1,998
Government	3	$2,648
Total	**185**	**$98,129**

Figure 5-16: Dyer Buildings in Floodplain (100-Year Flood)

NOTE: Analysis did not use official DFIRMS

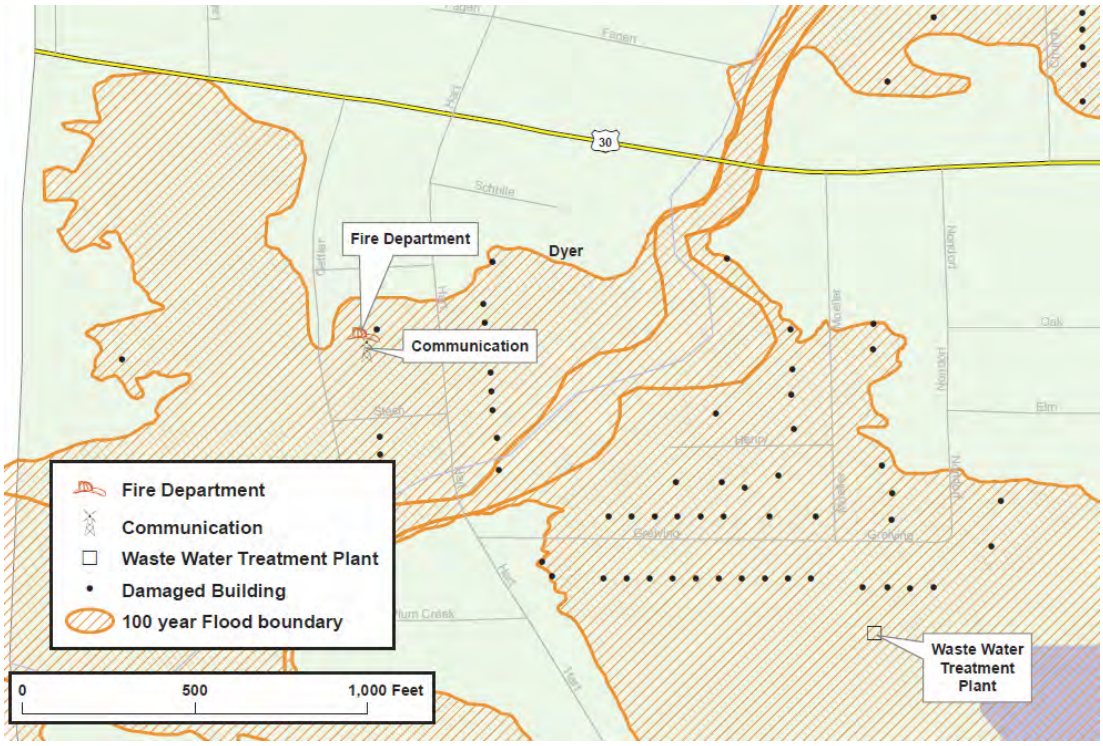
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The analysis identified one fire department, one communication facility, and one wastewater treatment facility that may be subject to flooding. A list of the critical facility potentially at risk to flooding within Dyer is given in Table 5-25. A map of the critical facility potentially at risk to flooding is shown in Figure 5-17.

Table 5-25: Dyer Damaged Critical Facilities

Facility Name
Dyer Fire Department
Police Department Communication Facility
Dyer Waste Water Treatment Facility

Figure 5-17: Boundary of 100-Year Flood Overlaid with Critical Facilities



NOTE: Analysis did not use official DFIRMS

City of East Chicago

Historical Flooding

The majority of flooding in East Chicago is related to overload of the combined sewer system (see Figure 5-18). The 145th Street Pumping Station relieves the combined sewer system. The mitigation strategies in Section 6.0 include rehabilitation of the pumping station to relieve flooding for several hundred homes.

Figure 5-18: East Chicago Sewer Map

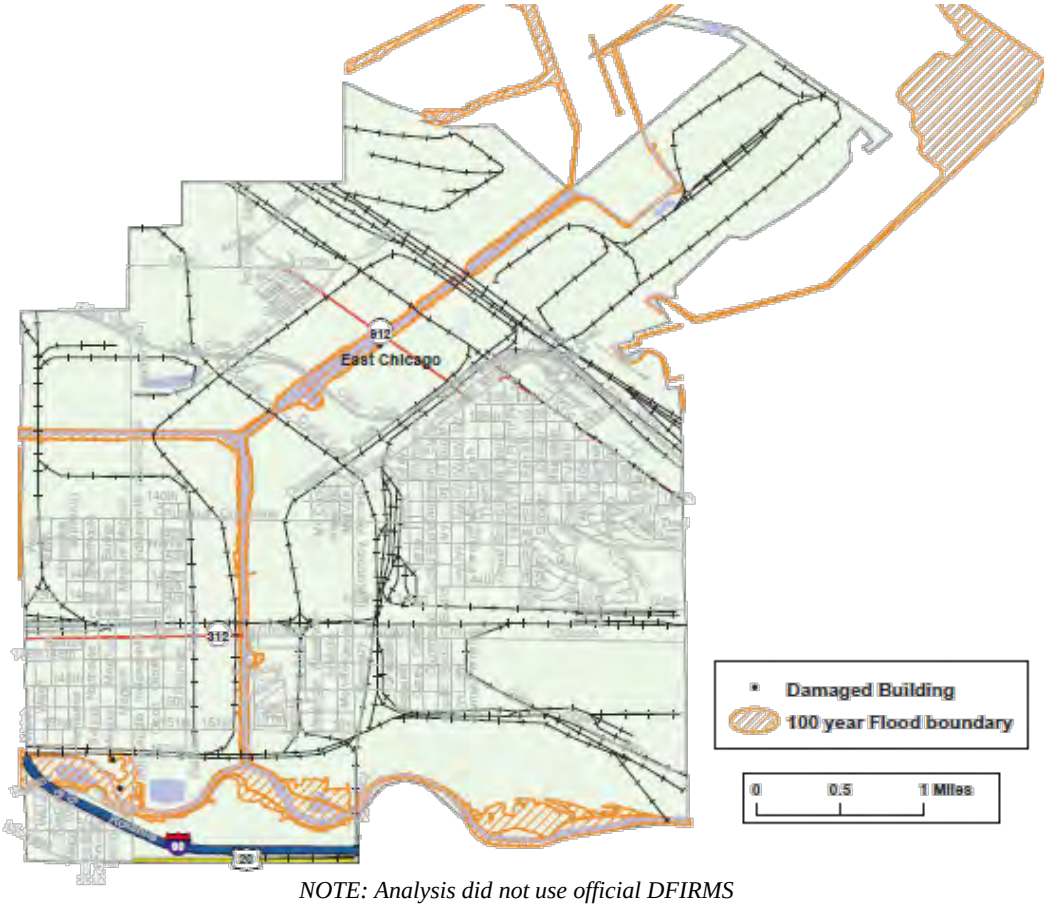
Flood Analysis

As previously stated, the majority of flooding in East Chicago is related to flash flooding and overload of existing infrastructure rather than riverine flooding. The HAZUS-MH riverine analysis estimates that the 100-year flood could potentially damage three buildings at a replacement cost of $3.2 million. The total estimated numbers of potentially damaged buildings are given in Table 5-26. Figure 5-19 depicts the East Chicago parcel points that fall within the 100-year floodplain.

Table 5-26: East Chicago Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Industrial	3	$3,187
Total	**3**	**$3,187**

Figure 5-19: East Chicago Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

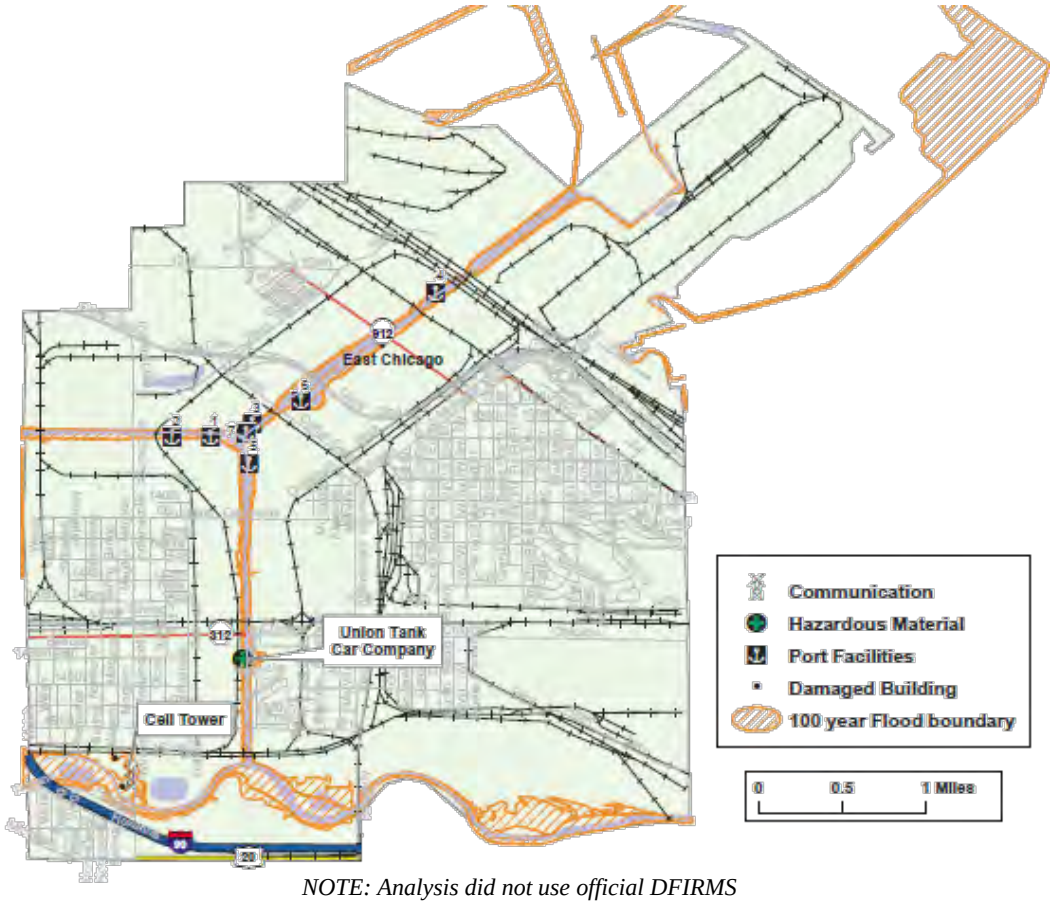
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The analysis identified one communication tower, one hazardous materials facility, and seven port facilities that may be subject to flooding. A list of the vulnerable critical facilities is in Table 5-27. A map of the critical facility potentially at risk to flooding is shown in Figure 5-20.

Table 5-27: East Chicago Damaged Critical Facilities

Facility Name
Cell Tower
Union Tank Car Company
Service Waste
Mobil Oil Corporation
United States Gypsum Company
LTV Steel Company
Northern Indiana Dock Company
American Terminals, North Dock
American Terminals, South Dock

Figure 5-20: Boundary of 100-Year Flood Overlaid with Critical Facilities



NOTE: Analysis did not use official DFIRMS

City of Gary

Historical Flooding

The City of Gary experienced major flooding in 2008. Flooding occurred in several areas of the city including major damage at Indiana University Northwest (IUN). In addition, Interstate 80/94 was closed due to flooding. An aerial photograph depicting the 2008 flooding is shown in Figure 5-21. Section 6.0 identifies specific mitigation strategies.

IUN Gary Campus, Sept 2008; *Source: NWI Times*

Figure 5-21: 2008 Flooding in Gary

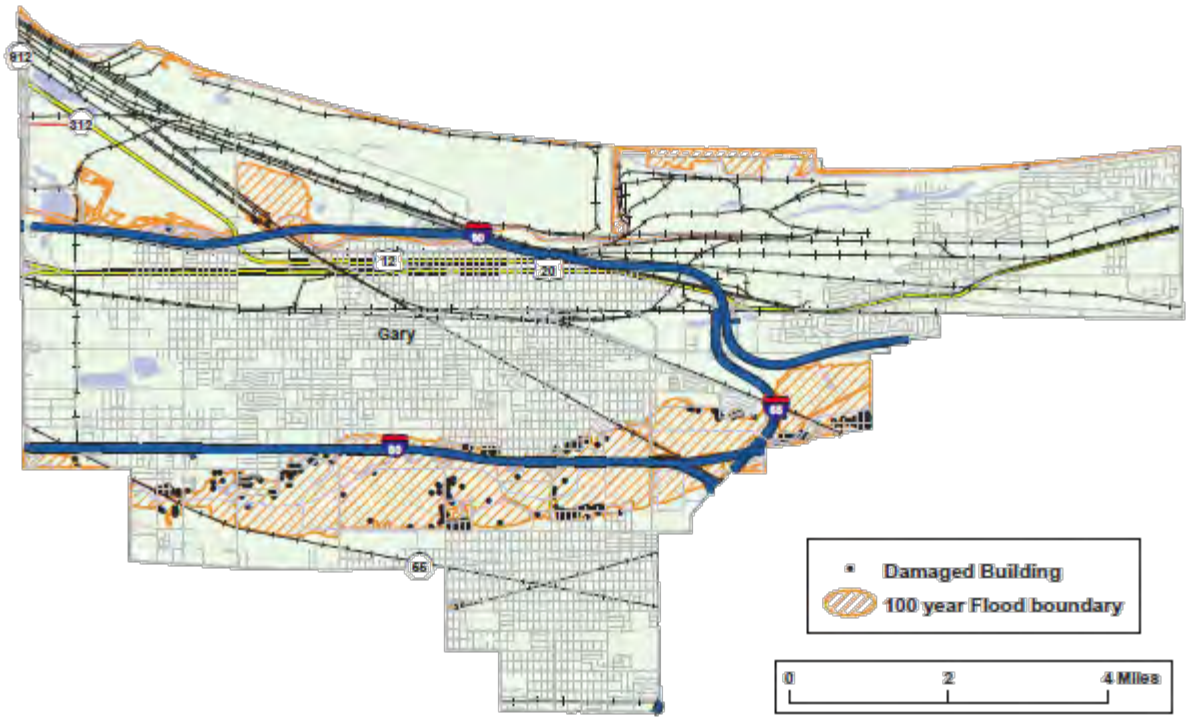
Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 369 buildings at a replacement cost of $79.5 million. The total estimated numbers of potentially damaged buildings are given in Table 5-28. Figure 5-22 depicts the Gary parcel points that fall within the 100-year floodplain.

Table 5-28: Gary Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	276	$18,185
Commercial	38	$14,572
Industrial	4	$716
Religious	16	$8,948
Government	33	$25,303
Education	2	$11,803
Total	**369**	**$79,527**

Figure 5-22: Gary Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

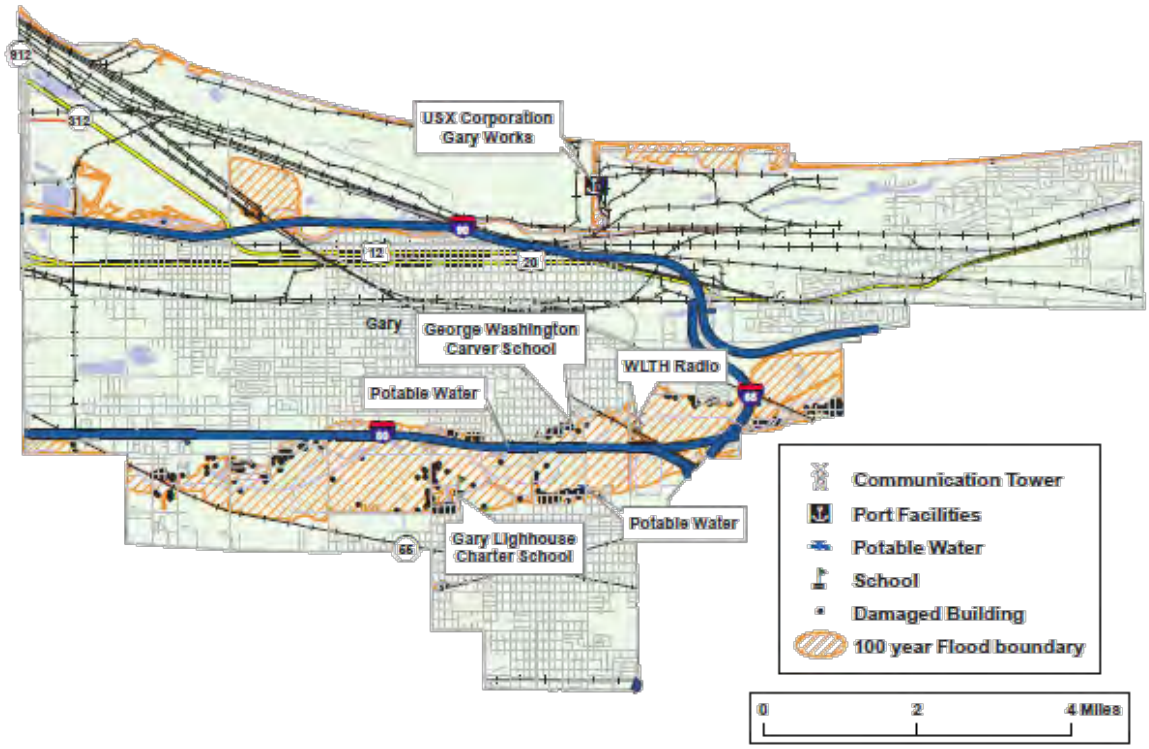
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The analysis identified one communication facility, two port facilities, two potable water facilities, and two schools that may be subject to flooding. The critical facility potentially at risk to flooding within Gary is given in Table 5-29. A map of critical facility potentially at risk to flooding is shown in Figure 5-23.

Table 5-29: Gary County Damaged Critical Facilities

Facility Name
WLTH Communication Tower
USX Corporation, Gary Works, East Dock
USX Corporation, Gary Works, West Dock
Potable Water, 28th and Madison
Potable Water, 32nd and Georgia
George Washington Carver School
Gary Lighthouse Charter School

Figure 5-23: Boundary of 100-Year Flood Overlaid with Critical Facilities



NOTE: Analysis did not use official DFIRMS

Town of Griffith

Historical Flooding

The Town of Griffith has experienced major flooding in recent years. During the mitigation strategies brainstorming session, Griffith identified the Griffith Golf Center and surrounding area as a location that frequently floods. Figure 5-24 identifies 2008 flooding along Cline Avenue (Golf Center is pictured to the right of Cline Avenue). The mitigation strategies in Section 6.0 include several drainage projects which are in progress including flood improvements to Cady Marsh ditch.

Griffith, August 2007 flooding; *Source: WGN*

Figure 5-24: 2008 Flooding in Griffith

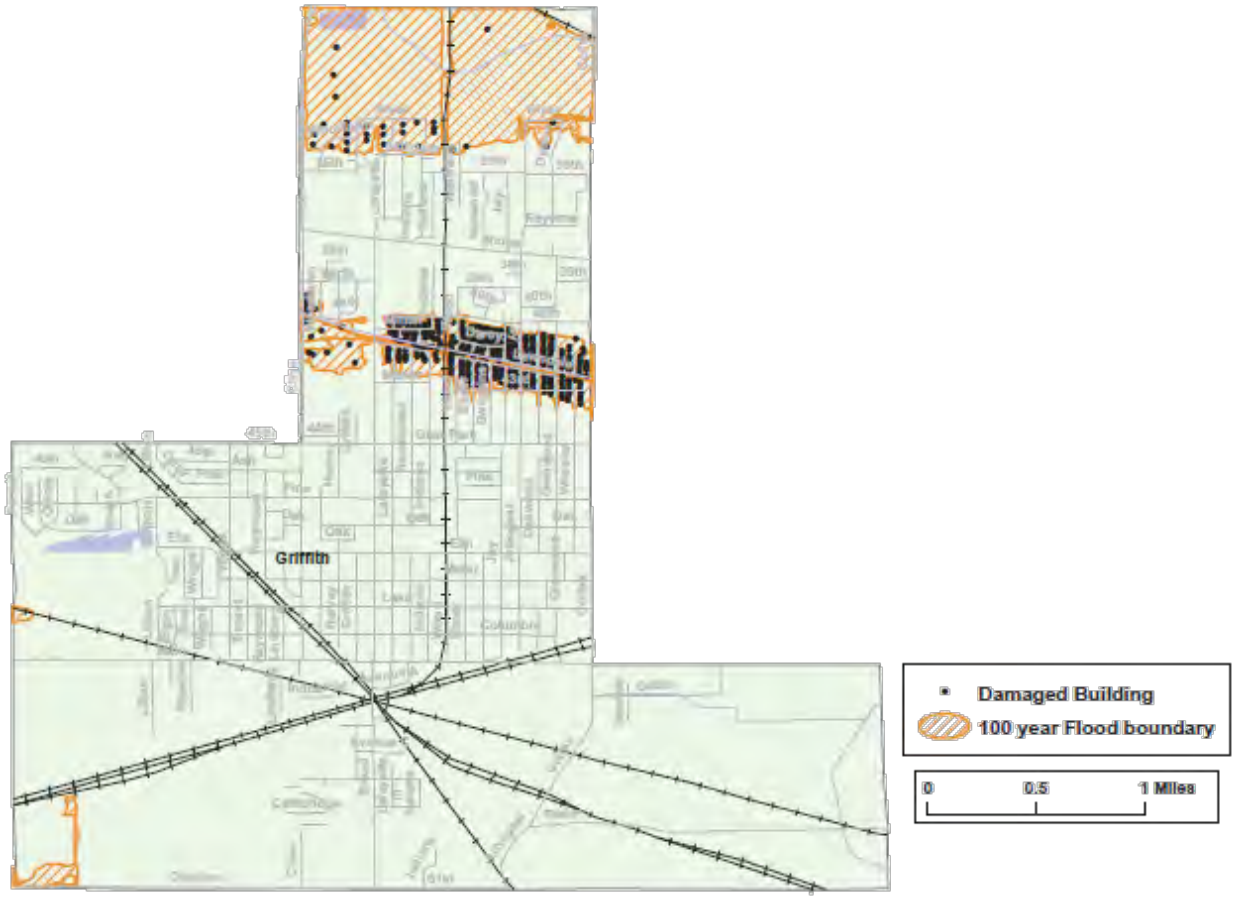
Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 435 buildings at a replacement cost of $74.7 million. The total estimated numbers of potentially damaged buildings are given in Table 5-30. Figure 5-25 depicts the Griffith parcel points that fall within the 100-year floodplain.

Table 5-30: Griffith Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	403	$55,165
Commercial	17	$8,477
Industrial	13	$10,891
Religious	1	$0
Government	1	$137
Total	**435**	**$74,670**

Figure 5-25: Griffith Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

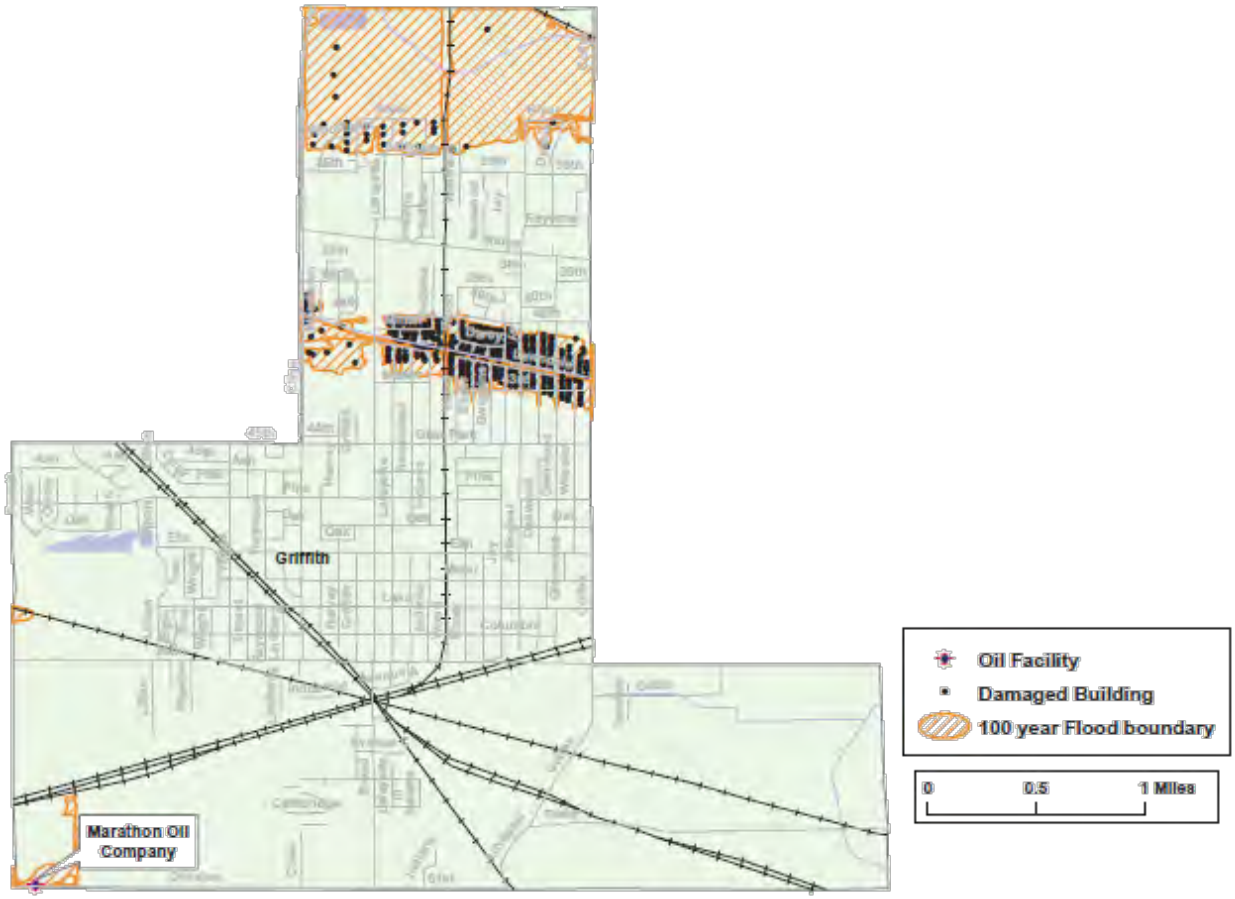
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The analysis identified one oil facility that may be subject to flooding. A list of the critical facility potentially at risk to flooding within Griffith is given in Table 5-31. A map of the critical facility potentially at risk to flooding is shown in Figure 5-26.

Table 5-31: Lake County Damaged Critical Facilities

Facility Name
Marathon Oil Company

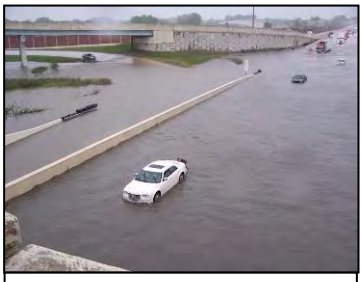
Figure 5-26: Boundary of 100-Year Flood Overlaid with Critical Facilities



NOTE: Analysis did not use official DFIRMS

City of Hammond

Historical Flooding



Hammond, September 2008
Source: Weather Underground

In September 2006, a severe storm produced 3.8 to 8 inches of rain in Hammond within approximately five hours. More than 1,000 residents reported basement backups. Particularly hard hit areas included portions of the Robertsdale, North Hammond, Central Hammond, and Hessville neighborhoods, while backups also occurred in both the South Hammond and Woodmar neighborhoods. The September flooding event also resulted in many residents becoming stranded at Dowling Park, which is located in the Hessville neighborhood and is bordered on the south by JF Mahoney Drive and Interstate 80/94 and on the east by Parish Avenue. Flooding from state-owned drainage ditches along Interstate 80/94 is believed to be the primary cause of Dowling Park access roads becoming impassible. Directly south of Dowling Park, across Interstate 80/94, exit ramps between the Interstate and Kennedy Avenue were also impassable due to high water.

Figure 5-27: 2008 Flooding in Hammond

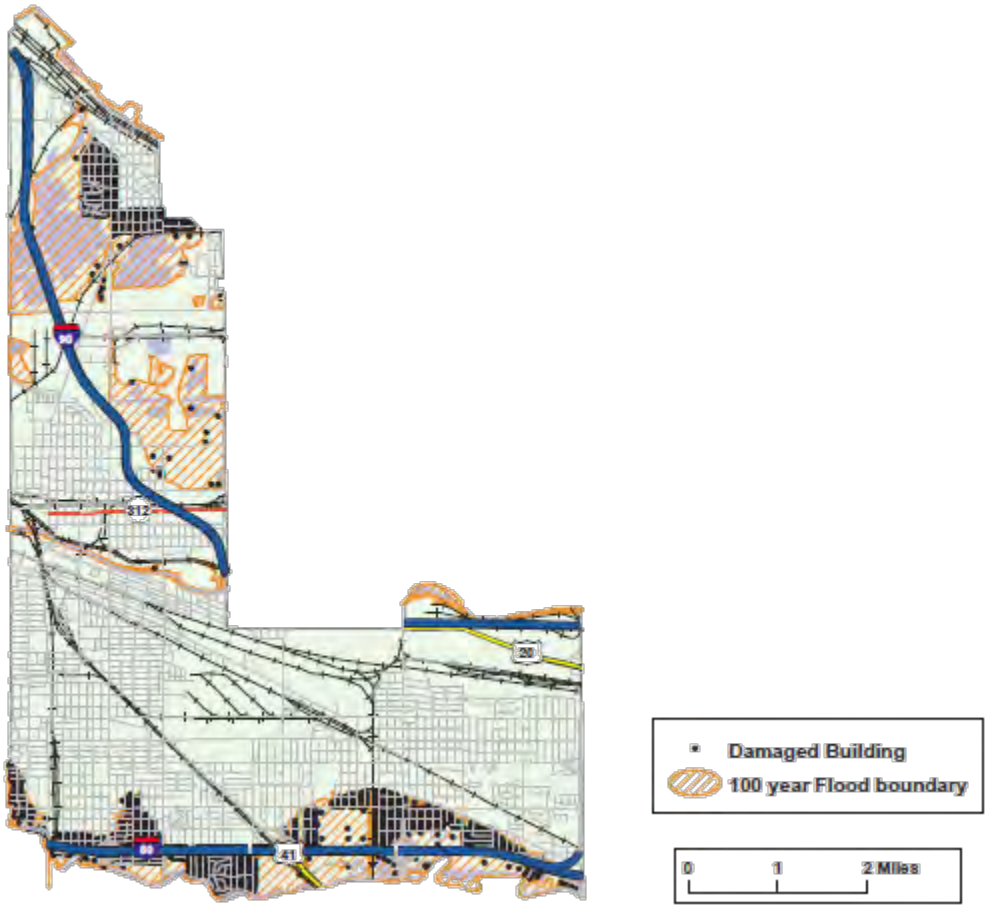
Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 3,938 buildings at a replacement cost of $580 million. The total estimated numbers of potentially damaged buildings are given in Table 5-32. Figure 5-28 depicts the Hammond parcel points that fall within the 100-year floodplain.

Table 5-32: Hammond Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	3,786	$402,632
Commercial	71	$65,244
Industrial	30	$55,923
Religious	26	$5,784
Government	19	$40,085
Education	6	$11,101
Total	**3,938**	**$580,769**

Figure 5-28: Hammond Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

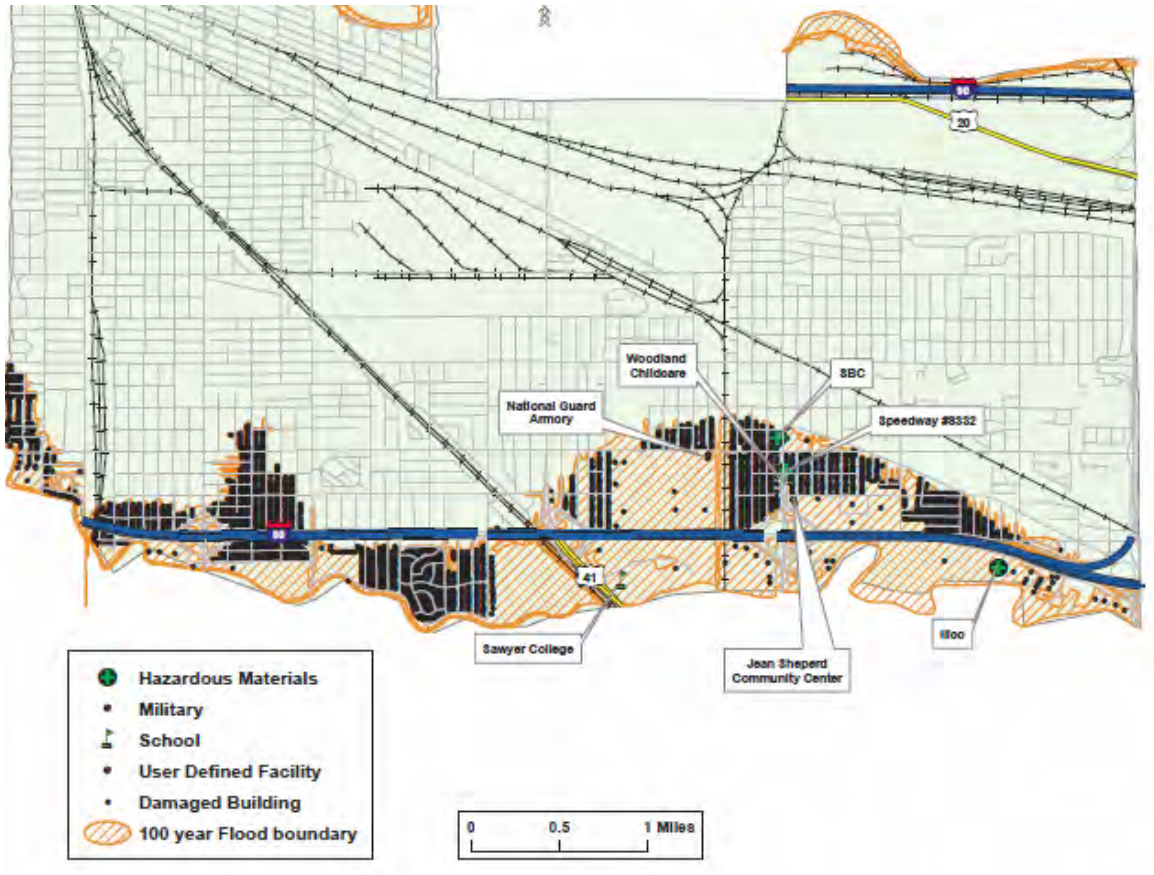
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The analysis identified one care facility, one fire/police department facility, one electric power facility, one military facility, six hazardous material facilities, one school, and one user-defined facility that may be subject to flooding. A list of the vulnerable critical facilities is in Table 5-33. Maps of critical facilities potentially at risk to flooding are shown in Figures 5-29 and 5-30.

Table 5-33: Hammond Damaged Critical Facilities

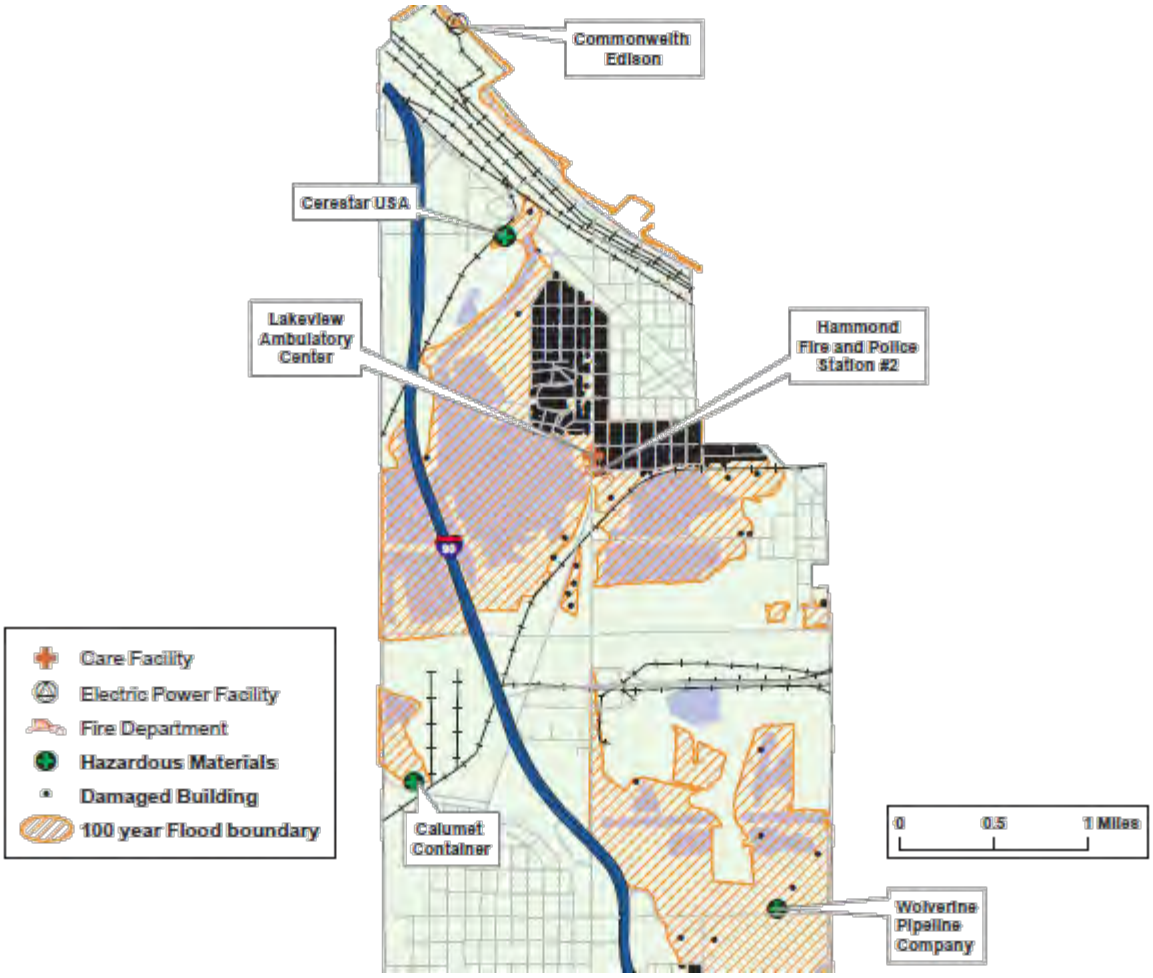
Facility Name
Lakeview Ambulatory Center
Hammond Fire and Police Station #2
Commonwealth Edison
National Guard Armory
Cerestar USA
Calumet Container
Illco
SBC
Speedway #8332
Wolverine Pipeline Company
Woodland Childcare
Sawyer College
Jean Shepherd Community Center

Figure 5-29: Boundary of 100-Year Flood Overlaid with Critical Facilities (Southern Hammond)



NOTE: Analysis did not use official DFIRMS

Figure 5-30: Boundary of 100-Year Flood Overlaid with Critical Facilities (Northern Hammond)



NOTE: Analysis did not use official DFIRMS

Town of Highland

Historical Flooding

Highland has experienced significant flooding in the past from the Little Calumet River. The north section of Highland is particularly flood-prone. Completion of the Little Calumet River Flood Control Project will protect the northern section. Highland also experiences flooding in the southern section from runoff and inadequate drainage from areas south of the town limits. Inadequate drainage structures cause flooding of many streets and some homes. The planning team developed mitigation strategies, listed in Section 6.0, to address these issues.

Main Street & US 41, Highland, Sept. 2008; *Source: Lake County Surveyor*

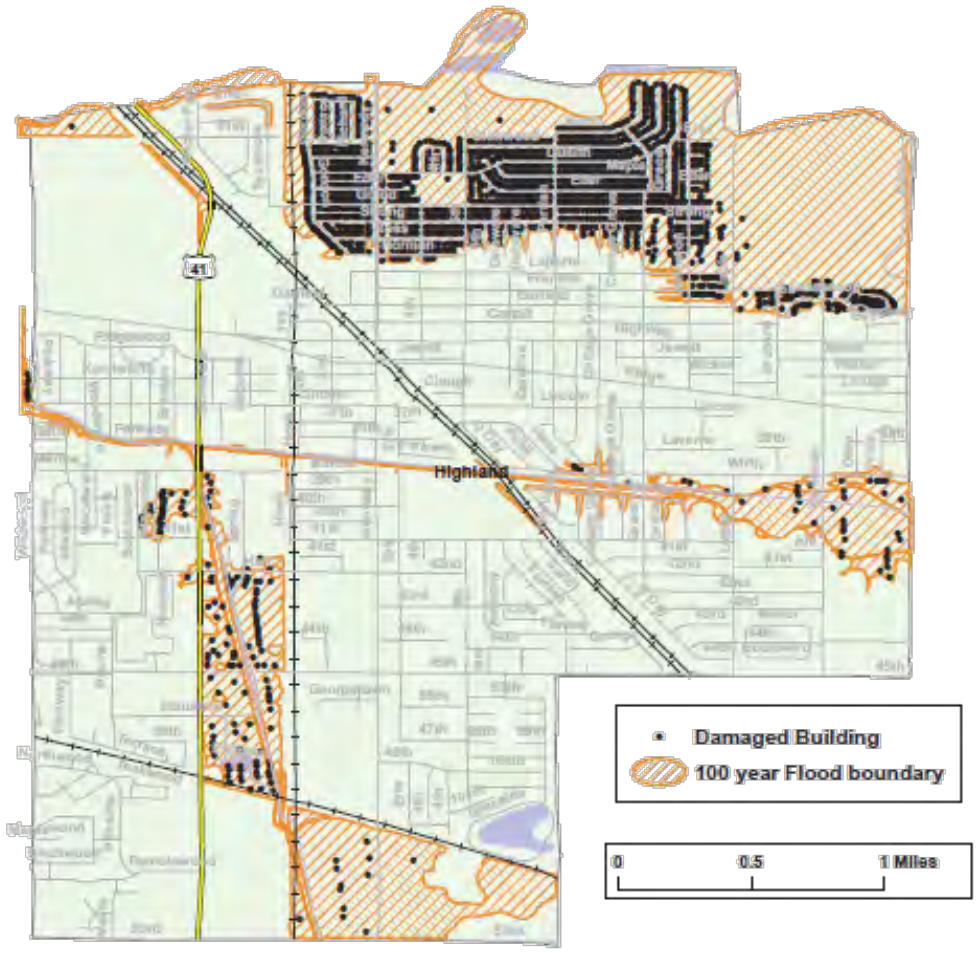
Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 1,813 buildings at a replacement cost of $252 million. The total estimated numbers of potentially damaged buildings are given in Table 5-34. Figure 5-31 depicts the Highland parcel points that fall within the 100-year floodplain.

Table 5-34: Highland Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	1,690	$188,905
Commercial	97	$48,212
Industrial	21	$4,124
Government	4	$4,269
Education	1	$7,043
Total	**1,813**	**$252,553**

Figure 5-31: Highland Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

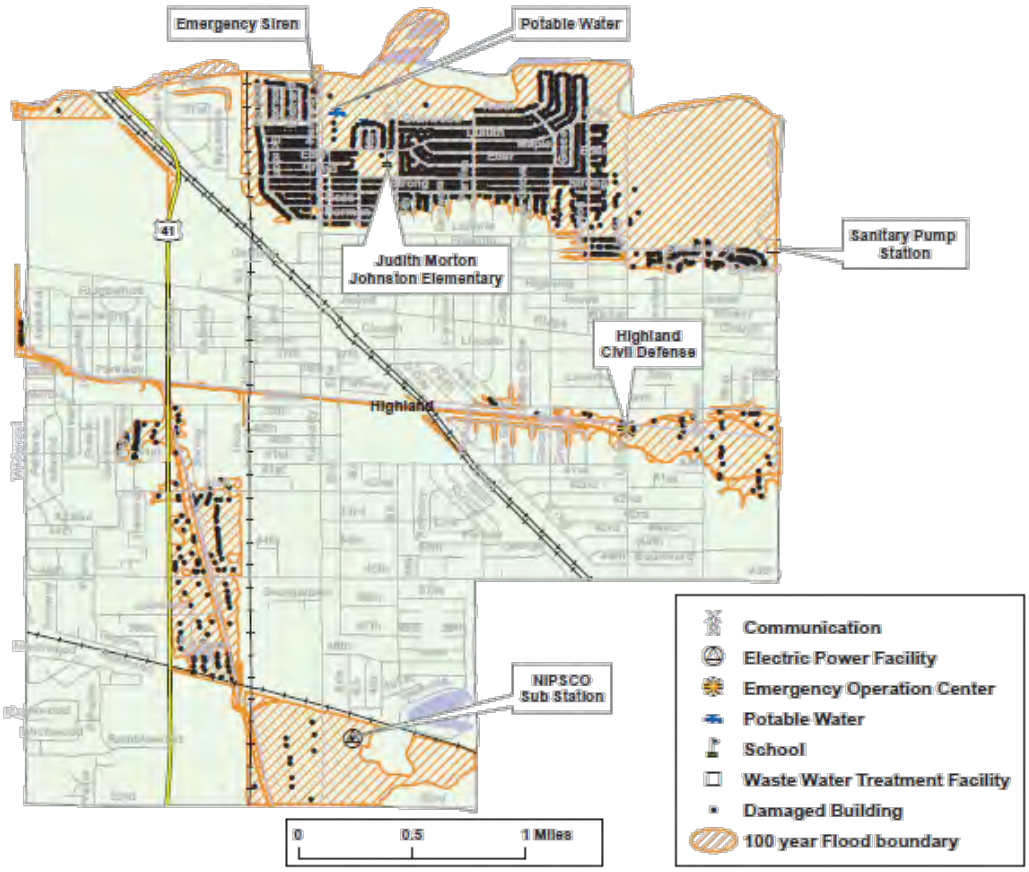
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The analysis identified one emergency siren, one electric power facility, one emergency operations center, two potable water facilities, one school, and one wastewater treatment facility that may be subject to flooding. The vulnerable critical facilities are in Table 5-35. A map of critical facility potentially at risk to flooding is shown in Figure 5-32.

Table 5-35: Lake County Damaged Critical Facilities

Facility Name
Emergency Siren (Bradley Pumping Station)
NIPSCO Sub Station
Highland Civil Defense (EOC)
Bradley Pump Station
Kennedy Avenue Storage
Judith Morton Johnston Elementary School
Sanitary Pump Station

Figure 5-32: Boundary of 100-Year Flood Overlaid with Critical Facilities



NOTE: Analysis did not use official DFIRMS

City of Hobart

Hobart, Sept. 2008;
Source: NWI Times

Historical Flooding

The City of Hobart experienced major flooding in 2008. Currently several properties, including the community center, are in flood-prone areas. The mitigation strategies in Section 6.0 include drainage projects that are in progress.

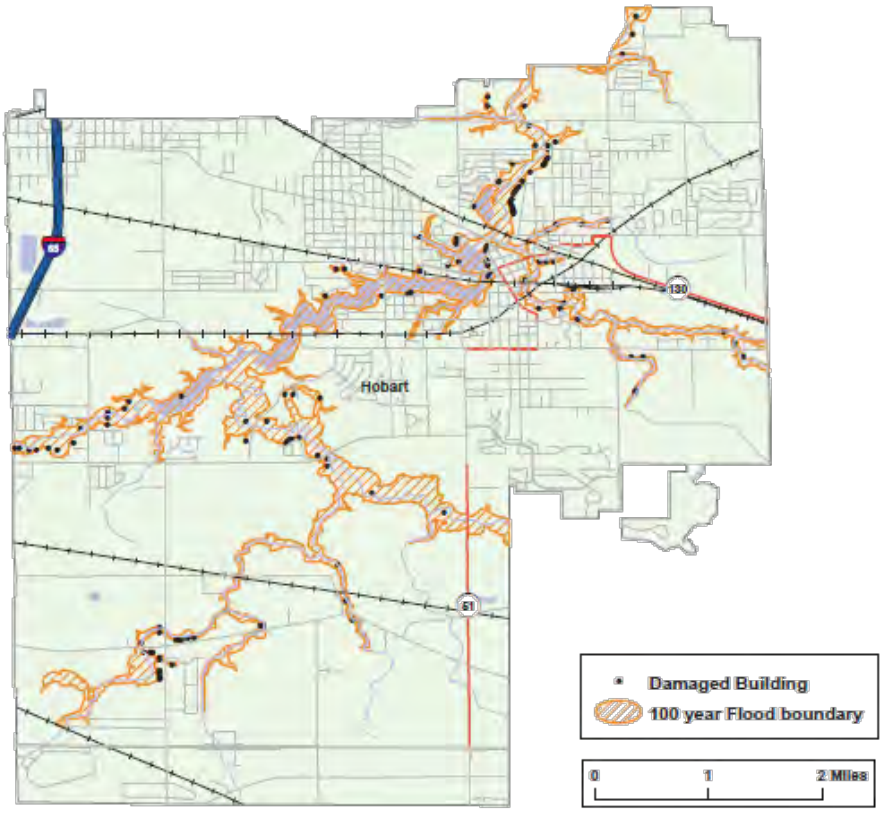
Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 132 buildings at a replacement cost of $24.2 million. The total estimated numbers of potentially damaged buildings are given in Table 5-36. Figure 5-33 depicts the Hobart parcel points that fall within the 100-year floodplain.

Table 5-36: Hobart Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	117	$17,874
Commercial	11	$6,117
Agricultural	2	$217
Government	1	$3
Education	1	$42
Total	**132**	**$24,253**

Figure 5-33: Hobart Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

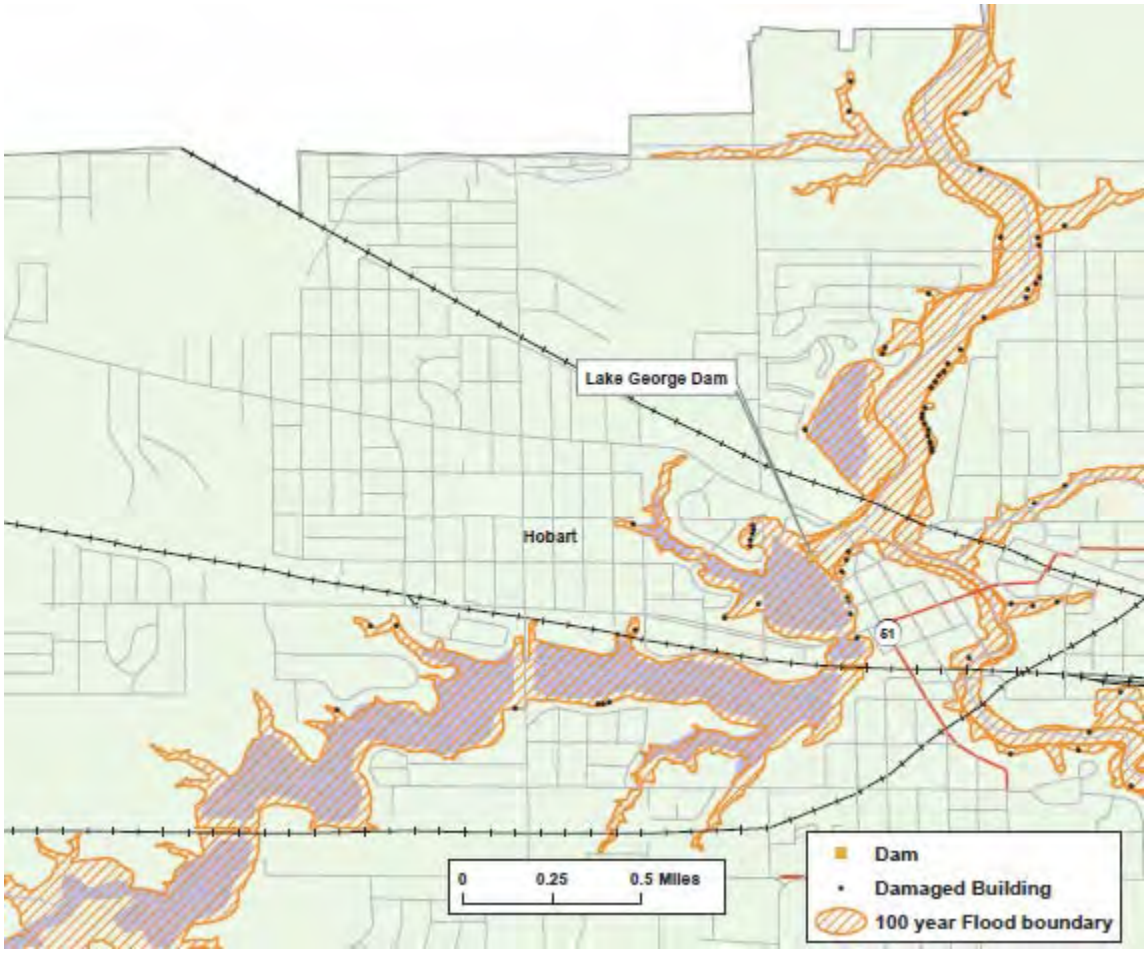
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). A complete list of all the critical facilities, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

The analysis identified one dam that may be subject to flooding. A list of the critical facility potentially at risk to flooding within Hobart is given in Table 4-20. A map of the critical facility potentially at risk to flooding is shown in Figure 4-6.

Table 4-20: Hobart Damaged Critical Facilities

Facility Name
Lake George Dam

Figure 4-6: Boundary of 100-Year Flood Overlaid with Critical Facilities



NOTE: Analysis did not use official DFIRMS

City of Lake Station

Riverside Mobile Home Park, Lake Station; January 2008; *Source: NWI Times*

Historical Flooding

Lake Station experienced significant flooding in 2008. An aerial photograph depicting the flooding is shown in Figure 5-34. Major flooding occurred at the Riverside trailer park and along Wyoming Street on the south side of Interstate 80/94, as well as on the north side of the city along 23rd and 24th streets.

Figure 5-34: 2008 Flooding in Lake Station

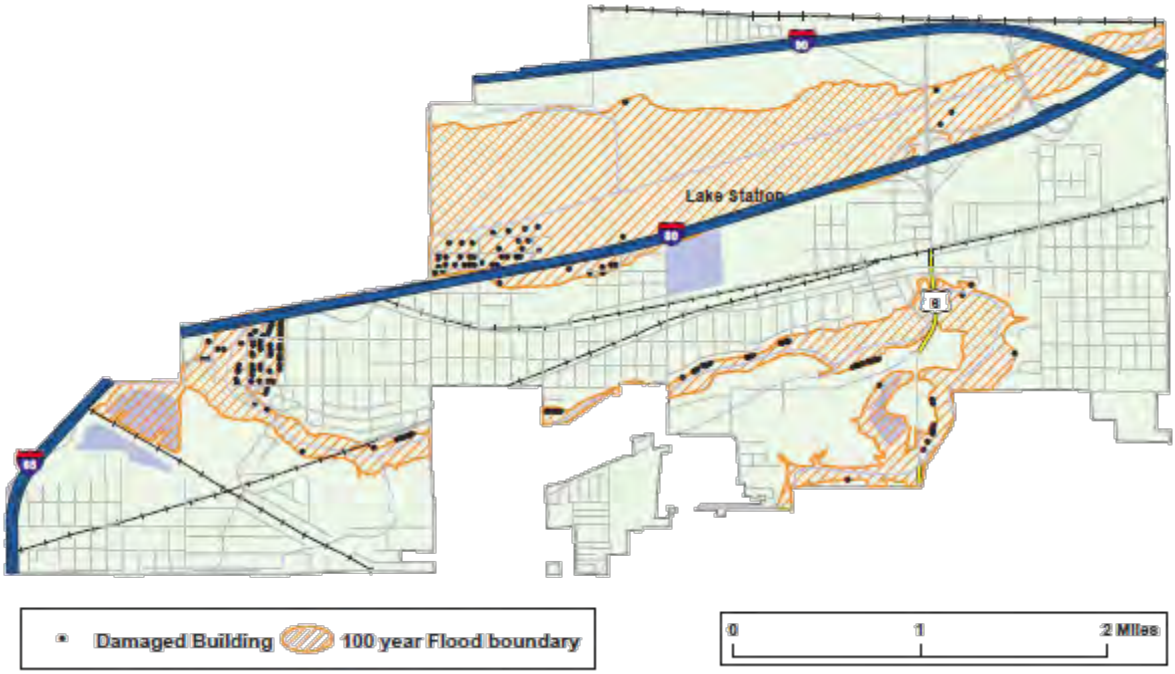
Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 152 buildings at a replacement cost of $26.4 million. The total estimated numbers of potentially damaged buildings are given in Table 5-37. Figure 5-35 depicts the Lake Station parcel points that fall within the 100-year floodplain.

Table 5-37: Lake Station Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	143	$13,676
Commercial	7	$10,095
Industrial	1	$1,664
Government	1	$924
Total	**152**	**$26,359**

Figure 5-37: Lake Station Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

The flood analysis estimates that there will be no critical facilities affected in Lake Station.

Town of Lowell

Historical Flooding

The Town of Lowell experienced major flooding from Cedar Creek in 2008. Much of the damage was caused by the Lake Dalecarlia Dam overtopping and flooding Cedar Creek. Section 6.0 identifies specific mitigation strategies.

Flood Analysis

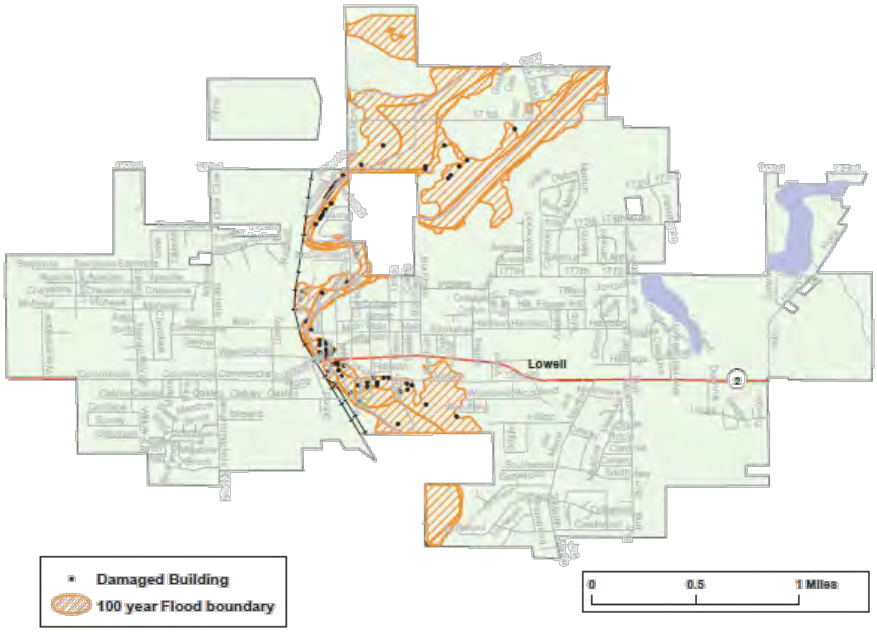
The analysis estimates that the 100-year flood could potentially damage 68 buildings at a replacement cost of $24.1 million. The total estimated numbers of potentially damaged buildings are given in Table 5-38. Figure 5-36 depicts the Lowell parcel points that fall within the 100-year floodplain.

Cedar Creek @ 121st Ave, Lowell, Sept. 2008;
Source: Lake County Surveyor

Table 5-38: Lowell HAZUS-MH Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	49	$6,641
Commercial	14	$4,035
Industrial	3	$11,150
Religious	1	$2,278
Government	1	$19
Total	**68**	**$24,123**

Figure 5-36: Lowell Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

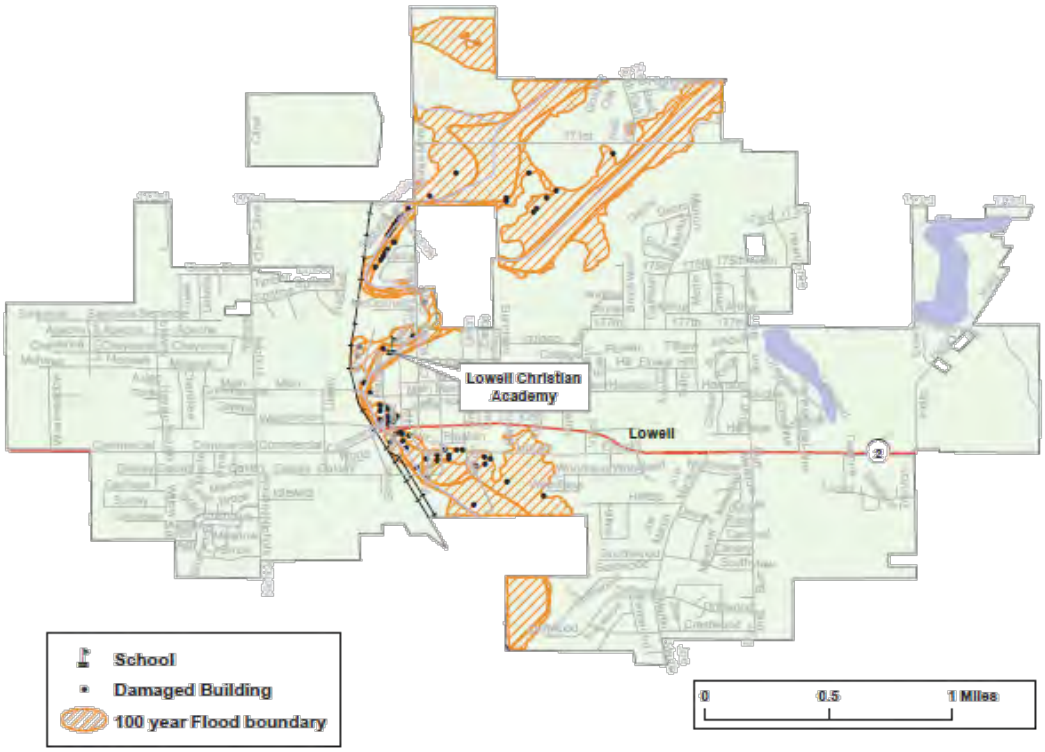
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The analysis identified one school facility that may be subject to flooding. A list of the critical facility potentially at risk to flooding within Lowell is given in Table 5-39. A map of critical facility potentially at risk to flooding is shown in Figure 5-37.

Table 5-39: Lowell Damaged Critical Facilities

Facility Name
Lowell Christian Academy

Figure 5-37: Boundary of 100-Year Flood Overlaid with Critical Facilities



NOTE: Analysis did not use official DFIRMS

Town of Merrillville

Merrillville; Sept. 2008;
Source: Panoramio

Historical Flooding

Merrillville is vulnerable to flooding from inadequate drainage, poor drainage infrastructure, and sanitary sewer backups. Residential development has created areas of poor drainage and flooding in the northwest and southeast quadrants of the town.

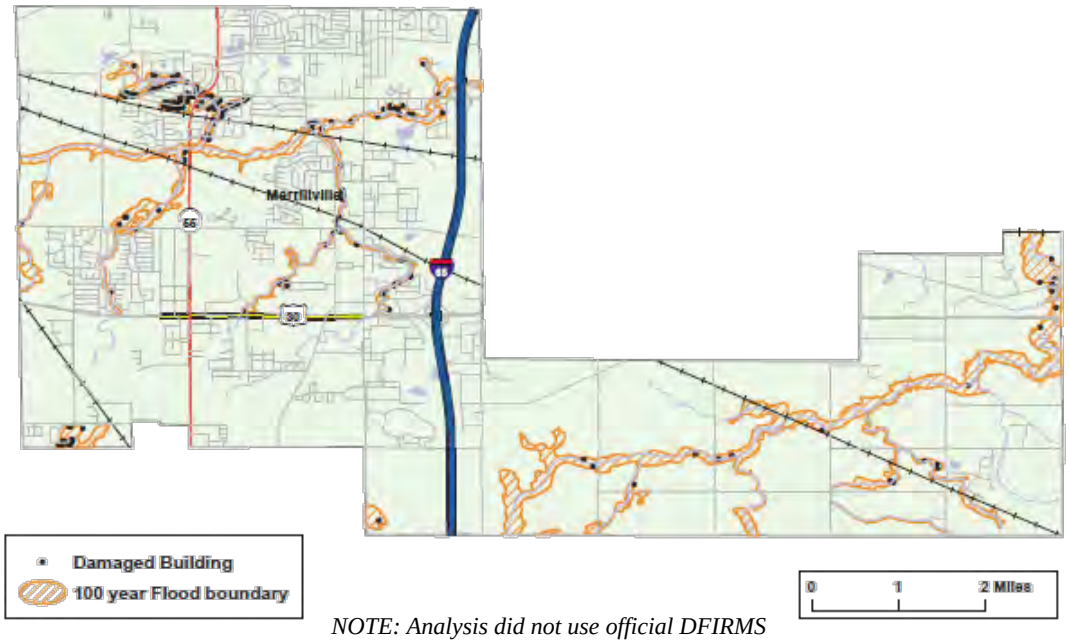
Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 213 buildings at a replacement cost of $46.5 million. The total estimated numbers of potentially damaged buildings are given in Table 5-40. Figure 5-38 depicts the Merrillville parcel points that fall within the 100-year floodplain.

Table 5-40: Merrillville Building Damage

General Occupancy	Number of Buildings Damaged	Total Building Damage (x1000)
Residential	175	$27,097
Commercial	9	$11,498
Industrial	2	$80
Agricultural	3	$337
Religious	19	$6,947
Government	5	$522
Total	**213**	**$46,481**

Figure 5-38: Merrillville Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

The flood analysis estimates that there will be no critical facilities affected in Merrillville.

Town of Munster

Historical Flooding

The majority of flooding in 2008 occurred in the north section of the town, and the properties behind the levees are an area of flooding concern. A map is included in Figure 5-39, and an aerial view is shown in Figure 5-40. The mitigation strategies in Section 6.0 include updating the city's comprehensive plan and instituting buy-outs of all residential properties behind the levee in order to transform the low-lying, flood-prone area into a park.

Munster, September 13, 2008; *Source: FEMA/Leo Skinner*

Figure 5-39: Munster Situational Map

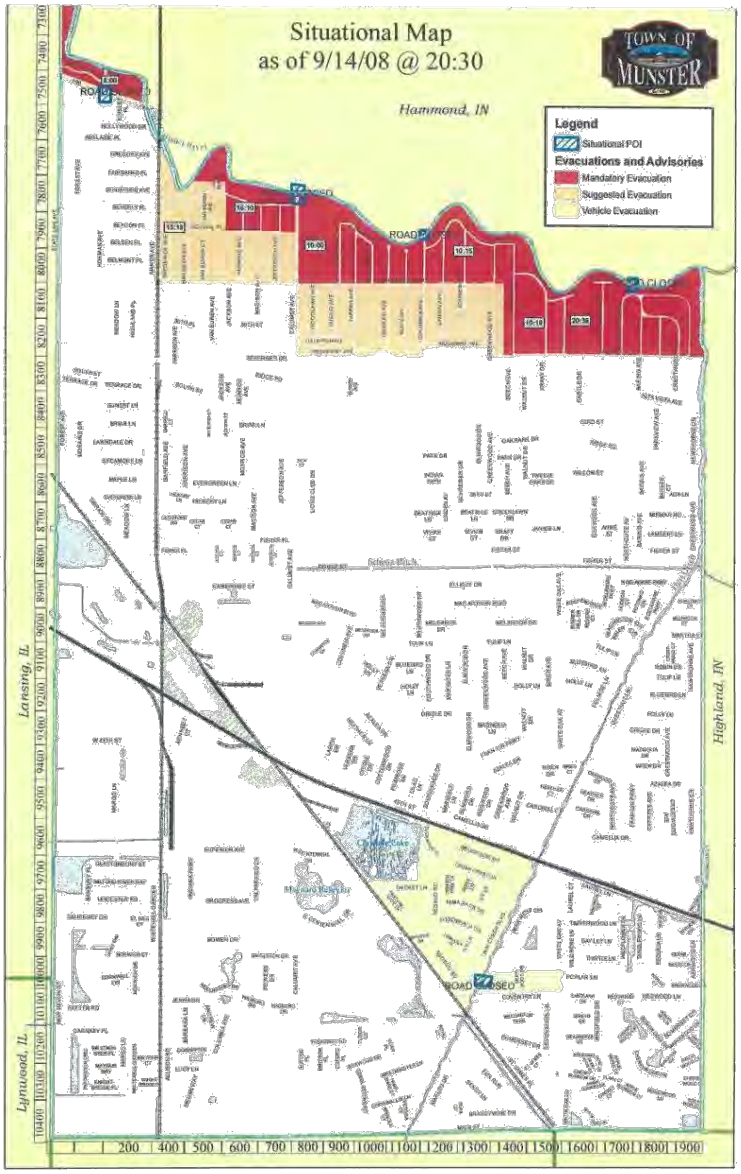


Figure 5-40: 2008 Flooding in Munster

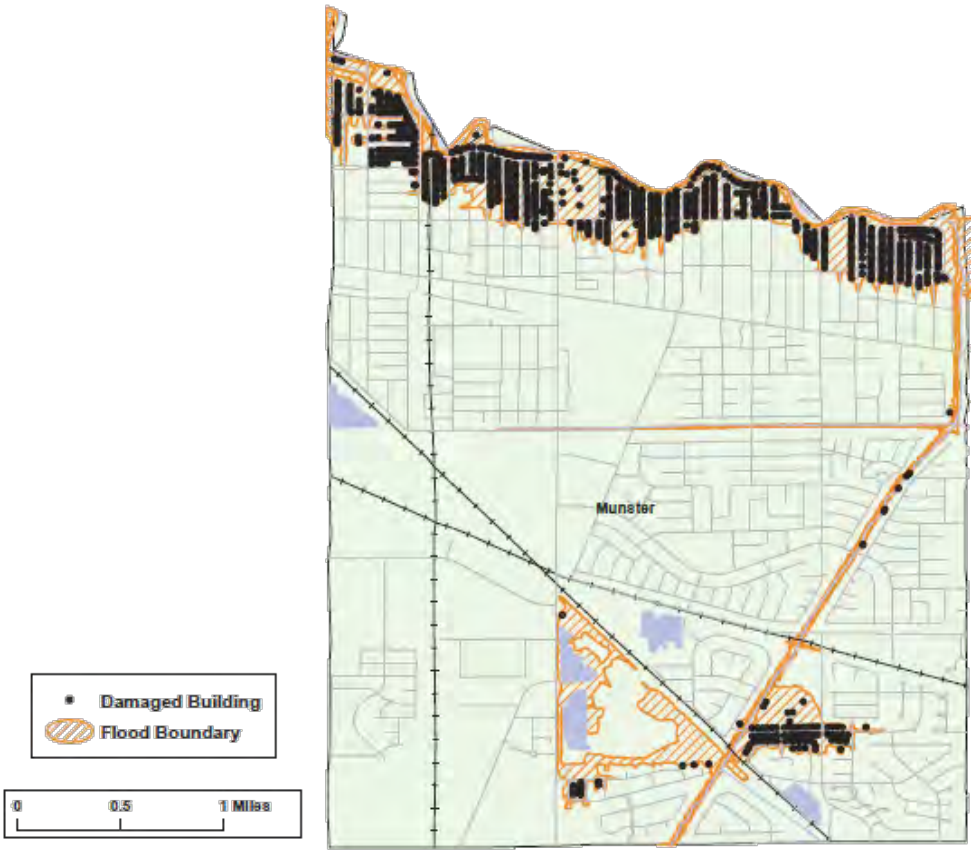
Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 1,118 buildings at a replacement cost of $27.6 million. The total estimated number of potentially damaged buildings is given in Table 5-41. Figure 5-41 depicts the Munster parcel points that fall within the 100-year floodplain.

Table 5-41: Munster Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	1,087	$200,548
Commercial	26	$49,683
Religious	3	$2,670
Government	2	$194
Total	**1,118**	**$253,095**

Figure 5-41: Munster Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

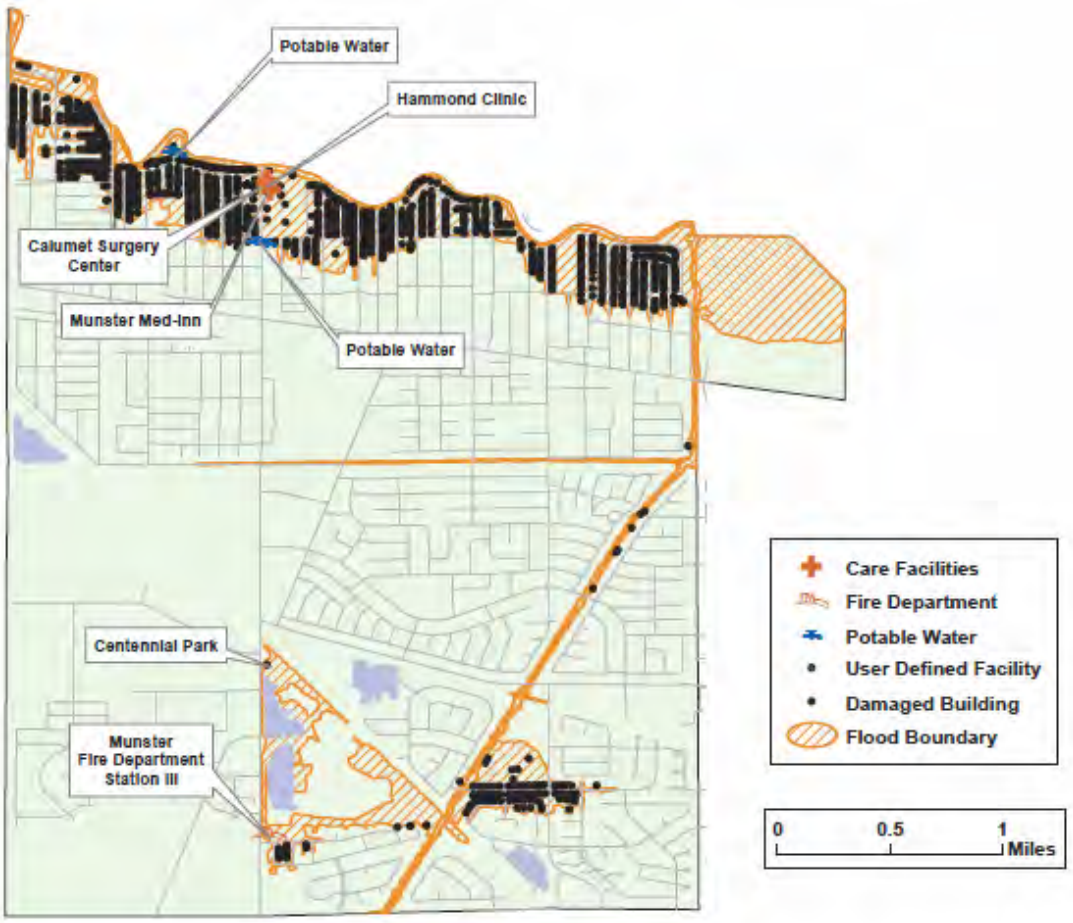
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The analysis identified three care facilities, one fire station, four potable water facilities, and one user-defined facility that may be subject to flooding. Vulnerable critical facilities are in Table 5-42. A map of critical facilities potentially at risk to flooding is shown in Figure 5-42.

Table 5-42: Munster, Indiana Damaged Critical Facilities

Facility Name
Calumet Surgery Center
Munster Med-Inn
Hammond Clinic
Munster Fire Department Station III
River Bend Pump Station
River Bend Water Tanks
Calumet Pump Station
Calumet Water Tanks
Centennial Park

Figure 5-42: Boundary of 100-Year Flood Overlaid with Critical Facilities



NOTE: Analysis did not use official DFIRMS

Town of New Chicago

Historical Flooding

The Town of New Chicago has potential flooding related to its combined sewer system. In addition, the community has potential flooding along Deep River on the north side of the town.

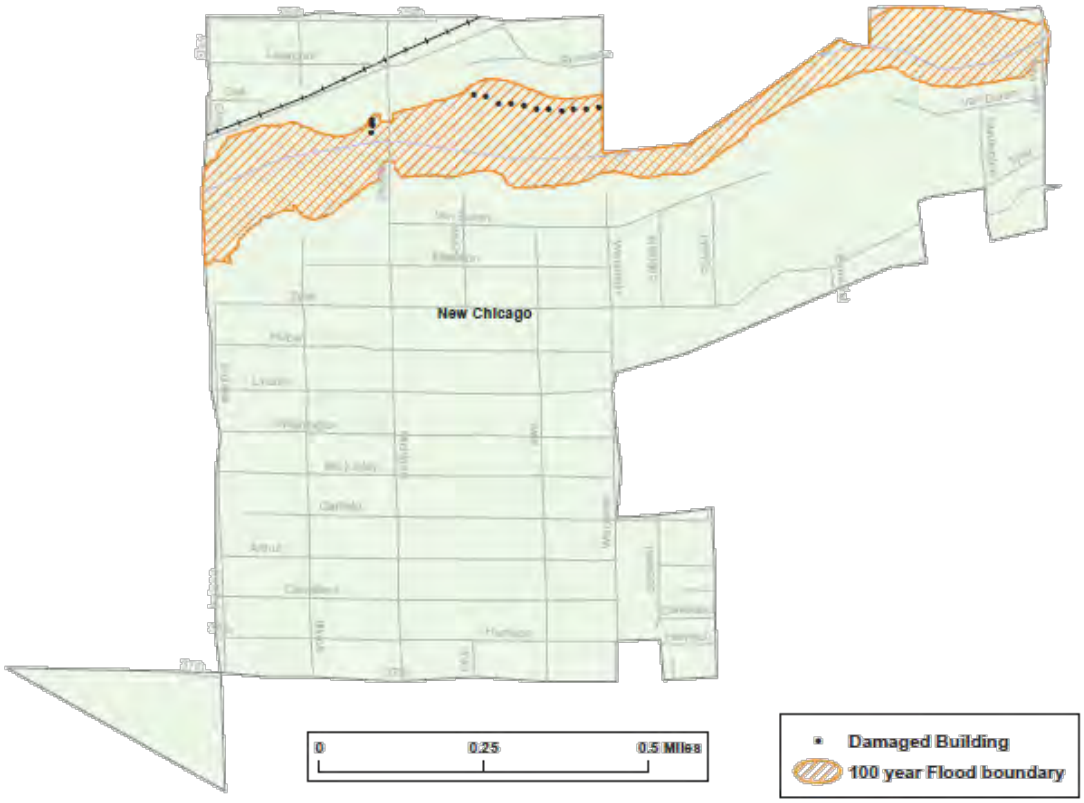
Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 15 buildings at a replacement cost of $1.1 million. The total estimated numbers of potentially damaged buildings are given in Table 5-43. Figure 5-43 depicts the New Chicago parcel points that fall within the 100-year floodplain.

Table 5-43: New Chicago Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	11	$1,032
Commercial	4	$22
Total	**15**	**$1,054**

Figure 5-43: New Chicago Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

The flood analysis estimates that there will be no critical facilities affected.

Town of Schererville

Historical Flooding

The interviews with Schererville representatives identified major flooding problems in the north side of the community including areas along Kennedy Avenue. Localized flash flooding also occurs regularly along US Highway 30 at the railroad overpass east of Highway 41. The flooding of 2008 eroded the Grand Canopy retention pond structure, which contains 400 acre feet of storage.

The town completed a watershed management study October 2009 to identify many drainage improvement projects. Section 6.0 addresses other mitigation strategies.

Main St & Kennedy Ave, Schererville; Sept. 2008; *Source: Lake County Surveyor*

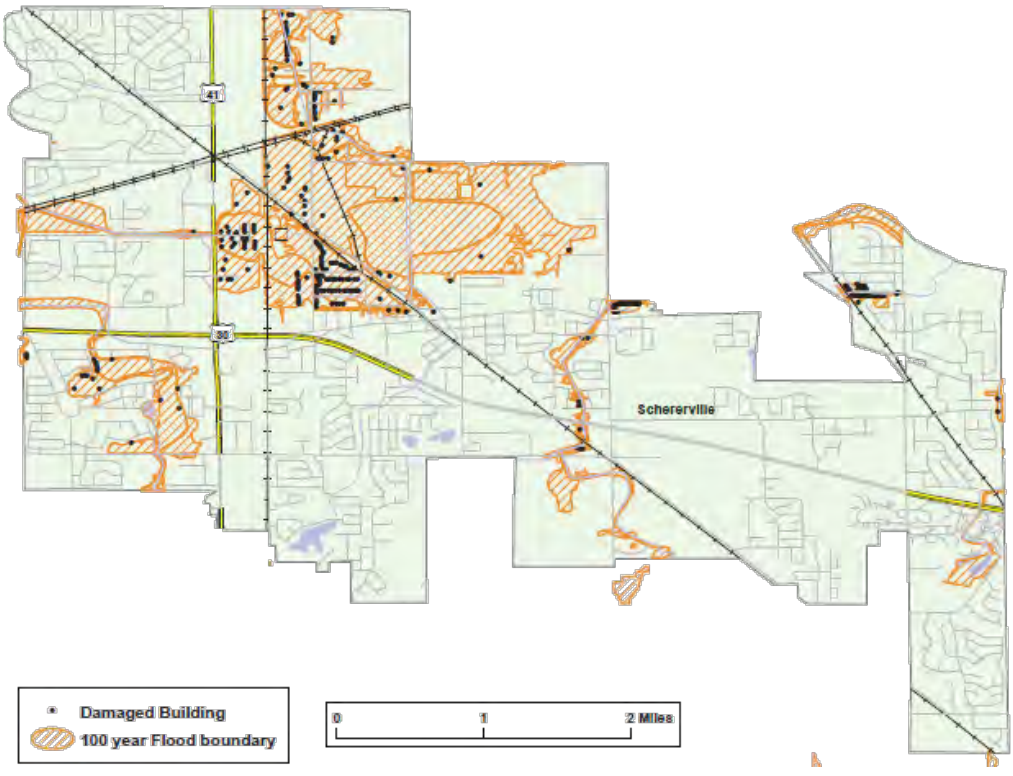
Flood Analysis

The analysis estimates that the 100-year flood would damage 320 buildings at a replacement cost of $113.8 million. The total estimated numbers of damaged buildings are given in Table 5-44. Figure 5-44 depicts the Schererville parcel points that fall within the 100-year floodplain.

Table 5-44: Schererville Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	240	$36,958
Commercial	24	$15,353
Industrial	54	$52,045
Religious	1	$9,407
Government	1	$13
Total	**320**	**$113,776**

Figure 5-44: Schererville Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

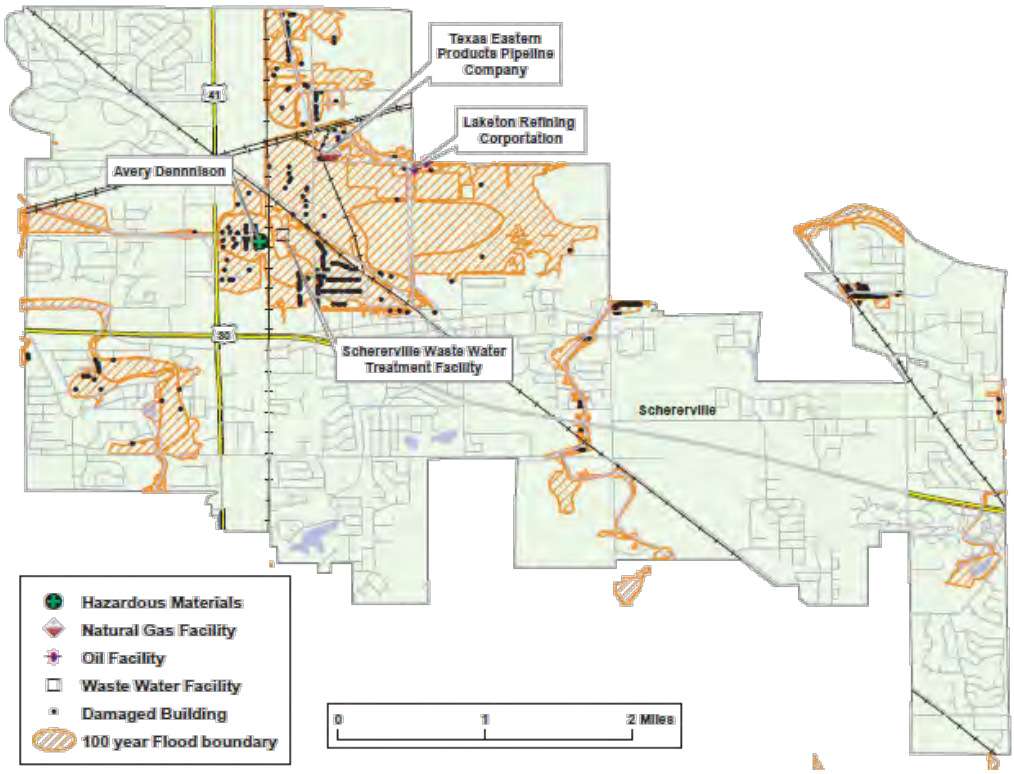
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The flood analysis identified one hazardous materials facility, one natural gas facility, one oil facility, and one wastewater treatment facility that may be subject to flooding. A list of the critical facilities within Schererville is given in Table 5-45. A map of critical facilities potentially at risk to flooding is shown in Figures 4-45.

Table 5-45: Schererville Damaged Critical Facilities

Facility Name
Avery Dennison (Hazardous Materials)
Texas Eastern Products (Natural Gas Facility)
Laketon Refining Corporation (Oil Facility)
Schererville Wastewater Facility

Figure 5-45: Boundary of 100-Year Flood Overlaid with Critical Facilities



NOTE: Analysis did not use official DFIRMS

Town of Schneider

Historical Flooding

Schneider experiences major flash flooding along Highway 41 due to poor drainage structures. Furthermore, the entire town is protected by a levee; in the event of levee failure, the community would be inundated by Kankakee River.

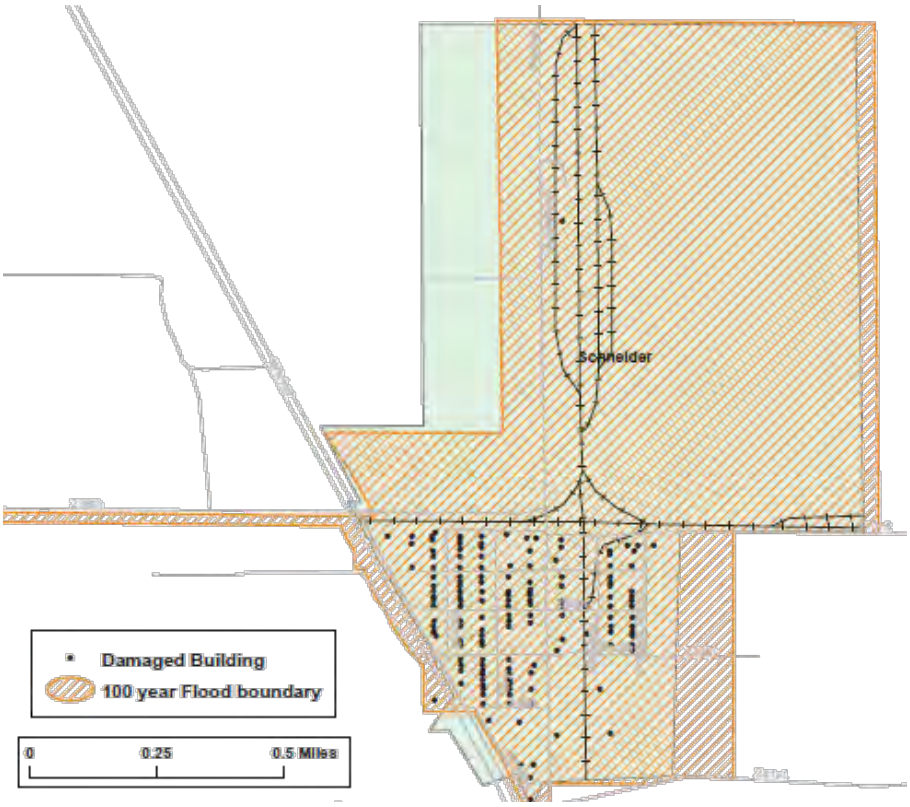
Flood Analysis

The analysis estimates that the 100-year flood would damage 147 buildings at a replacement cost of $19.3 million. The total estimated numbers of damaged buildings are given in Table 5-46. Figure 5-46depicts the Schneider parcel points that fall within the 100-year floodplain.

Table 5-46: Schneider Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	127	$9,364
Commercial	7	$1,265
Industrial	9	$7,547
Religious	1	$282
Government	3	$865
Total	**147**	**$19,323**

Figure 5-46: Schneider Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

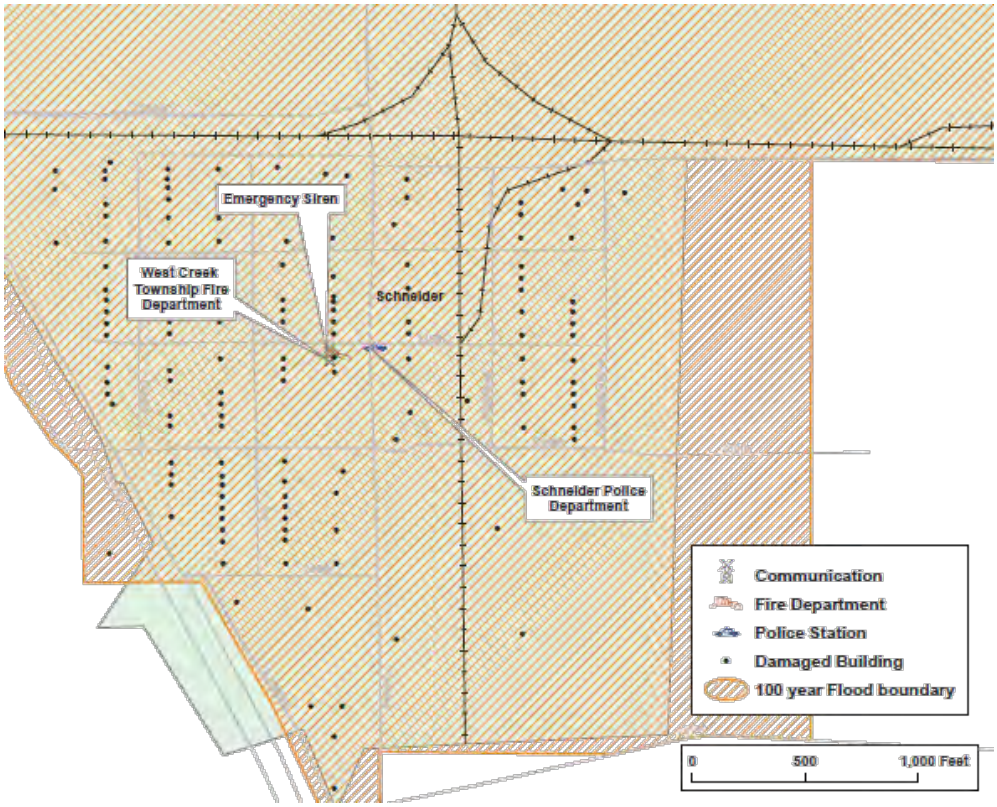
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The flood analysis identified one communications facility, one fire department, and one police department that may be subject to flooding. Vulnerable critical facilities are listed in Table 5-47. A map of critical facilities potentially at risk to flooding is shown in Figures 5-47.

Table 5-47: Schneider Damaged Critical Facilities

Facility Name
Emergency Siren (Schneider fire station)
West Creek Township Fire Department
Schneider Police Department

Figure 5-47: Boundary of 100-Year Flood Overlaid with Critical Facilities



NOTE: Analysis did not use official DFIRMS

Town of St. John

Historical Flooding

Much of St. John is located on high ground and is not as susceptible to flooding as other areas in the county; however, there are still areas that are vulnerable to flash and riverine flooding, and in 2003, many residents reported flood damage to their homes.

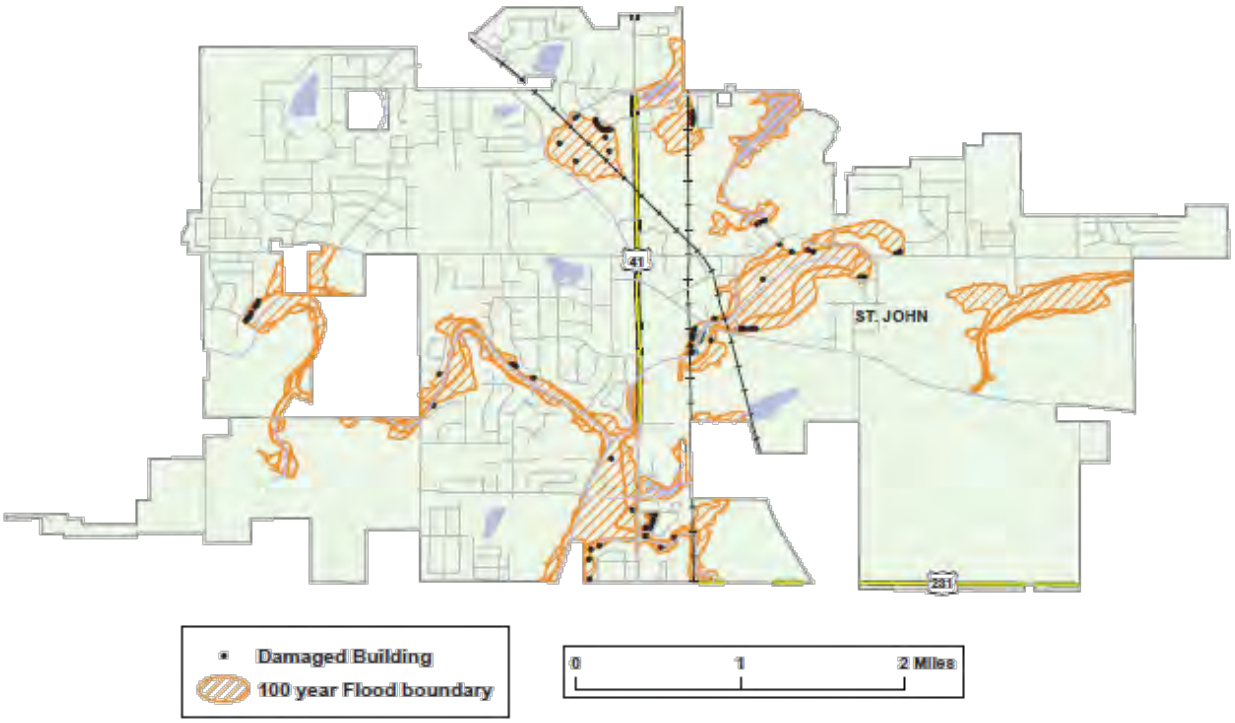
Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 80 buildings at a replacement cost of $14.6 million. The total estimated numbers of potentially damaged buildings are given in Table 5-48. Figure 5-48 depicts the St John parcel points that fall within the 100-year floodplain.

Table 5-48: St John Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	65	$11,685
Commercial	2	$454
Industrial	9	$2,298
Religious	3	$162
Government	1	$5
Total	**80**	**$14,604**

Figure 5-48: St John Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

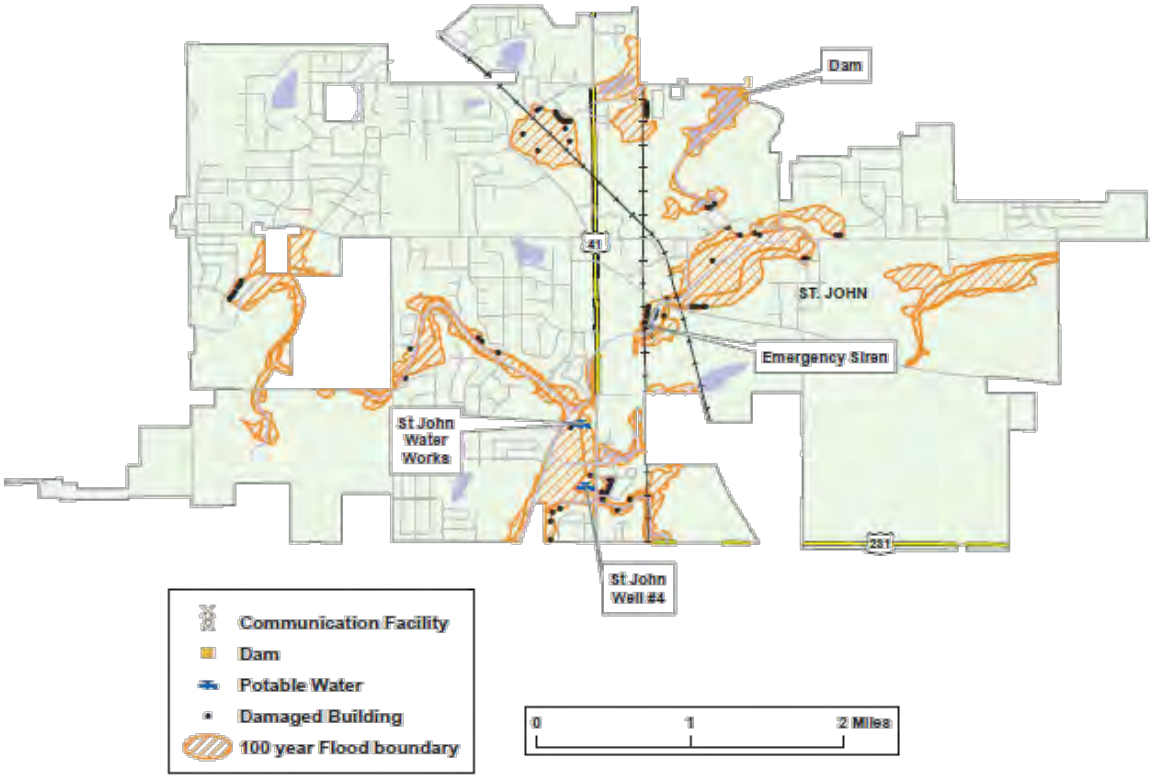
A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

The HAZUS-MH analysis identified one communication tower, one dam, and two potable water facilities that may be subject to flooding. A list of the critical facilities within St John is given in Table 5-49. A map of critical facilities potentially at risk to flooding is shown in Figure 5-49.

Table 5-49: St John Damaged Critical Facilities

Facility Name
Communication Tower- Fire Training Site
Dam
St John Water Works
St John Water Well #4

Figure 5-49 Boundary of 100-Year Flood Overlaid with Essential Facilities



NOTE: Analysis did not use official DFIRMS

City of Whiting

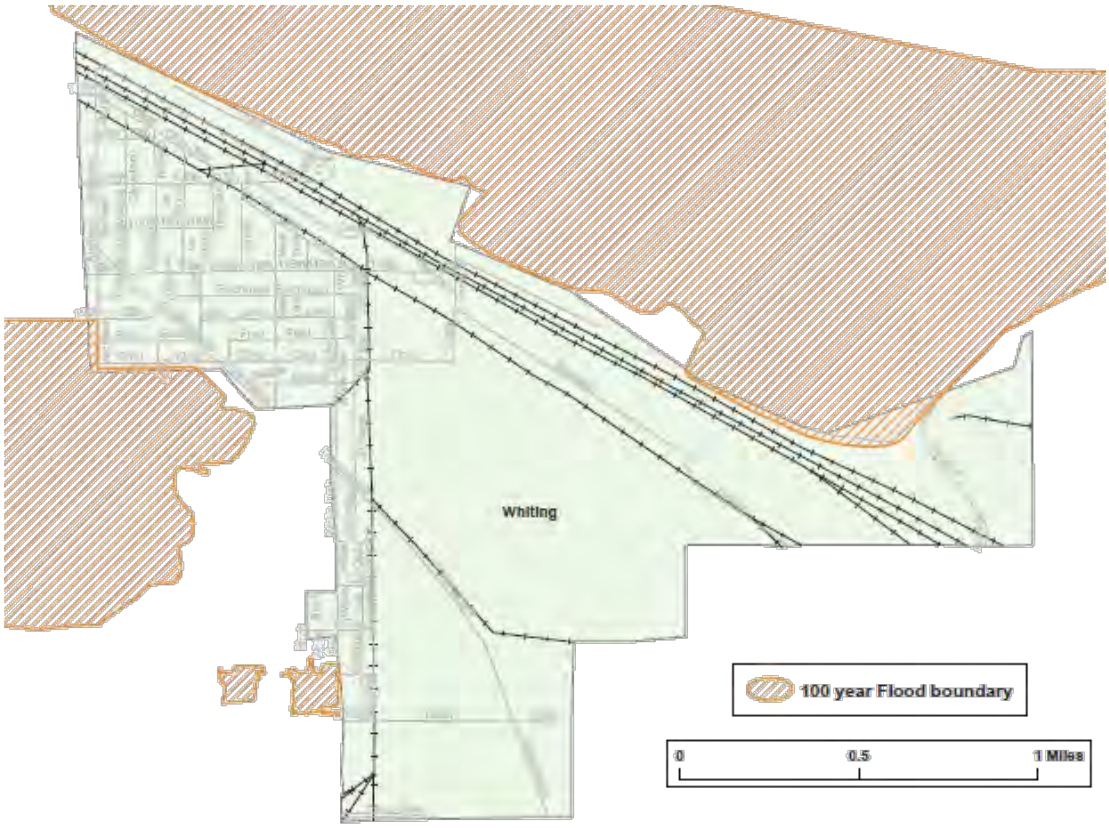
Historical Flooding

Due to its location next to Lake Michigan, Whiting does not experience extreme flood events, nor does it have any flood-prone properties.

Flood Analysis

The analysis estimates that the 100-year flood would not damage any buildings in Whiting. Figure 5-50 depicts Whiting and the 100-year floodplain in the area.

Figure 5-50: Whiting and Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

Town of Winfield

Historical Flooding

The Town of Winfield experiences minimal flooding. Any significant flooding that the town does experience is flash flooding along streets due to inadequate stormwater drainage.

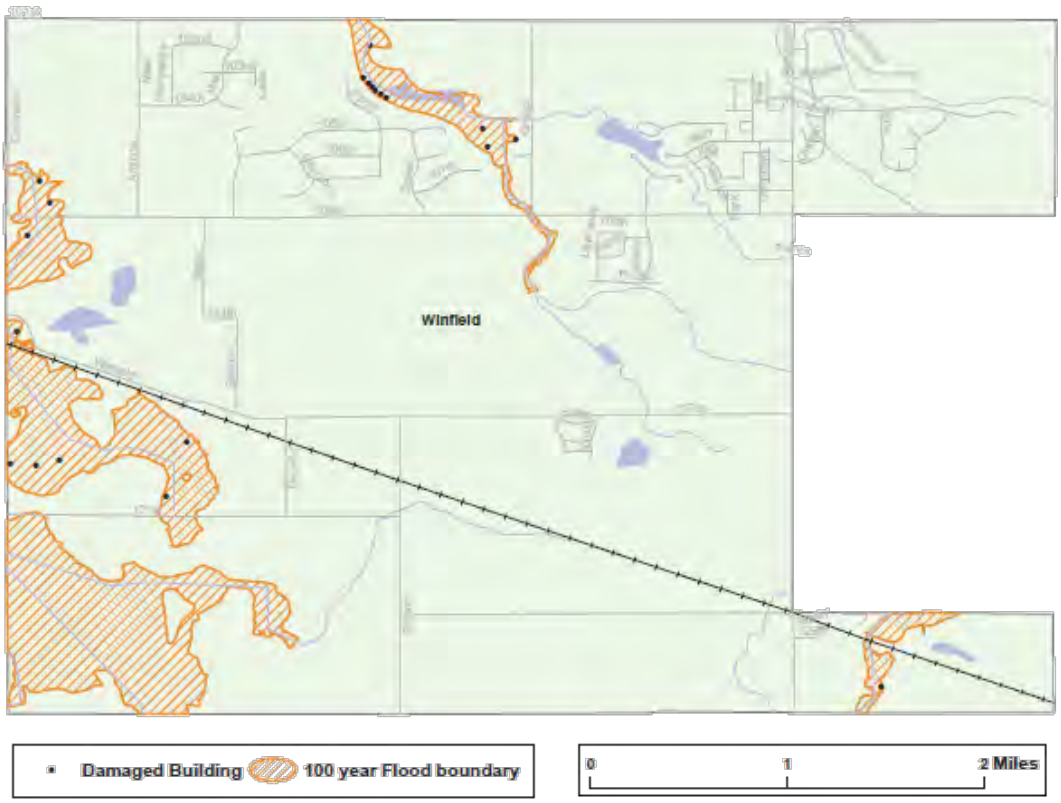
Flood Analysis

The analysis estimates that the 100-year flood could potentially damage 20 buildings at a replacement cost of $4.9 million. The total estimated numbers of potentially damaged buildings are given in Table 5-50. Figure 5-51 depicts the Winfield parcel points that fall within the 100-year floodplain.

Table 5-50: Winfield Building Damage

General Occupancy	Number of Buildings Potentially Damaged	Total Potential Building Damage (x1000)
Residential	14	$3,902
Agricultural	6	$994
Total	**20**	**$4,896**

Figure 5-51: Winfield Buildings in Floodplain (100-Year Flood)



NOTE: Analysis did not use official DFIRMS

The flood analysis estimates that there will be no critical facilities affected in Winfield.

Infrastructure

The types of infrastructure that could be impacted by a flood include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available for this plan, it is important to emphasize that any number of these items could become damaged in the event of a flood. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (e.g. loss of power or gas to community); or railway failure from broken or impassable railways. Bridges could also fail or become impassable, causing traffic risks.

Vulnerability Analysis for Flash Flooding

Flash flooding could affect any location within this jurisdiction; therefore, the entire county's population and buildings are vulnerable to a flash flood. These structures can expect the same impacts as discussed in a riverine flood. Critical facility names and locations are included in Appendix E.

Vulnerability Analysis for Dam and Levee Failure

An EAP is required to assess the effect of dam failure on these communities. In order to be considered creditable flood protection structures on FEMA's flood maps, levee owners must provide documentation to prove the levee meets design, operation, and maintenance standards for protection against the "one-percent-annual chance" flood.

Vulnerability to Future Assets/Infrastructure for Flooding

Flash flooding may affect nearly every location within the county; therefore all buildings and infrastructure are vulnerable to flash flooding. Currently, the Lake County planning commission reviews new development for compliance with the local zoning ordinance. At this time no construction is planned within the area of the 100-year floodplain. Therefore, there is no new construction which will be vulnerable to a 100-year flood.

Vulnerability to Future Assets/Infrastructure for Dam and Levee Failure

The Lake County planning commission reviews new development for compliance with the local zoning ordinance.

Analysis of Community Development Trends

Controlling floodplain development is the key to reducing flood-related damages. Areas with recent development within the county may be more vulnerable to drainage issues. Storm drains and sewer systems are usually most susceptible. Damage to these can cause the back-up of water, sewage, and debris into homes and basements, causing structural and mechanical damage as well as creating public health hazards and unsanitary conditions.

5.3.3 EARTHQUAKE HAZARD

Hazard Definition

An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped Earth as the huge plates that form the earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free causing the ground to shake.

Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates, as is the case for seismic zones in the Midwestern United States. The most seismically active area is referred to as the New Madrid Seismic Zone. Scientists have learned that the New Madrid fault system may not be the only fault system in the Central U.S. capable of producing damaging earthquakes. The Wabash Valley fault system in Illinois and Indiana shows evidence of large earthquakes in its geologic history, and there may be other, as yet unidentified, faults that could produce strong earthquakes.

Ground shaking from strong earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area it may cause deaths, injuries, and extensive property damage.

The possibility of the occurrence of a catastrophic earthquake in the central and eastern United States is real as evidenced by history and described throughout this section. The impacts of significant earthquakes affect large areas, terminating public services and systems needed to aid the suffering and displaced. These impaired systems are interrelated in the hardest struck zones. Power lines, water and sanitary lines, and public communication may be lost; and highways, railways, rivers, and ports may not allow transportation to the affected region. Furthermore, essential facilities, such as fire and police departments and hospitals, may be disrupted if not previously improved to resist earthquakes.

As with hurricanes, mass relocation may be necessary, but the residents who are suffering from the earthquake can neither leave the heavily impacted areas nor receive aid or even communication in the aftermath of a significant event.

Magnitude, which is determined from measurements on seismographs, measures the energy released at the source of the earthquake. Intensity measures the strength of shaking produced by the earthquake at a certain location and is determined from effects on people, human structures, and the natural environment. Tables 5-51 and 5-52 list earthquake magnitudes and their corresponding intensities.

http://earthquake.usgs.gov/learning/topics/mag_vs_int.php

Table 5-51: Abbreviated Modified Mercalli Intensity Scale

Mercalli Intensity	Description
I	Not felt except by a very few under especially favorable conditions.
II	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Table 5-52: Earthquake Magnitude vs. Modified Mercalli Intensity Scale

Earthquake Magnitude	Typical Maximum Modified Mercalli Intensity
1.0 - 3.0	I
3.0 - 3.9	II - III
4.0 - 4.9	IV - V
5.0 - 5.9	VI - VII
6.0 - 6.9	VII - IX
7.0 and higher	VIII or higher

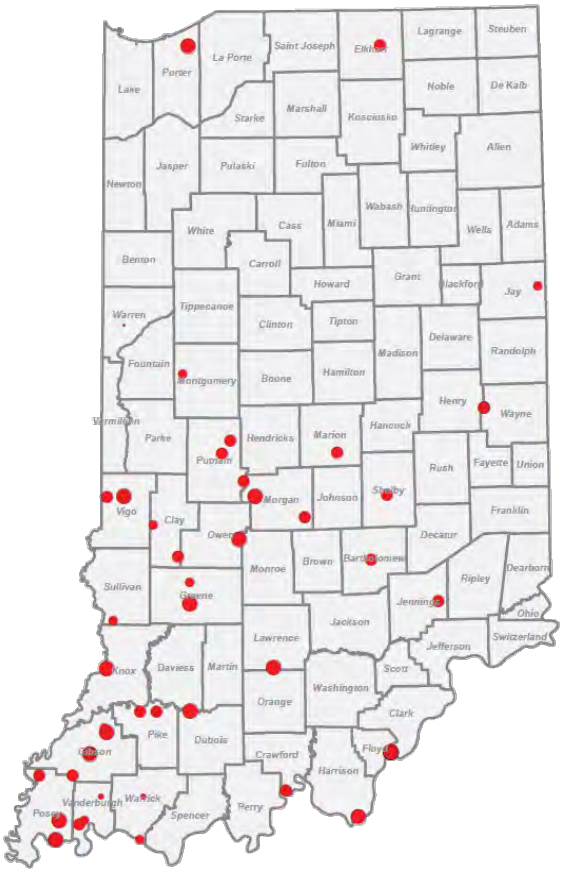
Previous Occurrences for Earthquake Hazard

Approximately 40 earthquakes have occurred in Indiana for which reasonably accurate records exist. They vary in moment magnitude from a low of approximately M=2.0 to a high of M=5.2. The consensus of opinion among seismologists working in the Midwest is that a magnitude 5.0- to 5.5-event could occur virtually anywhere at any time in the region. The last earthquake to occur in Indiana—as of the date of this report—occurred on September 12, 2004 just north of Shelbyville and measured 3.6 in magnitude. The largest prehistoric earthquake documented in the state occurred at Vincennes 6,100 years ago and is known by the size and physical character of sandblows formed during the quake to have had a moment magnitude of 7.4.

According to the Indiana Geological Survey (IGS), no earthquakes have been recorded with epicenters in Lake County. Statewide historical epicenters outside of Lake County are included

in Figure 5-52, although information related to the impacts to Lake County from these events is limited.

Figure 5-52: Historical Earthquake Epicenters

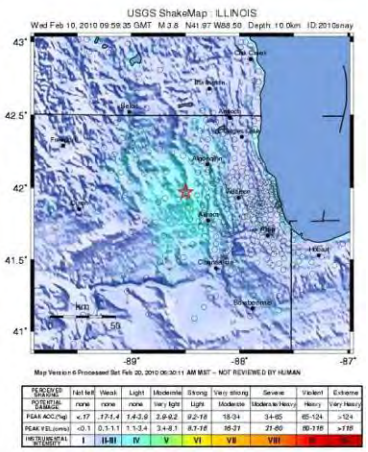


The most damaging Indiana earthquake originating within the state occurred on September 27, 1909 near the Indiana border between Vincennes and Terre Haute. Some chimneys fell, several building walls cracked, light connections severed, and pictures shook from the walls. It was felt throughout Indiana and parts of Iowa, Kentucky, Missouri, Arkansas, and probably in parts of Kansas, covering an area of 30,000 square miles.

Indiana has also suffered from damage caused by earthquakes originating in neighboring states. The worst occurred on November 9, 1968, and centered near Dale in southern Illinois. The shock, a magnitude of 5.3, was felt over 580,000 square miles and 23 states including all of Indiana. Intensity VII was reported from Cynthiana, where chimneys cracked, twisted, and toppled; at Fort Branch, where groceries fell from shelves and a loud roaring noise was heard; and in Mount Vernon, New Harmony, Petersburg, Princeton, and Stewartsville, all of which had similar effects. At Poseyville, "Fish jumped out of the rivers, ponds, and lakes."

On March 2, 1937, a shock centering near Anna, Ohio threw objects from shelves at Fort Wayne and some plaster fell. Six days later, another shock originating at Anna brought pictures crashing down and cracked plaster in Fort Wayne and was strongly felt in Lafayette.

On April 18, 2008, an earthquake originating in Illinois within the Wabash Valley Seismic Zone caused minor structural damage to buildings in East Alton, Mount Carmel, and West Salem, Illinois, and a cornice fell from one building at Louisville, Kentucky. The earthquake, a magnitude 5.4, was felt widely throughout the central United States from Green Bay, Wisconsin south to Atlanta, Georgia and Tuscaloosa, Alabama and from Sioux City, Iowa and Omaha, Nebraska east to Akron, Ohio and Parkersburg, West Virginia, including all or parts of Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Ohio, Tennessee, West Virginia, and Wisconsin. It was also felt in southern Ontario, Canada.



As of the date of this report, the most recent earthquake to hit the Central United States occurred on February 10, 2010 (see USGS shake map to the right). The epicenter of the magnitude 3.8 event was 3 km northwest of Lily Lake, Illinois, close to Chicago. Millions of people reported feeling the tremor including residents of Illinois, Indiana, Iowa, Michigan, Wisconsin, Kentucky, Tennessee, and even Georgia.

The great New Madrid earthquakes of 1811 and 1812 must have strongly affected the state, particularly the southwestern part, but there is little information available from these frontier times.

[The above history was abridged from Earthquake Information Bulletin, Volume 4, Number 4, July-August 1972 and from http://earthquake.usgs.gov/eqcenter/eqinthenews/2008/us2008qza6/#summary.]

1827 Jul 5 11:30 4.8M Intensity VI
Near New Harmony, Indiana (38.0N 87.5W)
The earthquake cracked a brick store at New Harmony, Indiana, and greatly alarmed some people. It was described as violent at New Madrid, Missouri, and severe in St. Louis. It also alarmed many in Cincinnati, Ohio and Frankfort, Kentucky.

1827 Aug 7 04:30 4.8M Intensity V
Southern Illinois (38.0N 88.0W)

1827 Aug 7 07:00 4.7M Intensity V
Southern Illinois (38.0N 88.0W)

1887 Feb 6 22:15 4.6M Intensity VI
Near Vincennes, Indiana (38.7N 87.5W)
This shock was strongest in southwest Indiana and southeast Illinois. Plaster was shaken from walls in Vincennes, west of Terre Haute, and in Martinsville; a cornice reportedly fell from a building in Huntington, Indiana. It was felt distinctly in Evansville, Indiana, but only slightly in the outskirts of St. Louis, Missouri. The shockwave was also reported in Louisville, Kentucky.

1891 Jul 27 02:28 4.1M Intensity VI
Evansville, Indiana (37.9N 87.5W)
A strong local earthquake damaged a wall on a hotel, broke dishes, and overturned furniture in Evansville. The shock also was strong near Evansville in Mount Vernon, and Newburgh Indiana; and at Hawesville, Henderson, and Owensboro, Kentucky.

1921 Mar 14 12:15 4.4M Intensity VI
Near Terre Haute, Indiana (39.5N 87.5W)
This earthquake broke windows in many buildings and sent residents rushing into the streets in Terre Haute. Small articles were overturned in Paris, Illinois, about 35 km northwest of Terre Haute.

1925 Apr 27 04:05 4.8M Intensity VI
Wabash River valley, near Princeton, Indiana (38.2N 87.8W)
Chimneys were downed in Princeton and in Carmi, Indiana; 100 km southwest chimneys were broken in Louisville, Kentucky. Crowds fled from the theaters in Evansville, Indiana. The affected area included parts of Indiana, Illinois, Kentucky, Missouri, and Ohio.

The above text was taken from http://earthquake.usgs.gov/regional/states/indiana/history.php

Geographic Location for Earthquake Hazard

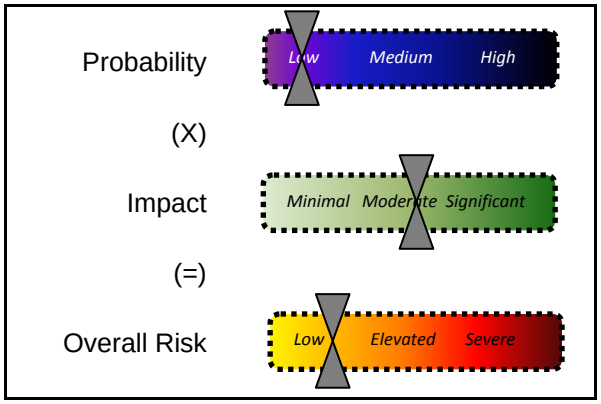
Lake County occupies a region susceptible to the threat of an earthquake along the Wabash Valley Fault System. Return periods for large earthquakes within the New Madrid System are estimated to be 500 years; moderate quakes between magnitude 5.5 and 6.0 can recur within approximately 150 years or less. The Wabash Valley Fault System is a sleeper that threatens the southwest quadrant of the state and may generate an earthquake large enough to cause damage as far north and east as Lake County.

Hazard Extent for Earthquake Hazard

The extent of the earthquake is countywide. One of the most critical sources of information that is required for accurate assessment of earthquake risk is soils data. A National Earthquake Hazards Reduction Program (NEHRP) compliant soils map was used for the analysis which was provided by IGS. The map identifies the soils most susceptible to failure.

Risk Identification for Earthquake Hazard

Based on historical information, the probability of an earthquake is low; however, USGS and IGS research and studies attest that future earthquakes in Lake County are possible. In Meeting #2, the planning team determined that the potential impact of an earthquake is moderate; therefore, the overall risk of an earthquake hazard for Lake County is low.



Vulnerability Analysis for Earthquake Hazard

This hazard could impact the entire jurisdiction equally; therefore, the entire county's population and all buildings are vulnerable to an earthquake and can expect the same impacts within the affected area. To accommodate this risk, this plan will consider all buildings located within the county as vulnerable.

Critical Facilities

All critical facilities are vulnerable to earthquakes. A critical facility would encounter many of the same impacts as any other building within the county. These impacts include structural failure and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Critical facility names and locations are included in Appendix E.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 5-5. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure and loss of building function which could result in indirect impacts (e.g. damaged homes will no longer be habitable causing residents to seek shelter).

Infrastructure

During an earthquake, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available to this plan, it is important to emphasize that any number of these items could become damaged in the event of an earthquake. The impacts to these items include broken, failed, or impassable roadways, broken or failed utility lines (e.g. loss of power or gas to community), and railway failure from broken or impassable railways. Bridges could also fail or become impassable causing traffic risks. Typical scenarios are described to gauge the anticipated impacts of earthquakes in the county in terms of numbers and types of buildings and infrastructure.

The Polis team contacted IGS to obtain existing geological information. Four earthquake scenarios—two based on deterministic scenarios and two based on probabilistic scenarios—were developed to provide a reasonable basis for earthquake planning in Lake County. Note that a deterministic scenario, in this context, refers to hazard or risk models based on specific scenarios without explicit consideration of the probability of their occurrences.

The first deterministic scenario was a 7.1 magnitude epicenter along the Wabash Valley fault zone. Shake maps provided by FEMA were used in HAZUS-MH to estimate losses for Lake County based on this event.

The second deterministic scenario was a moment magnitude of 5.5 with the epicenter located in Lake County. This scenario was selected based upon the opinion of the IGS stating it could occur in the selected location and that it would therefore represent a realistic scenario for planning purposes.

Additionally, the analysis included two different types of probabilistic scenarios. These types of scenarios are based on ground shaking parameters derived from U.S. Geological Survey probabilistic seismic hazard curves. The first probabilistic scenario was a 500-year return period scenario. This scenario evaluates the average impacts of a multitude of possible earthquake epicenters with a magnitude that would be typical of that expected for a 500-year return period. The second probabilistic scenario allowed calculation of annualized loss. The annualized loss analysis in HAZUS-MH provides a means for averaging potential losses from future scenarios while considering their probabilities of occurrence. The HAZUS-MH earthquake model evaluates eight different return period scenarios for the 100-, 250-, 500-, 750-, 1000-, 1500-, 2000-, and 2500-year return period earthquake events. HAZUS-MH then calculates the probabilities of these events as well as the interim events, calculates their associated losses, and sums these losses to calculate an annualized loss. These analysis options were chosen because they are useful for prioritization of seismic reduction measures and for simulating mitigation strategies.

The following earthquake hazard modeling scenarios were performed:

- 7.1 magnitude earthquake on the Wabash Valley Fault System
- 5.5 magnitude earthquake local epicenter
- 500-year return period event
- Annualized earthquake loss

Modeling a deterministic scenario requires user input for a variety of parameters. One of the most critical sources of information that is required for accurate assessment of earthquake risk is soils data. Fortunately, a National Earthquake Hazards Reduction Program (NEHRP) soil classification map exists for Indiana. NEHRP soil classifications portray the degree of shear-wave amplification that can occur during ground shaking. The IGS supplied the soils map was used for the analysis. FEMA provided a map for liquefaction potential that was used by HAZUS-MH.

An earthquake depth of 10.0 kilometers was selected based on input from IGS. HAZUS-MH also requires the user to define an attenuation function unless ground motion maps are supplied. Because Lake County has experienced smaller earthquakes, the decision was made to use the Central Eastern United States (CEUS) attenuation function. The probabilistic return period analysis and the annualized loss analysis do not require user input.

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.

HAZUS-MH Earthquake Analysis

Results for 7.1 Magnitude Earthquake Wabash Valley Scenario

The results of the 7.1 Wabash Valley earthquake are depicted in Table 5-53, Table 5-54, and Figure 5-53. HAZUS-MH estimates that approximately 60 buildings will be at least moderately damaged. It is estimated that no buildings will be damaged beyond repair.

The total building related losses totaled $26.3 million; 6% 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 more than 33% of the total loss.

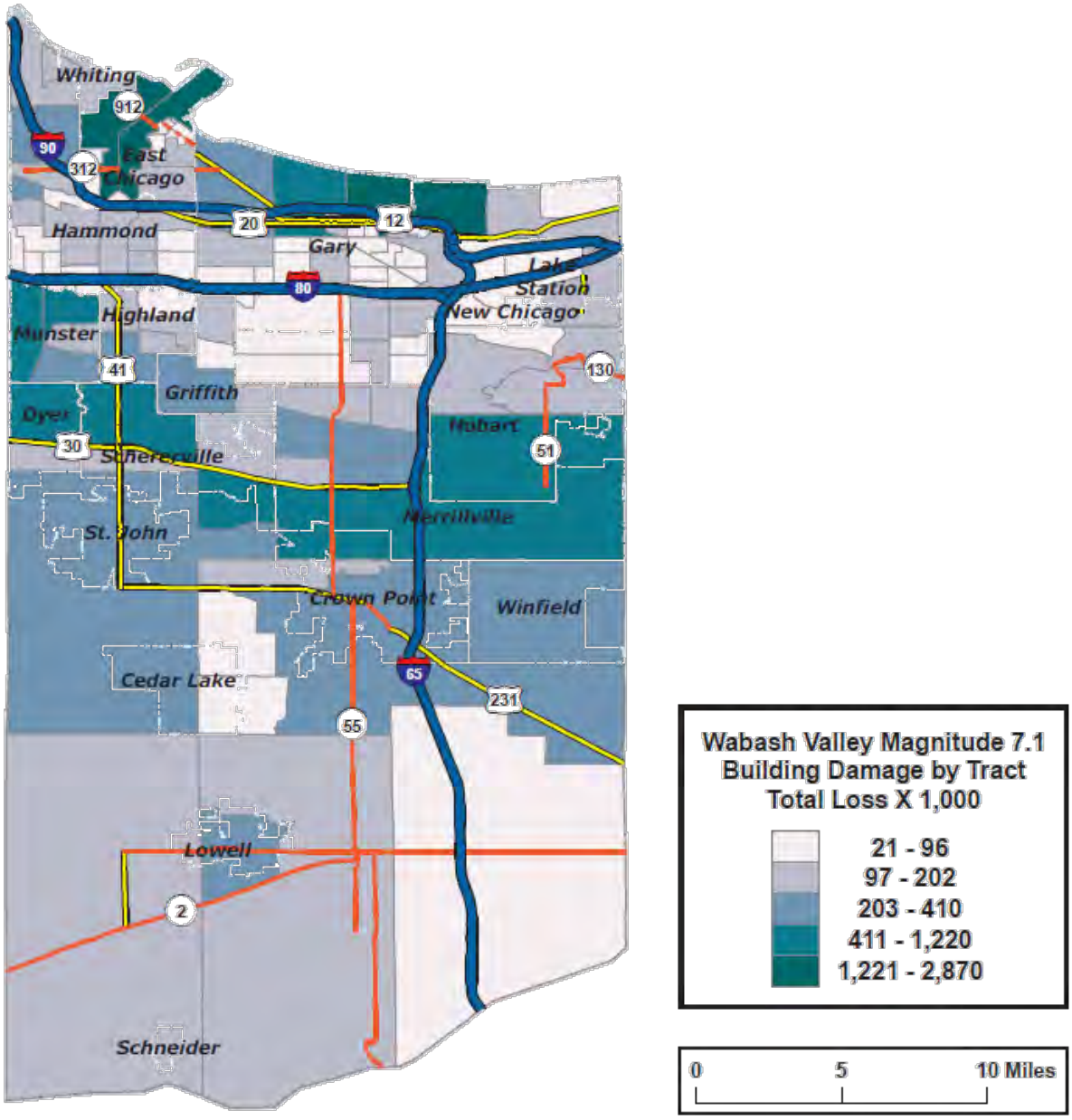
Table 5-53 Wabash Valley Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	1,094	0.61	12	1.45	1	1.96	0	0.00	0	0.00
Commercial	9,114	5.06	90	10.60	8	13.86	0	0.00	0	0.00
Education	194	0.11	2	0.21	0	0.20	0	0.00	0	0.00
Government	1,244	0.69	10	1.18	1	1.23	0	0.00	0	0.00
Industrial	1,515	0.84	17	1.95	2	2.70	0	0.00	0	0.00
Other Residential	12,558	6.98	87	10.32	7	10.98	0	0.00	0	0.00
Religion	1,960	1.09	21	2.45	2	2.81	0	0.00	0	0.00
Single Family	152,354	84.63	607	71.84	40	66.27	0	0.00	0	0.00
Total	180,033		845		60		0		0	

Table 5-54: Wabash Valley Scenario-Building Economic losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.00	0.25	0.04	0.10	0.39
	Capital-Related	0.00	0.00	0.18	0.03	0.03	0.24
	Rental	0.03	0.03	0.25	0.03	0.03	0.43
	Relocation	0.20	0.01	0.17	0.09	0.10	0.58
	Subtotal	0.28	0.05	0.85	0.20	0.25	1.63
Capital Stock Losses							
	Structural	0.79	0.07	0.40	0.58	0.17	2.02
	Non_Structural	4.12	0.68	2.24	5.43	1.48	13.94
	Content	2.32	0.29	1.61	2.79	1.13	8.14
	Inventory	0.00	0.00	0.06	0.45	0.01	0.51
	Subtotal	7.23	1.04	4.32	9.24	2.78	24.61
	Total	7.51	1.09	5.17	9.44	3.03	26.25

Figure 5-53: Wabash Valley Scenario-Building Economic Losses in Thousands of Dollars



Before the earthquake, the region had 7,643 care beds available for use. On the day of the earthquake, the model estimates that only 4,043 care beds (53%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 97% of the beds will be back in service. By day 30, 100% will be operational.

Results for 5.5 Magnitude Earthquake in Lake County

The results of the initial analysis, the 5.5 magnitude earthquake with an epicenter near the center of Lake County, are depicted in Tables 5-55 and 5-56 and Figure 5-53. HAZUS-MH estimates that approximately 23,497 buildings will be at least moderately damaged. This is more than 13% of the total number of buildings in the region. It is estimated that 903 buildings will be damaged beyond repair.

The total building related losses totaled $3.7 billion; 14% 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 comprised more than 60% of the total loss.

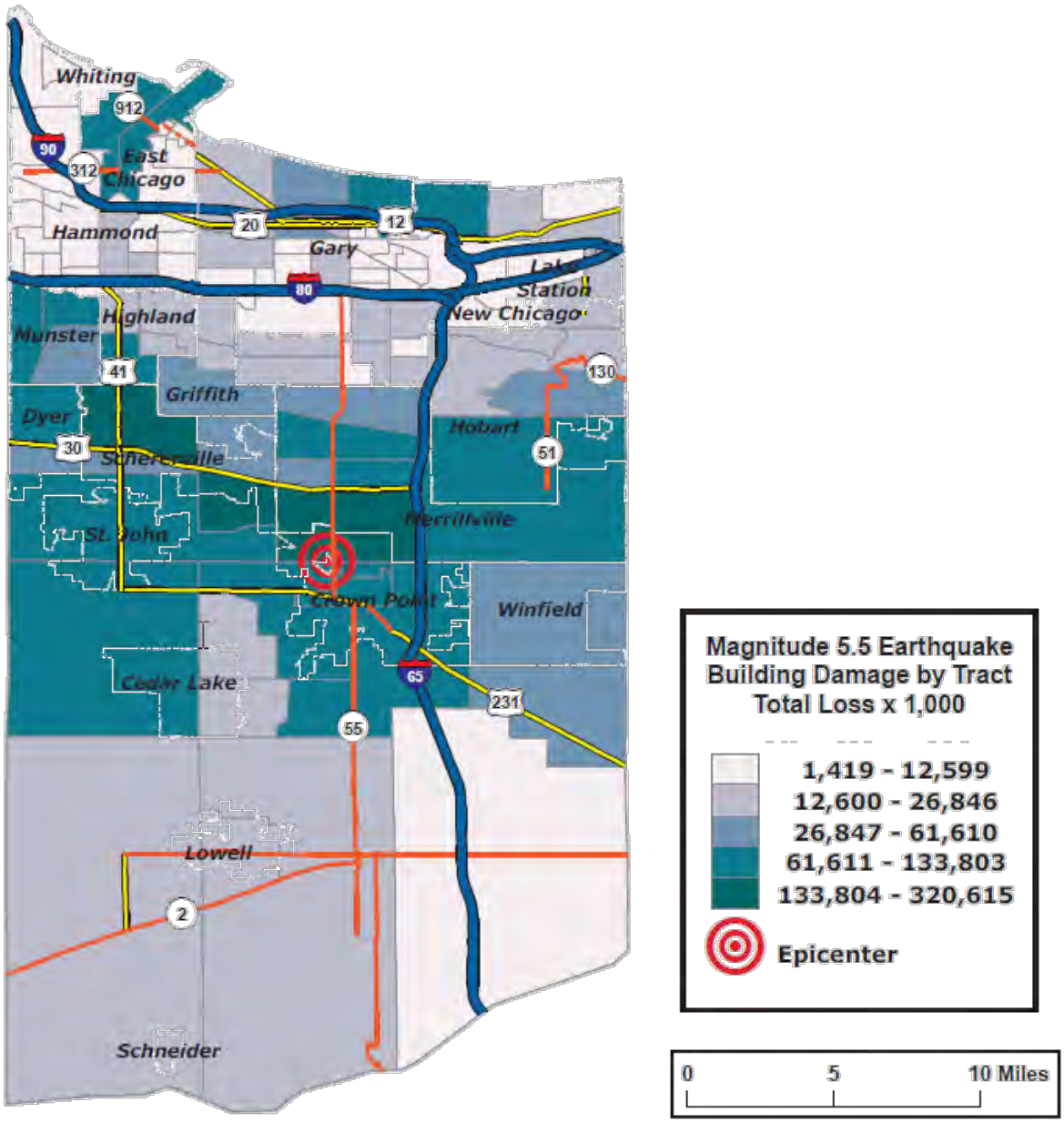
Table 5-55: Lake County 5.5M Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	665	0.56	194	0.49	169	0.93	68	1.54	11	1.24
Commercial	5,691	4.83	1,726	4.37	1,300	7.15	424	9.65	70	7.73
Education	124	0.11	36	0.09	27	0.15	8	0.18	2	0.18
Government	850	0.72	209	0.53	149	0.82	39	0.88	8	0.93
Industrial	943	0.80	265	0.67	231	1.27	82	1.87	12	1.38
Other Residential	8,246	6.99	2,489	6.29	1,430	7.86	411	9.35	77	8.48
Religion	1,240	1.05	384	0.97	260	1.43	83	1.88	16	1.77
Single Family	100,143	84.94	34,239	86.59	14,628	80.40	3,284	74.64	707	78.29
Total	117,901		39,540		18,194		4,400		903	

Table 5-56: Lake County 5.5M Scenario-Building Economic Losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	6.93	62.50	5.75	10.88	86.07
	Capital-Related	0.00	2.84	47.48	3.51	3.27	57.10
	Rental	39.15	11.35	41.36	3.66	7.17	102.68
	Relocation	145.00	7.03	60.68	16.76	47.54	277.01
	Subtotal	184.16	28.15	212.02	29.68	68.86	522.86
Capital Stock Losses							
	Structural	239.27	16.01	78.58	42.49	33.90	410.24
	Non_Structural	1,104.65	126.32	251.47	216.51	146.41	1,845.36
	Content	499.00	48.46	172.67	120.16	100.88	941.17
	Inventory	0.00	0.00	6.42	22.27	0.68	29.37
	Subtotal	1,842.92	190.78	509.14	401.43	281.87	3,226.14
	Total	2,027.08	218.93	721.16	431.11	350.72	3,749.00

Figure 5-54: Lake County 5.5M Scenario-Building Economic Losses in Thousands of Dollars



Before the earthquake, the region had 7,643 care beds available for use. On the day of the earthquake, the model estimates that only 313 care beds (4%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 53% of the beds will be back in service. By day 30, 80% will be operational.

Results 5.0 Magnitude 500-Year Probabilistic Scenario

The results of the 500-year probabilistic analysis are depicted in Tables 5-57 and 5-58. HAZUS-MH estimates that approximately 1,249 buildings will be at least moderately damaged. This is more than 1% of the total number of buildings in the region. It is estimated that 13 buildings will be damaged beyond repair. The total building-related losses totaled $93.2 million; 30% 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 more than 45% of the total loss.

Table 5-57: 500-Year Probabilistic Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	1,039	0.59	47	1.22	19	1.70	3	1.88	0	0.98
Commercial	8,729	4.96	344	8.95	121	11.09	17	11.75	1	6.83
Education	186	0.11	7	0.18	2	0.22	0	0.21	0	0.21
Government	1,200	0.68	40	1.03	13	1.23	2	1.17	0	1.13
Industrial	1,445	0.82	60	1.58	24	2.18	3	2.34	0	1.13
Other Residential	12,181	6.93	339	8.82	116	10.64	15	10.43	1	8.21
Religion	1,880	1.07	71	1.84	27	2.45	4	2.68	0	2.23
Single Family	149,187	84.84	2,933	76.38	771	70.50	100	69.55	10	79.27
Total	175,849		3,840		1,093		143		13	

Table 5-58: 500-Year Probabilistic Scenario-Building Economic Losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.16	3.87	0.59	0.82	5.45
	Capital-Related	0.00	0.07	2.73	0.36	0.23	3.38
	Rental	1.49	0.52	2.58	0.39	0.46	5.45
	Relocation	5.48	0.35	3.36	1.68	2.74	13.61
	Subtotal	6.98	1.10	12.54	3.02	4.25	27.89
Capital Stock Losses							
	Structural	9.48	0.79	4.31	5.32	2.12	22.02
	Non_Structural	18.37	2.10	4.82	5.68	3.97	34.94
	Content	2.82	0.33	1.51	2.16	1.10	7.91
	Inventory	0.00	0.00	0.06	0.35	0.01	0.41
	Subtotal	30.67	3.22	10.69	13.51	7.20	65.29
	Total	37.64	4.33	23.23	16.53	11.45	93.17

Before the earthquake, the region had 7,643 care beds available for use. On the day of the earthquake, the model estimates that only 4,827 care beds (63%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 98% of the beds will be back in service. By day 30, 100% will be operational.

Results Annualized Risk Scenario

HAZUS-MH estimates that approximately 655 buildings will be at least moderately damaged. It is estimated that no buildings will be damaged beyond repair.

Vulnerability to Future Assets/Infrastructure for Earthquake Hazard

New construction, especially critical facilities, will accommodate earthquake mitigation design standards.

Analysis of Community Development Trends

Community development will occur outside of the low-lying areas in floodplains with a water table within five feet of grade that is susceptible to liquefaction.

In the brainstorming sessions, the MHMP team discussed specific mitigation strategies for potential earthquake hazards. The discussion included strategies to harden and protect future, as well as existing, structures against the possible termination of public services and systems including power lines, water and sanitary lines, and public communication.

5.3.4 THUNDERSTORM HAZARD

Hazard Definition

Severe thunderstorms are defined as thunderstorms with one or more of the following characteristics: strong winds, large damaging hail, or frequent lightning. Severe thunderstorms most frequently occur in Indiana during the spring and summer months, but can occur any month of the year at any time of day. A severe thunderstorm's impacts can be localized or can be widespread in nature. A thunderstorm is classified as severe when it meets one or more of the following criteria.

- Hail of diameter 0.75 inches or higher
- Frequent and dangerous lightning
- Wind speeds equal to or greater than 58 miles per hour

Hail

Hail is a product of a strong thunderstorm. Hail usually falls near the center of a storm, however strong winds occurring at high altitudes in the thunderstorm can blow the hailstones away from the storm center, resulting in damage in other areas near the storm. Hailstones range from pea-sized to baseball-sized, but hailstones larger than softballs have been reported on rare occasions.

Nickel-sized hail, August 2007, Crown Point; *Source: WGN*

Lightning

Lightning is a discharge of electricity from a thunderstorm. Lightning is often perceived as a minor hazard, but in reality lightning causes damage to many structures and kills or severely injures numerous people in the United States each year.

Severe Winds (Straight-Line Winds)

Straight-line winds from thunderstorms are a fairly common occurrence across Indiana. Straight-line winds can cause damage to homes, businesses, power lines, and agricultural areas, and may require temporary sheltering of individuals who are without power for extended periods of time.

Previous Occurrences for Thunderstorm Hazard

The NCDC database reported 62 hailstorms in Lake County since 1950. Hailstorms occur nearly every year in the late spring and early summer months. A recent event occurred in 2008 when quarter-sized hail was reported near Route 2 and Commercial Street. Thunderstorms developed during the middle and late afternoon hours of May 30 across east central Illinois and moved east across northwest Indiana during the evening hours. These thunderstorms produced large hail, heavy rain and some flooding.

The Lake County hailstorms are identified in Table 5-59. Additional details for NCDC events are included in Appendix C.

Table 5-59: Lake County Hailstorms*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Lake	4/23/1961	Hail	1.75 in.	0	0	0	0
Lake	6/29/1976	Hail	1.75 in.	0	0	0	0
Lake	6/29/1976	Hail	1.75 in.	0	0	0	0
Lake	7/26/1978	Hail	1.00 in.	0	0	0	0
Lake	8/13/1980	Hail	1.75 in.	0	0	0	0
Lake	7/1/1983	Hail	2.00 in.	0	0	0	0
Lake	7/1/1983	Hail	1.00 in.	0	0	0	0
Lake	7/2/1983	Hail	0.75 in.	0	0	0	0
Lake	9/18/1983	Hail	0.75 in.	0	0	0	0
Lake	3/27/1991	Hail	1.00 in.	0	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Lake	3/27/1991	Hail	0.75 in.	0	0	0	0
Lake	3/27/1991	Hail	2.00 in.	0	0	0	0
Lake	7/7/1991	Hail	1.00 in.	0	0	0	0
Lake	3/6/1992	Hail	1.75 in.	0	0	0	0
Lake	7/8/1992	Hail	0.88 in.	0	0	0	0
Damaged A Television	4/20/1993	Hail	1.00 in.	0	0	0	0
Cedar Lake	4/20/1993	Hail	0.75 in.	0	0	0	0
Hammond	4/25/1994	Hail	1.00 in.	0	0	0	0
Schererville	6/13/1994	Hail	1.75 in.	0	0	0	0
Griffith	6/13/1994	Hail	1.75 in.	0	0	0	0
Lowell	7/6/1994	Hail	1.75 in.	0	0	0	0
Crown Point	6/6/1995	Hail	0.75 in.	0	0	0	0
Hammond	6/7/1995	Hail	1.75 in.	0	0	0	0
Hammond	6/7/1995	Hail	1.50 in.	0	0	0	0
Gary	6/7/1995	Hail	0.75 in.	0	0	0	0
Schererville	4/12/1996	Hail	0.75 in.	0	0	0	0
Lowell	4/19/1996	Hail	0.75 in.	0	0	0	0
Highland	4/19/1996	Hail	0.75 in.	0	0	0	0
Crown Pt	5/9/1996	Hail	0.75 in.	0	0	0	0
Merrillville	5/9/1996	Hail	1.00 in.	0	0	0	0
Lowell	5/5/1997	Hail	2.00 in.	0	0	0	0
Hammond	7/18/1997	Hail	1.00 in.	0	0	0	0
Munster	4/10/1999	Hail	1.25 in.	0	0	0	0
Lowell	7/31/1999	Hail	1.75 in.	0	0	0	0
Lowell	5/18/2000	Hail	1.00 in.	0	0	0	0
Hobart	7/17/2003	Hail	1.00 in.	0	0	0	0
Munster	7/17/2003	Hail	1.00 in.	0	0	0	0
Cedar Lake	7/17/2003	Hail	1.00 in.	0	0	0	0
Lowell	7/17/2003	Hail	1.75 in.	0	0	0	0
Merrillville	8/1/2003	Hail	1.00 in.	0	0	0	0
Cedar Lake	8/1/2003	Hail	0.75 in.	0	0	0	0
Munster	8/3/2003	Hail	0.75 in.	0	0	0	0
Hammond	5/7/2004	Hail	0.75 in.	0	0	0	0
Highland	5/23/2004	Hail	0.75 in.	0	0	0	0
Crown Pt	6/4/2005	Hail	0.88 in.	0	0	0	0
Whiting	6/9/2005	Hail	0.88 in.	0	0	0	0
Lowell	6/21/2006	Hail	1.50 in.	0	0	0	0
Shelby	6/26/2006	Hail	1.00 in.	0	0	0	0
Griffith	10/2/2006	Hail	1.00 in.	0	0	0K	0K
Merrillville	5/15/2007	Hail	0.75 in.	0	0	0K	0K
Schererville	6/18/2007	Hail	0.88 in.	0	0	0K	0K
East Chicago	7/10/2007	Hail	0.75 in.	0	0	0K	0K
Highland	8/15/2007	Hail	0.75 in.	0	0	0K	0K
Griffith	8/15/2007	Hail	0.88 in.	0	0	0K	0K
Crown Pt	8/15/2007	Hail	0.75 in.	0	0	0K	0K
Hobart	8/15/2007	Hail	1.00 in.	0	0	0K	0K

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Merrillville	8/15/2007	Hail	0.75 in.	0	0	0K	0K
Hobart	8/15/2007	Hail	1.75 in.	0	0	0K	0K
Merrillville	8/15/2007	Hail	0.88 in.	0	0	0K	0K
Lowell	5/30/2008	Hail	1.00 in.	0	0	0K	0K
Griffith	6/4/2008	Hail	0.88 in.	0	0	0K	0K
Gary	6/22/2008	Hail	0.75 in.	0	0	0K	0K

** NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.*

August 2007, Crown Point; *Source: WGN*

The NCDC database reported 13 occurrences of significant lightning strikes in Lake County since 1950. For example, on August 9, 2007, a house under construction was struck by lightning. The house suffered fire and water damage. Thunderstorms produced lightning strikes which caused structural damage.

The Lake County lightning strikes are identified in Table 5-60. Additional details for NCDC events are included in Appendix C. Lightning occurs in Lake County every year. The following list only represents those events which were recorded by the NCDC.

Table 5-60: Lake County Lightning Strikes*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Lake	4/19/1993	Lightning	N/A	0	1	50K	0
Hobart	5/17/1994	Lightning	N/A	0	0	5K	0
Hobart	6/27/1995	Lightning	N/A	0	1	0	0
Cedar Lake	5/24/1996	Lightning	N/A	0	1	0	0
Crown Pt	6/25/2002	Lightning	N/A	0	2	0	0
Hammond	5/9/2003	Lightning	N/A	0	0	0	0
Crown Pt	5/11/2005	Lightning	N/A	0	0	0	0
Munster	5/29/2006	Lightning	N/A	0	0	0	0
Gary	7/20/2006	Lightning	N/A	0	0	50K	0
Schererville	5/15/2007	Lightning	N/A	0	0	20K	0K
Gary	5/26/2007	Lightning	N/A	0	1	0K	0K
Lake Station	6/18/2007	Lightning	N/A	0	0	5K	0K
Winfield	8/9/2007	Lightning	N/A	0	0	20K	0K

** NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.*

The NCDC database identified 137 wind storms reported since 1950. In December 2007, a wind storm caused significant damage: numerous large tree limbs were blown down; a fence was

destroyed, and shingles were blown off houses. Only a few bolts of lightning were reported but winds gusted as high as 70 miles per hour.

As shown in the following table, wind storms have historically occurred year-round with the greatest frequency and damage between May and July. Table 5-61 includes available top wind speeds for Lake County.

Table 5-61: Lake County Wind Storms*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Lake	7/12/1957	Tstm Winds	0 kts.	0	0	0	0
Lake	8/7/1958	Tstm Winds	0 kts.	0	0	0	0
Lake	7/20/1962	Tstm Winds	0 kts.	0	0	0	0
Lake	6/19/1964	Tstm Winds	0 kts.	0	0	0	0
Lake	6/4/1969	Tstm Winds	0 kts.	0	0	0	0
Lake	7/2/1970	Tstm Winds	0 kts.	0	0	0	0
Lake	6/16/1973	Tstm Winds	0 kts.	0	0	0	0
Lake	6/16/1973	Tstm Winds	0 kts.	0	0	0	0
Lake	6/16/1973	Tstm Winds	0 kts.	0	0	0	0
Lake	6/20/1974	Tstm Winds	0 kts.	0	0	0	0
Lake	6/20/1974	Tstm Winds	0 kts.	0	0	0	0
Lake	6/14/1975	Tstm Winds	52 kts.	0	0	0	0
Lake	6/14/1975	Tstm Winds	0 kts.	0	0	0	0
Lake	6/14/1975	Tstm Winds	0 kts.	0	0	0	0
Lake	3/12/1976	Tstm Winds	0 kts.	0	0	0	0
Lake	7/15/1976	Tstm Winds	0 kts.	0	0	0	0
Lake	7/28/1976	Tstm Winds	0 kts.	0	0	0	0
Lake	6/8/1977	Tstm Winds	0 kts.	0	0	0	0
Lake	7/9/1980	Tstm Winds	0 kts.	0	0	0	0
Lake	8/13/1980	Tstm Winds	0 kts.	0	0	0	0
Lake	4/4/1981	Tstm Winds	0 kts.	0	0	0	0
Lake	4/3/1982	Tstm Winds	0 kts.	0	0	0	0
Lake	7/17/1983	Tstm Winds	0 kts.	0	0	0	0
Lake	7/19/1983	Tstm Winds	55 kts.	0	0	0	0
Lake	8/5/1989	Tstm Winds	0 kts.	1	0	0	0
Lake	3/27/1991	Tstm Winds	56 kts.	0	0	0	0
Lake	6/15/1991	Tstm Winds	0 kts.	0	0	0	0
Lake	10/4/1991	Tstm Winds	0 kts.	0	0	0	0
Lake	6/17/1992	Tstm Winds	0 kts.	0	0	0	0
Lake	6/17/1992	Tstm Winds	0 kts.	0	0	0	0
Lake	6/17/1992	Tstm Winds	0 kts.	0	0	0	0
Lake	7/2/1992	Tstm Winds	67 kts.	0	0	0	0
Lake	7/2/1992	Tstm Winds	0 kts.	0	0	0	0
Lake	7/2/1992	Tstm Winds	0 kts.	0	2	0	0
Schererville	7/6/1994	Tstm Winds	0 kts.	0	0	0	0
Whiting	6/7/1995	Tstm Winds	0 kts.	0	0	10K	0
Cedar Lake	6/26/1995	Tstm Winds	0 kts.	0	0	1K	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Munster	6/27/1995	Tstm Winds	0 kts.	0	0	20K	0
Dyer	7/15/1995	Tstm Winds	0 kts.	0	0	10K	0
Lake	3/20/1996	High Wind	55 kts.	0	0	0	0
Lake	3/25/1996	High Wind	46 kts.	0	0	0	0
Schererville	4/19/1996	Tstm Wind/hail	175 kts.	0	0	10K	0
Lake	10/29/1996	Tstm Winds	0 kts.	0	0	0	0
Gary	4/5/1997	Tstm Winds	55 kts.	0	0	0	0
Schererville	4/30/1997	Tstm Winds	0 kts.	0	0	0	0
Leroy	7/18/1997	Tstm Winds	50 kts.	0	0	0	0
Crown Pt	8/16/1997	Tstm Winds	50 kts.	0	0	0	0
Gary	6/18/1998	Tstm Winds	50 kts.	0	0	0	0
Lake	8/24/1998	Tstm Winds	50 kts.	0	2	0	0
Lake	11/10/1998	High Wind	50 kts.	0	0	0	0
Gary Airport	7/21/1999	Tstm Winds	61 kts.	0	0	0	0
Hammond	5/8/2000	Tstm Winds	50 kts.	0	0	0	0
Hammond	8/6/2000	Tstm Winds	61 kts.	0	0	0	0
Gary	8/6/2000	Tstm Winds	52 kts.	0	0	0	0
Aetna	8/6/2000	Tstm Winds	52 kts.	0	0	0	0
Griffith	9/11/2000	Tstm Winds	58 kts.	0	0	0	0
Lake	2/25/2001	Strong Wind	0 kts.	0	0	0	0
Lake	6/11/2001	Tstm Winds	50 kts.	0	0	0	0
Hammond	10/24/2001	Tstm Winds	50 kts.	0	0	25K	0
Lake	3/9/2002	High Wind	51 kts.	0	0	0	0
Gary	9/19/2002	Tstm Winds	50 kts.	0	0	0	0
Lake	10/4/2002	High Wind	52 kts.	0	0	0	0
Lake	5/11/2003	Strong Wind	48 kts.	0	0	6K	0
Gary	7/5/2003	Tstm Winds	52 kts.	0	0	0	0
Lowell	7/6/2003	Tstm Winds	50 kts.	0	0	0	0
Hammond	7/7/2003	Tstm Winds	52 kts.	0	0	0	0
Munster	7/7/2003	Tstm Winds	52 kts.	0	0	0	0
Hobart	7/17/2003	Tstm Winds	57 kts.	0	0	100K	0
Munster	7/17/2003	Tstm Winds	60 kts.	0	0	0	0
St John	7/17/2003	Tstm Winds	50 kts.	0	0	0	0
Cedar Lake	8/1/2003	Tstm Winds	61 kts.	0	0	0	0
Lake	11/13/2003	High Wind	52 kts.	0	0	0	0
Gary	3/1/2004	Tstm Winds	50 kts.	0	0	0	0
Crown Pt	3/1/2004	Tstm Winds	50 kts.	0	0	0	0
Lake	3/5/2004	High Wind	59 kts.	0	0	0	0
Lowell	5/30/2004	Tstm Winds	55 kts.	0	0	0	0
Hobart	7/3/2004	Tstm Winds	50 kts.	0	0	0	0
Griffith	7/3/2004	Tstm Winds	50 kts.	0	0	0	0
Gary	7/21/2004	Tstm Winds	65 kts.	0	0	0	0
Merrillville	7/21/2004	Tstm Winds	50 kts.	0	0	0	0
Crown Pt	6/4/2005	Tstm Winds	55 kts.	0	0	0	0
Schererville	6/4/2005	Tstm Winds	52 kts.	0	0	35K	0
Schererville	3/13/2006	Tstm Winds	52 kts.	0	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Lake	3/31/2006	High Wind	58 kts.	0	0	0	0
Dyer	5/29/2006	Tstm Winds	61 kts.	0	0	15K	0
Munster	5/29/2006	Tstm Winds	55 kts.	0	0	8K	0
Schererville	5/29/2006	Tstm Winds	65 kts.	0	0	0	0
Lake	7/20/2006	Strong Wind	45 kts.	0	0	3.0M	0
Hammond	7/20/2006	Tstm Winds	50 kts.	0	0	0	0
Merrillville	7/20/2006	Tstm Winds	55 kts.	0	1	400K	0
Gary	7/30/2006	Tstm Winds	50 kts.	0	0	5K	0
Schererville	8/2/2006	Tstm Winds	52 kts.	0	0	0	0
Griffith	10/2/2006	Tstm Wind	55 kts.	0	0	5K	0K
Calumet City	10/2/2006	Tstm Wind	60 kts.	0	0	10K	0K
Schererville	10/2/2006	Tstm Wind	52 kts.	0	0	0K	0K
Cedar Lake	5/15/2007	Tstm Wind	60 kts.	0	0	10K	0K
Cedar Lake	5/15/2007	Tstm Wind	60 kts.	0	0	30K	0K
Crown Pt	5/15/2007	Tstm Wind	50 kts.	0	0	0K	0K
Hobart	5/15/2007	Tstm Wind	50 kts.	0	0	0K	0K
Gary	5/15/2007	Tstm Wind	60 kts.	0	0	60K	0K
New Chicago	5/15/2007	Tstm Wind	55 kts.	0	0	5K	0K
Crown Pt	5/15/2007	Tstm Wind	60 kts.	0	0	0K	0K
Cedar Lake	5/15/2007	Tstm Wind	50 kts.	0	0	0K	0K
Griffith	6/18/2007	Tstm Wind	60 kts.	0	0	0K	0K
Dyer	6/18/2007	Tstm Wind	50 kts.	0	0	0K	0K
Crown Pt	6/18/2007	Tstm Wind	55 kts.	0	0	20K	0K
St John	6/18/2007	Tstm Wind	50 kts.	0	0	0K	0K
Merrillville	6/18/2007	Tstm Wind	60 kts.	0	0	200K	0K
Schererville	6/18/2007	Tstm Wind	55 kts.	0	0	2K	0K
Hobart	6/18/2007	Tstm Wind	55 kts.	0	0	0K	0K
Lake Station	6/18/2007	Tstm Wind	60 kts.	0	1	10K	0K
East Chicago	8/15/2007	Tstm Wind	85 kts.	0	0	1.0M	0K
Gary Airport	8/15/2007	Tstm Wind	60 kts.	0	0	0K	0K
Munster	8/23/2007	Tstm Wind	56 kts.	0	0	0K	0K
Dyer	8/23/2007	Tstm Wind	50 kts.	0	0	0K	0K
Hammond	8/23/2007	Tstm Wind	55 kts.	0	0	10K	0K
Gary Airport	8/23/2007	Tstm Wind	50 kts.	0	0	1.0M	0K
Lowell	8/23/2007	Tstm Wind	50 kts.	0	0	0K	0K
Merrillville	8/23/2007	Tstm Wind	70 kts.	0	0	500K	0K
Schererville	8/23/2007	Tstm Wind	52 kts.	0	0	0K	0K
Gary	8/23/2007	Tstm Wind	52 kts.	0	0	0K	0K
Hammond	9/25/2007	Tstm Wind	52 kts.	0	0	0K	0K
Gary	9/25/2007	Tstm Wind	52 kts.	0	0	0K	0K
Schererville	12/23/2007	Tstm Wind	52 kts.	0	0	5K	0K
Lowell	6/5/2008	Heavy Rain	N/A	0	0	0K	0K
INZ001	10/26/2008	High Wind	53 kts.	0	0	0K	0K
Whiting	6/8/2008	Tstm Wind	70 kts.	0	0	0K	0K
Dinwiddie	6/21/2008	Tstm Wind	55 kts.	0	0	0K	0K
St John	7/31/2008	Tstm Wind	65 kts.	0	0	5K	0K

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Gary	7/31/2008	Tstm Wind	61 kts.	0	0	0K	0K
Hobart	7/31/2008	Tstm Wind	56 kts.	0	0	0K	0K
Gary Airport	8/4/2008	Tstm Wind	59 kts.	0	0	0K	0K
Munster	8/4/2008	Tstm Wind	61 kts.	0	0	10K	0K
Griffith	8/4/2008	Tstm Wind	70 kts.	0	0	0K	0K
Merrillville	8/4/2008	Tstm Wind	61 kts.	0	0	0K	0K
Cole Airport	8/4/2008	Tstm Wind	70 kts.	0	0	35K	0K
Griffith	8/4/2008	Tstm Wind	52 kts.	0	0	0K	0K

** NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.*

Geographic Location for Thunderstorm Hazard

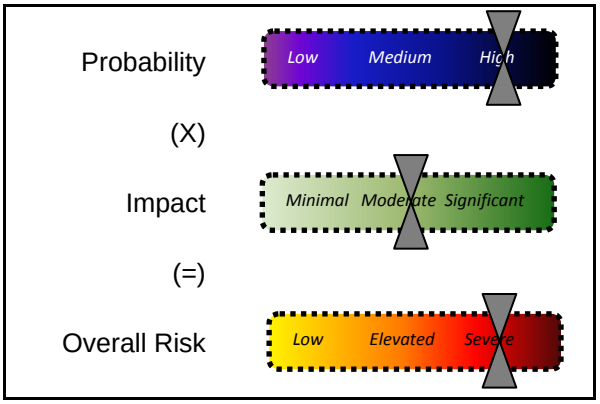
The entire county has the same risk for occurrence of thunderstorms. They can occur at any location within the county.

Hazard Extent for Thunderstorm Hazard

The extent of the historical thunderstorms varies in terms of the extent of the storm, the wind speed, and the size of hail stones. Thunderstorms can occur at any location within the county.

Risk Identification for Thunderstorm Hazard

Based on historical information, the probability of a thunderstorm is high. In Meeting #2, the planning team determined that the potential impact of a thunderstorm is moderate; therefore, the overall risk of a thunderstorm hazard for Lake County is severe.



Vulnerability Analysis for Thunderstorm Hazard

Severe thunderstorms are an equally distributed threat across the entire jurisdiction; therefore, the entire county's population and all buildings are vulnerable to a severe thunderstorm and can expect the same impacts within the affected area. This plan will therefore consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Lake County are discussed in Table 5-5.

Critical Facilities

All critical facilities are vulnerable to severe thunderstorms. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include

structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of building functionality (e.g. a damaged police station will no longer be able to serve the community). Table 5-4 lists the types and numbers of all of the essential facilities in the area. Critical facility names and locations are included in Appendix E.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is provided in Table 5-5. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of building functionality (e.g. a damaged home will no longer be habitable causing residents to seek shelter).

Infrastructure

During a severe thunderstorm, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable it is important to emphasize that any number of these items could become damaged during a severe thunderstorm. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (e.g. loss of power or gas to community); or railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic.

Potential Dollar Losses for Thunderstorm Hazard

A HAZUS-MH analysis was not completed for thunderstorms because the widespread extent of such a hazard makes it difficult to accurately model outcomes.

To determine dollar losses for a thunderstorm hazard, the available NCDC hazard information was condensed to include only thunderstorm hazards that occurred within the past ten years. Lake County's MHMP team then reviewed the property damages reported to NCDC and made any applicable updates.

August 2007, Griffith;
Source: WGN

It was determined that since 1998, Lake County has incurred $4.2 million in damages relating to thunderstorms, including hail, lightning, and high winds. The resulting information is listed in Table 5-62.

Table 5-62: Lake County Property Damage (1998–2008)

Location or County	Date	Type	Property Damage
Gary	06/18/98	Tstm Wind	$0
Countywide	08/24/98	Tstm Wind	$0
Lake	11/10/98	High Wind	$0
		1998 Subtotal	**$0**
Munster	04/10/99	Hail	$0
Gary Airport	07/21/99	Tstm Wind	$0
Lowell	07/31/99	Hail	$0
		1999 Subtotal	**$0**
Hammond	05/08/00	Tstm Wind	$0
Lowell	05/18/00	Hail	$0
Hammond	08/06/00	Tstm Wind	$0
Gary	08/06/00	Tstm Wind	$0
Aetna	08/06/00	Tstm Wind	$0
Griffith	09/11/00	Tstm Wind	$0
		2000 Subtotal	**$0**
Lake	02/25/01	Strong Wind	$0
Countywide	06/11/01	Tstm Wind	$0
Hammond	10/24/01	Tstm Wind	$25,000
		2001 Subtotal	**$25,000**
Lake	03/09/02	High Wind	$0
Crown Pt	06/25/02	Lightning	$0
Gary	09/19/02	Tstm Wind	$0
Lake	10/04/02	High Wind	$0
		2002 Subtotal	**$0**
Hammond	05/09/03	Lightning	$0
Lake	05/11/03	Strong Wind	$6,000
Gary	07/05/03	Tstm Wind	$0
Lowell	07/06/03	Tstm Wind	$0
Hammond	07/07/03	Tstm Wind	$0
Munster	07/07/03	Tstm Wind	$0
Hobart	07/17/03	Hail	$0
Munster	07/17/03	Hail	$0
Cedar Lake	07/17/03	Hail	$0
Lowell	07/17/03	Hail	$0
Hobart	07/17/03	Tstm Wind	$100,000
Munster	07/17/03	Tstm Wind	$0
St John	07/17/03	Tstm Wind	$0
Merrillville	08/01/03	Hail	$0
Cedar Lake	08/01/03	Hail	$0
Cedar Lake	08/01/03	Tstm Wind	$0
Munster	08/03/03	Hail	$0
Lake	11/13/03	High Wind	$0
		2003 Subtotal	**$106,000**
Gary	03/01/04	Tstm Wind	$0
Crown Pt	03/01/04	Tstm Wind	$0

Location or County	Date	Type	Property Damage
Lake	03/05/04	High Wind	$0
Hammond	05/07/04	Hail	$0
Highland	05/23/04	Hail	$0
Lowell	05/30/04	Tstm Wind	$0
Hobart	07/03/04	Tstm Wind	$0
Griffith	07/03/04	Tstm Wind	$0
Gary	07/21/04	Tstm Wind	$0
Merrillville	07/21/04	Tstm Wind	$0
		2004 Subtotal	**$0**
Crown Pt	05/11/05	Lightning	$0
Crown Pt	06/04/05	Hail	$0
Crown Pt	06/04/05	Tstm Wind	$0
Schererville	06/04/05	Tstm Wind	$35,000
Whiting	06/09/05	Hail	$0
		2005 Subtotal	**$35,000**
Schererville	03/13/06	Tstm Wind	$0
Lake	03/31/06	High Wind	$0
Munster	05/29/06	Lightning	$0
Dyer	05/29/06	Tstm Wind	$15,000
Munster	05/29/06	Tstm Wind	$8,000
Schererville	05/29/06	Tstm Wind	$0
Lowell	06/21/06	Hail	$0
Shelby	06/26/06	Hail	$0
Gary	07/20/06	Lightning	$50,000
Lake	07/20/06	Strong Wind	$3,000,000
Hammond	07/20/06	Tstm Wind	$0
Merrillville	07/20/06	Tstm Wind	$400,000
Gary	07/30/06	Tstm Wind	$5,000
Schererville	08/02/06	Tstm Wind	$0
Griffith	10/02/06	Hail	$0
Griffith	10/02/06	Tstm Wind	$5,000
Calumet City	10/02/06	Tstm Wind	$10,000
Schererville	10/02/06	Tstm Wind	$0
		2006 Subtotal	**$3,493,000**
Merrillville	05/15/07	Hail	$0
Schererville	05/15/07	Lightning	$20,000
Cedar Lake	05/15/07	Tstm Wind	$10,000
Cedar Lake	05/15/07	Tstm Wind	$30,000
Crown Pt	05/15/07	Tstm Wind	$0
Hobart	05/15/07	Tstm Wind	$0
Gary	05/15/07	Tstm Wind	$60,000
New Chicago	05/15/07	Tstm Wind	$5,000
Crown Pt	05/15/07	Tstm Wind	$0
Cedar Lake	05/15/07	Tstm Wind	$0
Gary	05/26/07	Lightning	$0
Schererville	06/18/07	Hail	$0
Lake Station	06/18/07	Lightning	$5,000

Location or County	Date	Type	Property Damage
Griffith	06/18/07	Tstm Wind	$0
Dyer	06/18/07	Tstm Wind	$0
Crown Pt	06/18/07	Tstm Wind	$20,000
St John	06/18/07	Tstm Wind	$0
Merrillville	06/18/07	Tstm Wind	$200,000
Schererville	06/18/07	Tstm Wind	$2,000
Hobart	06/18/07	Tstm Wind	$0
Lake Station	06/18/07	Tstm Wind	$10,000
East Chicago	07/10/07	Hail	$0
Winfield	08/09/07	Lightning	$20,000
Highland	08/15/07	Hail	$0
Griffith	08/15/07	Hail	$0
Crown Pt	08/15/07	Hail	$0
Hobart	08/15/07	Hail	$0
Merrillville	08/15/07	Hail	$0
Hobart	08/15/07	Hail	$0
Merrillville	08/15/07	Hail	$0
East Chicago	08/15/07	Tstm Wind	$1,000,000
Gary Airport	08/15/07	Tstm Wind	$0
Munster	08/23/07	Tstm Wind	$0
Dyer	08/23/07	Tstm Wind	$0
Hammond	08/23/07	Tstm Wind	$10,000
Gary Airport	08/23/07	Tstm Wind	1.0M
Lowell	08/23/07	Tstm Wind	$0
Merrillville	08/23/07	Tstm Wind	$500,000
Schererville	08/23/07	Tstm Wind	$0
Gary	08/23/07	Tstm Wind	$0
Hammond	09/25/07	Tstm Wind	$0
Gary	09/25/07	Tstm Wind	$0
Schererville	12/23/07	Tstm Wind	$5,000
		2007 Subtotal	**$505,000**
Lowell	05/30/08	Hail	$0
Griffith	06/04/08	Hail	$0
Lowell	06/05/08	Heavy Rain	$0
Whiting	06/08/08	Tstm Wind	$0
Dinwiddie	06/21/08	Tstm Wind	$0
Gary	06/22/08	Hail	$0
St John	07/31/08	Tstm Wind	$5,000
Gary	07/31/08	Tstm Wind	$0
Hobart	07/31/08	Tstm Wind	$0
Gary Airport	08/04/08	Tstm Wind	$0
Munster	08/04/08	Tstm Wind	$10,000
Griffith	08/04/08	Tstm Wind	$0
Merrillville	08/04/08	Tstm Wind	$0
Cole Airport	08/04/08	Tstm Wind	$35,000
Griffith	08/04/08	Tstm Wind	$0
Lake	10/26/08	High Wind	$0

Location or County	Date	Type	Property Damage
		2008 Subtotal	$50,000
		Total Property Damage	$4,214,000

The historical data is erratic and not wholly documented or confirmed. As a result, potential dollar losses for a future event cannot be precisely calculated; however, based on averages in the last decade, it can be determined that Lake County incurs annual risk of approximately $421,400 per year.

Vulnerability to Future Assets/Infrastructure for Thunderstorm Hazard

All future development within the county and all communities will remain vulnerable to these events.

Analysis of Community Development Trends

Preparing for severe storms will be enhanced if officials sponsor a wide range of programs and initiatives to address the overall safety of county residents. New structures need to be built with more sturdy construction, and those structures already in place need to be hardened to lessen the potential impacts of severe weather. Community warning sirens to provide warning of approaching storms are also vital to preventing the loss of property and ensuring the safety of Lake County residents.

5.3.5 WINTER STORM HAZARD

Hazard Definition

Severe winter weather consists of various forms of precipitation and strong weather conditions. This may include one or more of the following: freezing rain, sleet, heavy snow, blizzards, icy roadways, extreme low temperatures, and strong winds. These conditions can cause human health risks such as frostbite, hypothermia, and death.

Ice (glazing) and Sleet Storms

December 2008, Dyer;
Source: Weather Underground

Ice or sleet, even in the smallest quantities, can result in hazardous driving conditions and can be a significant cause of property damage. Sleet can be easily identified as frozen raindrops. Sleet does not stick to trees and wires. The most damaging winter storms in Indiana have been ice storms. Ice storms are the result of cold rain that freezes on contact with objects having a temperature below freezing. Ice storms occur when moisture-laden gulf air converges with the northern jet stream causing strong winds and heavy precipitation. This precipitation takes the form of freezing rain coating power lines, communication lines, and trees with heavy ice. The winds will then cause the overburdened limbs and cables to snap; leaving large sectors of the population

without power, heat, or communication. Falling trees and limbs can also cause building damage during an ice storm. In the past few decades numerous ice storm events have occurred in Indiana.

Snowstorms

Significant snowstorms are characterized by the rapid accumulation of snow, often accompanied by high winds, cold temperatures, and low visibility. A blizzard is categorized as a snowstorm with winds of 35 miles per hour or greater and/or visibility of less than one-quarter mile for three or more hours. The strong winds during a blizzard blow about falling and already existing snow, creating poor visibility and impassable roadways. Blizzards have the potential to result in property damage.

Indiana has repeatedly been struck by blizzards. Blizzard conditions cannot only cause power outages and loss of communication, but also make transportation difficult. The blowing of snow can reduce visibility to less than one-quarter mile, and the resulting disorientation makes even travel by foot dangerous if not deadly.

Severe Cold

Severe cold is characterized by the ambient air temperature dropping to around 0°F or below. These extreme temperatures can increase the likelihood of frostbite and hypothermia. High winds during severe cold events can enhance the air temperature's effects. Fast winds during cold weather events can lower the wind chill factor (how cold the air feels on your skin). As a result, the time it takes for frostbite and hypothermia to affect a person's body will decrease.

Previous Occurrences for Winter Storm Hazard

The NCDC database identified 37 winter storm and extreme cold events for Lake County since 1950. For example, in 2008, heavy snow developed during the evening hours of February 25 and continued into the early afternoon hours of February 26. Storm total snowfall amounts included 7.8 inches Valparaiso, 6.8 inches in Merrillville, 6.2 inches in Goodland, 6.1 inches in Portage, 6.0 inches in Remington, 6.0 inches in Earl Park, and 5.8 inches in Rensselaer.

White-out conditions, January 2005, Hammond; *Source: Weather Underground*

The NCDC winter storms are listed in Table 5-63. Additional details for NCDC events are included in Appendix C.

Table 5-63: Winter Storm Events*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Lake	3/4/1993	Heavy Snow	N/A	0	0	0	0
Lake	3/13/1993	Heavy Snow	N/A	0	0	0	0
Lake	1/14/1994	Extreme Cold	N/A	3	0	5.0M	0
Lake	2/25/1994	Heavy Snow	N/A	0	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Lake	4/10/1995	Ice Storm	N/A	0	0	0	0
Lake	12/27/1995	Heavy Snow	N/A	0	0	0	0
Lake	2/2/1996	Extreme Cold	N/A	0	0	0	0
Lake	1/9/1997	Winter Storm	N/A	0	0	0	0
Lake	1/15/1997	Winter Storm	N/A	0	0	0	0
Lake	12/9/1997	Heavy Snow	N/A	0	0	0	0
Lake	3/9/1998	Heavy Snow	N/A	0	0	0	0
Lake	1/1/1999	Heavy Snow	N/A	0	0	0	0
Lake	3/8/1999	Heavy Snow	N/A	0	0	0	0
Lake	1/25/2000	Heavy Snow	N/A	0	0	0	0
Lake	2/18/2000	Heavy Snow	N/A	0	0	0	0
Lake	12/11/2000	Blizzard	N/A	0	0	0	0
Lake	1/31/2002	Winter Storm	N/A	0	0	0	0
Lake	2/26/2002	Winter Storm	N/A	0	0	0	0
Lake	3/2/2002	Winter Storm	N/A	0	0	0	0
Lake	12/24/2002	Winter Storm	N/A	0	0	0	0
Lake	1/23/2003	Extreme Cold	N/A	0	0	0	0
Lake	3/4/2003	Winter Storm	N/A	0	0	0	0
Lake	1/4/2004	Heavy Snow	N/A	0	0	0	0
Lake	1/29/2004	Extreme Cold	N/A	0	0	0	0
Lake	5/3/2004	Frost/freeze	N/A	0	0	0	0
Lake	1/4/2005	Heavy Snow	N/A	0	0	0	0
Lake	1/21/2005	Heavy Snow	N/A	0	0	0	0
Lake	12/8/2005	Winter Storm	N/A	0	0	0	0
Lake	2/13/2007	Blizzard	N/A	0	0	0K	0K
Lake	2/25/2007	Winter Storm	N/A	0	0	0K	0K
Lake	12/1/2007	Ice Storm	N/A	0	0	0K	0K
Lake	12/15/2007	Heavy Snow	N/A	0	0	0K	0K
Lake	12/31/2007	Heavy Snow	N/A	0	0	0K	0K
Lake	1/29/2008	Winter Storm	N/A	0	0	0K	0K
Lake	1/31/2008	Winter Storm	N/A	0	0	0K	0K
Lake	2/1/2008	Winter Storm	N/A	0	0	0K	0K
Lake	2/25/2008	Winter Storm	N/A	0	0	0K	0K

** NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.*

Geographic Location for Winter Storm Hazard

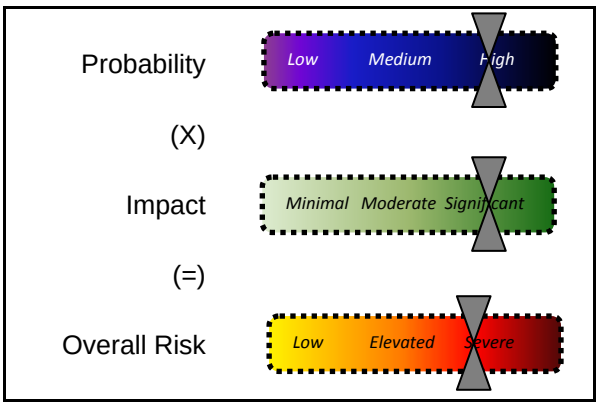
Severe winter storms are regional in nature. Most of the NCDC data is calculated regionally or in some cases statewide.

Hazard Extent for Winter Storm Hazard

The extent of the historical winter storms varies in terms of storm location, temperature, and ice or snowfall. A severe winter storm can occur anywhere in the jurisdiction.

Risk Identification for Winter Storm Hazard

Based on historical information, the probability of a winter storm is high. In Meeting #2, the planning team determined that the potential impact of a winter storm is significant; therefore, the overall risk of a winter storm hazard for Lake County is severe.



Vulnerability Analysis for Winter Storm Hazard

Winter storm impacts are equally distributed across the entire jurisdiction; therefore, the entire county is vulnerable to a winter storm and can expect the same impacts within the affected area. The building exposure for Lake County, as determined from the building inventory, is included in Table 5-5.

Critical Facilities

All critical facilities are vulnerable to a winter storm. A critical facility will encounter many of the same impacts as other buildings within the jurisdiction. These impacts include loss of gas or electricity from broken or damaged utility lines, damaged or impassable roads and railways, broken water pipes, and roof collapse from heavy snow. Table 5-4 lists the types and numbers of the essential facilities in the area. Critical facility names and locations are included in Appendix E.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 5-5. The impacts to the general buildings within the county are similar to the damages expected to the critical facilities. These include loss of gas or electricity from broken or damaged utility lines, damaged or impassable roads and railways, broken water pipes, and roof collapse from heavy snow.

Infrastructure

During a winter storm, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable it is important to emphasize that any number of these items could become damaged

during a winter storm. Potential impacts include broken gas and/or electricity lines or damaged utility lines, damaged or impassable roads and railways, and broken water pipes.

Potential Dollar Losses for Winter Storm Hazard

A HAZUS-MH analysis was not completed for winter storms because the widespread extent of such a hazard makes it difficult to accurately model outcomes.

To determine dollar losses for a winter storm hazard, the available NCDC hazard information was condensed to include only winter storm hazards that occurred within the past ten years. Lake County's MHMP team then reviewed the property damages reported to NCDC and made any applicable updates.

It was determined that since 1998, Lake County has incurred $0 in damages relating to winter storms, including sleet/ice and heavy snow. The resulting information is listed in Table 5-64.

Table 5-64: Lake County Property Damage (1998–2008)

Location or County	Date	Type	Property Damage
Lake	03/09/98	Heavy Snow	$0
		1998 Subtotal	**$0**
Lake	01/01/99	Heavy Snow	$0
Lake	03/08/99	Heavy Snow	$0
		1999 Subtotal	**$0**
Lake	01/25/00	Heavy Snow	$0
Lake	02/18/00	Heavy Snow	$0
Lake	12/11/00	Blizzard	$0
		2000 Subtotal	**$0**
Lake	01/31/02	Winter Storm	$0
Lake	02/26/02	Winter Storm	$0
Lake	03/02/02	Winter Storm	$0
Lake	12/24/02	Winter Storm	$0
		2002 Subtotal	**$0**
Lake	01/23/03	Extreme Cold/wind Chill	$0
Lake	03/04/03	Winter Storm	$0
		2003 Subtotal	**$0**
Lake	01/04/04	Heavy Snow	$0
Lake	01/29/04	Extreme Cold/wind Chill	$0
Lake	05/03/04	Frost/freeze	$0
		2004 Subtotal	**$0**
Lake	01/04/05	Heavy Snow	$0
Lake	01/21/05	Heavy Snow	$0
Lake	12/08/05	Winter Storm	$0
		2005 Subtotal	**$0**
Lake	02/13/07	Blizzard	$0
Lake	02/25/07	Winter Storm	$0
Lake	12/01/07	Ice Storm	$0
Lake	12/15/07	Heavy Snow	$0

Location or County	Date	Type	Property Damage
Lake	12/31/07	Heavy Snow	$0
		2007 Subtotal	**$0**
Lake	01/29/08	Winter Storm	$0
Lake	01/31/08	Winter Storm	$0
Lake	02/01/08	Winter Storm	$0
Lake	02/25/08	Winter Storm	$0
Lake	11/18/08	Lake-effect Snow	$0
Lake	12/18/08	Winter Storm	$0
Lake	12/21/08	Extreme Cold/wind Chill	$0
		2008 Subtotal	**$0**
Lake	01/14/09	Winter Storm	$0
Lake	01/15/09	Extreme Cold/wind Chill	$0
Lake	01/20/09	Lake-effect Snow	$0
		2009 Subtotal	**$0**
		Total Property Damage	**$0**

The historical data is erratic and not wholly documented or confirmed. As a result, potential dollar losses for a future event cannot be precisely calculated; however, based on averages in the last decade, it can be determined that Lake County has no annual monetary risk for winter weather.

Vulnerability to Future Assets/Infrastructure for Winter Storm Hazard

Any new development within the county will remain vulnerable to these events.

Analysis of Community Development Trends

Because the winter storm events are regional in nature future development will be equally impacted across the county.

5.3.7 HAZARDOUS MATERIALS RELEASE HAZARD

Hazard Definition

The state of Indiana has numerous active transportation lines that run through many of its counties. Active railways transport harmful and volatile substances between our borders every day. The transportation of chemicals and substances along interstate routes is commonplace in Indiana. The rural areas of Indiana have considerable agricultural commerce creating a demand for fertilizers, herbicides, and pesticides to be transported along rural roads. Finally, Indiana is bordered by two major rivers and Lake Michigan. Barges transport chemicals and substances along these waterways daily. These factors increase the chance of hazardous material releases and spills throughout the state of Indiana.

The release or spill of certain substances can cause an explosion. Explosions result from the ignition of volatile products such as petroleum products, natural and other flammable gases, hazardous materials/chemicals, dust, and bombs. An explosion can potentially cause death, injury, and property damage. In addition, a fire routinely follows an explosion which may cause further damage and inhibit emergency response. Emergency response may require fire, safety/law enforcement, search and rescue, and hazardous materials units.

Trail derailment, June 2003, St. John; *Source: www.monon.monon.org*

Previous Occurrences for Hazardous Materials Release Hazard

Lake County has not experienced significantly large-scale hazardous material incidents resulting in multiple deaths or serious injuries, although there have been many minor releases that have put local firefighters, hazardous materials teams, emergency management, and local law enforcement into action to try to stabilize these incidents and prevent or lessen harm to Lake County residents. Table 5-65 lists the county's historical hazmat incidents.

Table 5-65: Lake County Hazardous Materials Releases (1987–2003)

Year	Location	Description
Fixed-Site Releases		
1987	Gary	A hydrochloric acid spill occurred, triggering an evacuation of 2,500 residents. The residents were not allowed to return to their homes for nine hours. Many problems arose as a result of the evacuation including emergency transportation, emergency medical treatment, emergency shelter locations, emergency communications, emergency broadcasting procedures, mass feedings, security, news media, hazmat transportation, weather conditions, and on-site investigations.
2000	Hammond/ East Chicago	A hazardous materials release of a mixture of substances at the Rhodia Chemical Company resulted in fire and heat damage to the facility. The fire required an evacuation of 2,000 residents from the community of East Chicago.
2003	Whiting	An electrical problem caused an explosion and fire at the BP-Amoco facility in Whiting. Over 135 people required decontamination as a result of the incident. The hazard was exacerbated by the fact that the industrial site was located immediately adjacent to a residential area.
Transportation-Related Releases		
2002	Lake Station	A fuel truck rollover on the Indiana Toll Road at Lake Station resulted in the release of 1,000 gallons of diesel fuel onto the road.
2002	Cedar Lake	1,500 gallons of ammonia was released when a snowmobile hit a storage truck. The driver of the snowmobile was killed on impact.
2003	St. John	A 3-4 car train derailed while traveling westbound due to concrete on the tracks from a nearby construction project resulting in a diesel spill into a ditch that flows into Shilling's Ditch.

Source: Lake County Hazard Analysis (2003)

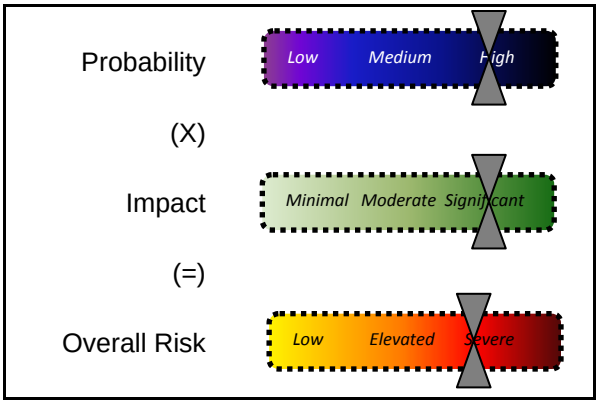
Geographic Location for Hazardous Materials Release Hazard

The hazardous material hazards are countywide and are primarily associated with the transport of materials via highway, railroad, and/or river barge.

Hazard Extent for Hazardous Materials Release Hazard

The extent of the hazardous material hazard varies both in terms of the quantity of material being transported as well as the specific content of the container.

Risk Identification for Hazardous Materials Release



Based on historical information, the probability of a hazmat hazard is high. In Meeting #2, the planning team determined that the potential impact of a hazmat release is significant; therefore, the overall risk of a hazmat hazard for Lake County is severe.

Vulnerability Analysis for Hazardous Materials Release Hazard

Hazardous material impacts are an equally distributed threat across the entire jurisdiction; therefore, the entire county is vulnerable to a hazardous material release and can expect the same impacts within the affected area. The main concern during a release or spill is the population affected. The building exposure for Lake County, as determined from building inventory, is included in Table 5-5. This plan will therefore consider all buildings located within the county as vulnerable.

Critical Facilities

All critical facilities and communities within the county are at risk. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural failure due to fire or explosion and loss of function of the facility (e.g. a damaged police station will no longer be able to serve the community). Table 5-4 lists the types and numbers of all essential facilities in the area. Critical facility names and locations are included in Appendix E.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 5-5. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure due to fire or explosion or debris and loss of function of the building (e.g. a damaged home will no longer be habitable causing residents to seek shelter).

Infrastructure

During a hazardous material release the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available to this plan it is important to emphasize that any number of these items could become damaged in the event of a hazardous material release. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (e.g. loss of

power or gas to community); and railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic.

In terms of numbers and types of buildings and infrastructure, typical scenarios are described to gauge the anticipated impacts of hazardous material release events in the county.

HAZUS-MH Hazardous Materials Release Analysis

The Polis Center conducted two HAZUS-MH analyses for hazardous materials releases: one in East Chicago; the other in Gary/Hammond.

East Chicago Analysis

The U.S. EPA's ALOHA (Areal Locations of Hazardous Atmospheres) model was utilized to assess the area of impact for a chlorine release along the EJE rail line between Aldis Avenue and Cline Avenue on the north side of East Chicago. There were two 33,500 gallon railcars involved in the release for a total of 67,000 gallons of chlorine.

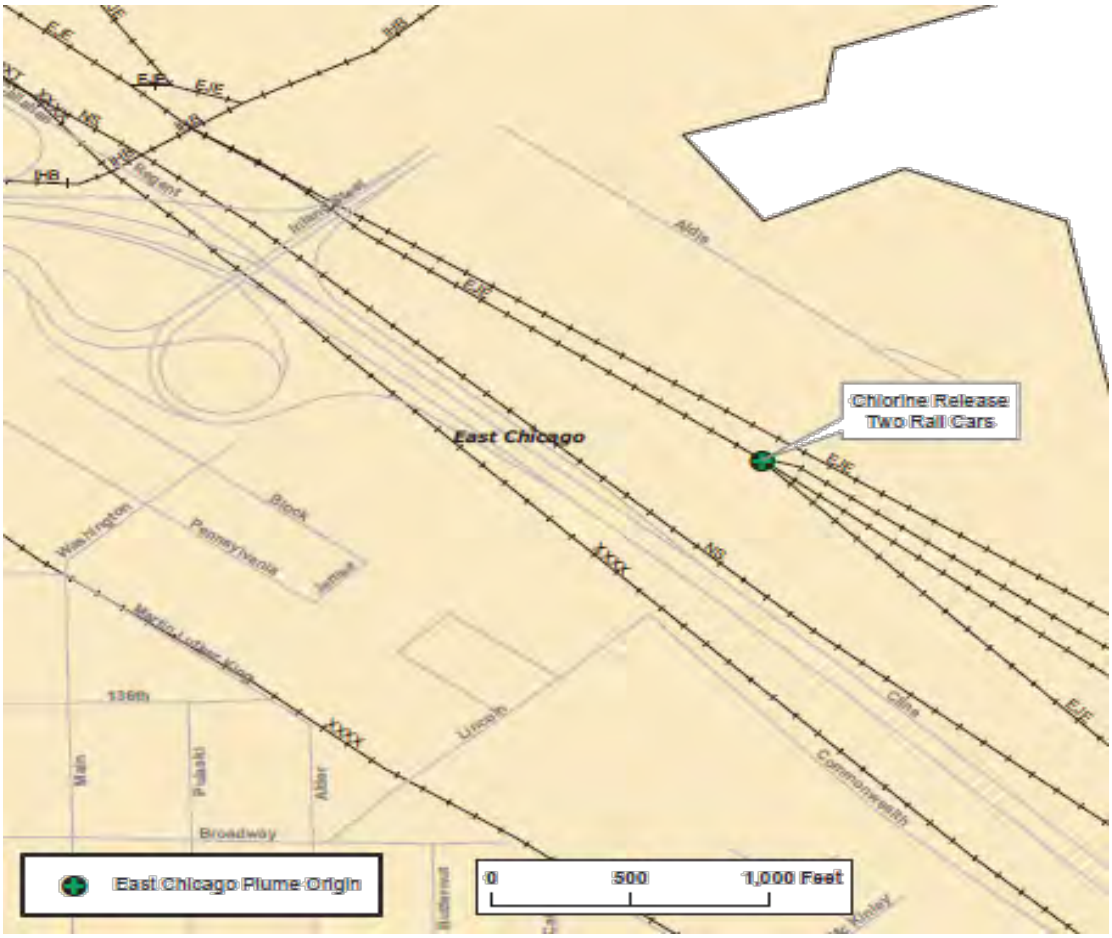
Chlorine is a greenish yellow gas with a pungent suffocating odor. The gas liquefies at -35°C and room pressure or will liquefy from pressure applied at room temperature. Contact with unconfined liquid chlorine can cause frostbite from evaporative cooling. Chlorine does not burn, but, like oxygen, supports combustion. The toxic gas can have adverse health effects from either long-term inhalation of low concentrations of vapors or short-term inhalation of high concentrations. Chlorine vapors are much heavier than air and tend to settle in low areas. Chlorine is commonly used to purify water, bleach wood pulp, and make other chemicals.

Source: CAMEO

ALOHA is a computer program designed especially for use by people responding to chemical accidents, as well as for emergency planning and training. Chlorine is a common chemical used in industrial operations and can be found in either liquid or gas form. Rail and truck tankers commonly haul chlorine to and from facilities.

For this scenario, moderate atmospheric and climatic conditions with a slight breeze from the west were assumed. The target area was chosen due to its proximity to residential and commercial interests in the community. The geographic area covered in this analysis is depicted in Figure 5-55.

Figure 5-55: Location of Chemical Release



The ALOHA atmospheric modeling parameters were based upon a north-northeast wind speed of five miles per hour. The temperature was 68°F with 75% humidity and partly cloudy skies.

The source of the chemical spill is a horizontal, cylindrical-shaped tank. The diameter of the tank was set to 14.7 feet and the length set to 53 feet (67,000 gallons). Values modeled in ALOHA represent the combined total of two rail cars each containing 33,500 gallons of chlorine. At the time of its release, it was estimated that the tanks were 85% full. The chlorine in these tanks is in its liquid state.

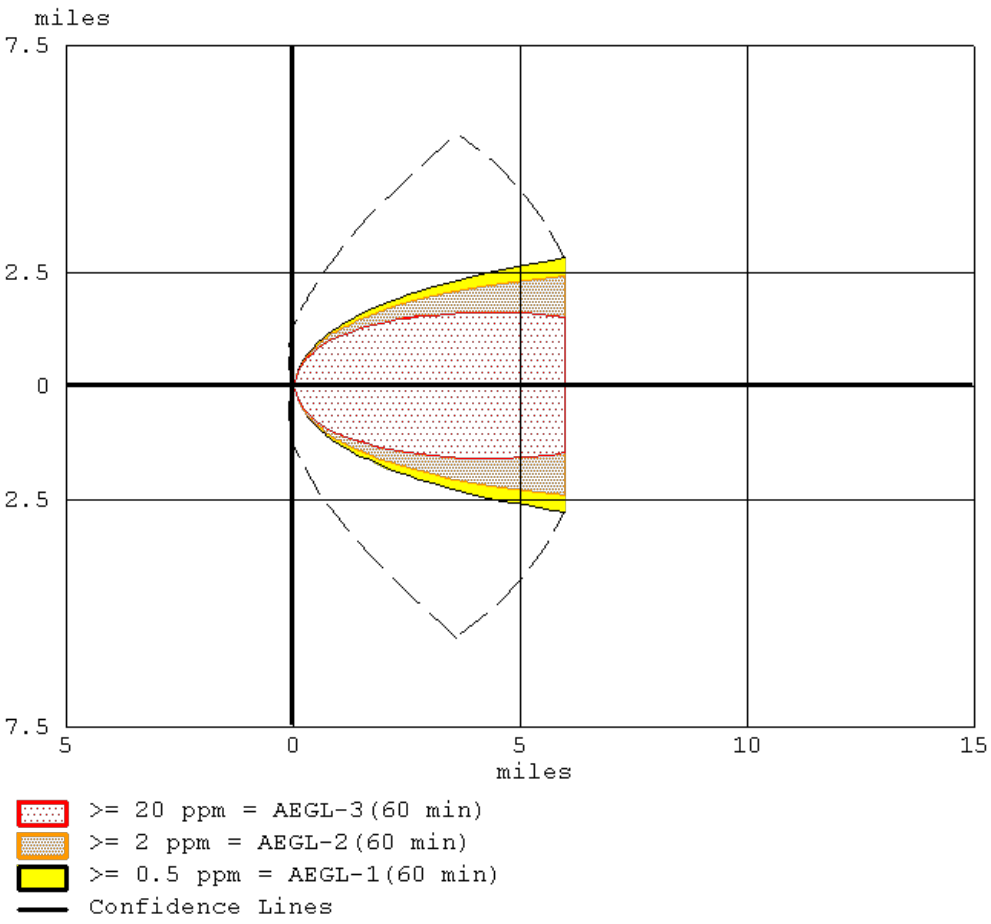
This release was based on a leak from a 5-inch-diameter hole, 12 inches above the bottom of the tank.

Figure 5-56: ALOHA Plume Modeling Parameters

```
SITE DATA:
  Location: EAST CHICAGO, INDIANA
  Building Air Exchanges Per Hour: 0.34 (sheltered single storied)
  Time: February 12, 2010  1134 hours CST (user specified)

CHEMICAL DATA:
  Chemical Name: CHLORINE                 Molecular Weight: 70.91 g/mol
  AEGL-1(60 min): 0.5 ppm   AEGL-2(60 min): 2 ppm   AEGL-3(60 min): 20 ppm
  IDLH: 10 ppm
  Ambient Boiling Point: -30.1° F
  Vapor Pressure at Ambient Temperature: greater than 1 atm
  Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 5 knots from NNE at 10 meters
  Ground Roughness: open country          Cloud Cover: 5 tenths
  Air Temperature: 68° F                  Stability Class: C
  No Inversion Height                     Relative Humidity: 75%

SOURCE STRENGTH:
  Leak from hole in horizontal cylindrical tank
  Non-flammable chemical is escaping from tank
  Tank Diameter: 14.7 feet                Tank Length: 53 feet
  Tank Volume: 67000 gallons
  Tank contains liquid                    Internal Temperature: 68° F
  Chemical Mass in Tank: 336 tons         Tank is 85% full
  Circular Opening Diameter: 5 inches
  Opening is 12 inches from tank bottom
  Release Duration: 20 minutes
  Max Average Sustained Release Rate: 42,100 pounds/min
     (averaged over a minute or more)
  Total Amount Released: 658,559 pounds
  Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).
```

Using the settings above, approximately 658,559 pounds of material would be released (42,100 pounds per minute). The images in Figures 5-57 and 5-58 depict the plume footprint generated by ALOHA. As the substance moves away from the source, the level of substance concentration decreases. Each color-coded area depicts a level of concentration measured in parts per million.

Figure 5-57: Plume Footprint Generated by ALOHA



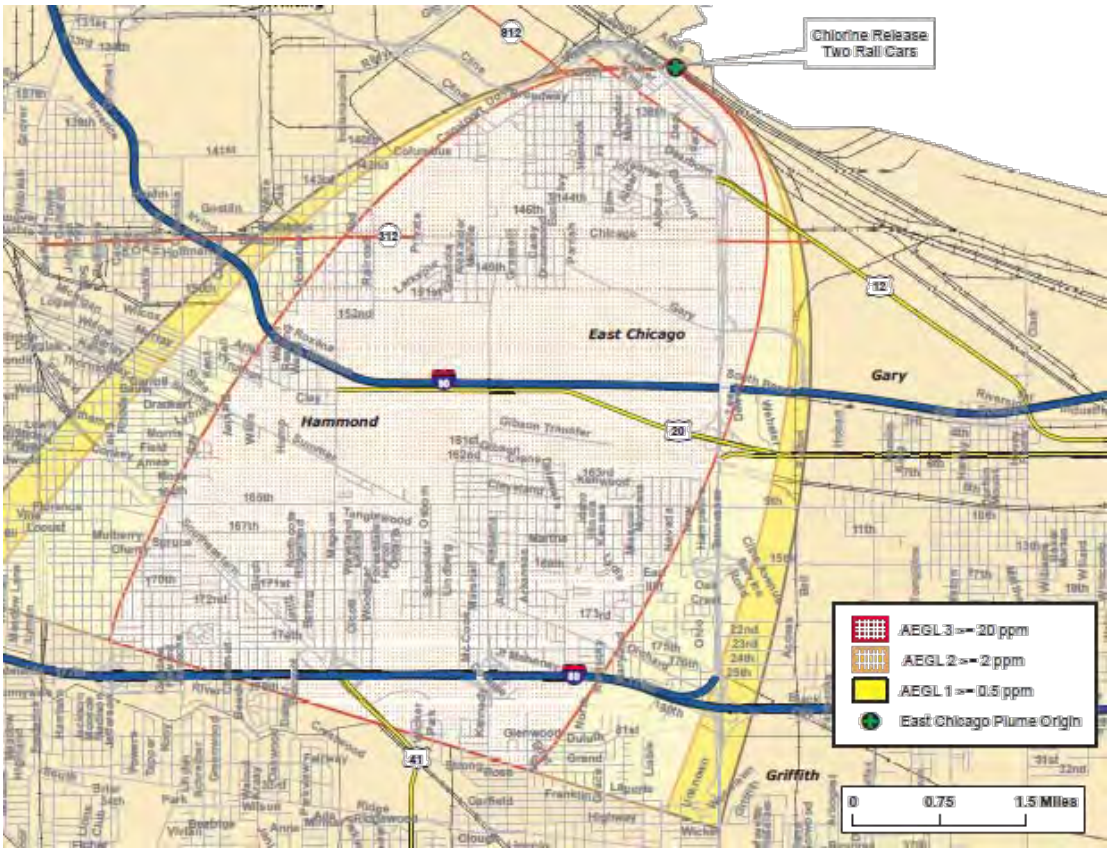
Acute Exposure Guideline Levels (AEGLs) are intended to describe the health effects on humans due to once-in-a-lifetime or rare exposure to airborne chemicals. The National Advisory Committee for AEGLs is developing these guidelines to help both national and local authorities, as well as private companies, deal with emergencies involving spills or other catastrophic exposures.

- AEGL 1: Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic non sensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

- AEGL 2: Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

- AEGL 3: Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Figure 5-58: ALOHA Plume Footprint Overlaid in ArcGIS



The Lake building inventory point layer was added to ArcMap and overlaid with the plume footprint. The building inventory point layer was then intersected with each of the four footprint areas to classify each building inventory point based upon the plume footprint in which it is located.

By summing the building inventory points within all AEGL zones (AEGL 1 >= 20 ppm, AEGL 2 >= 2 ppm and AEGL 3 >= 0.5 ppm), the GIS overlay analysis predicts that as many as 25,945 buildings could be exposed at a replacement cost of $2.3 billion. If this event were to occur, approximately 58,680 people would be affected.

The results of the analysis against the building inventory points are depicted in Tables 5-66 through 5-69. Table 5-66 summarizes the results of the chemical spill within all AEGL zones (>= 20 ppm, >= 2 ppm and >= 0.5 ppm). Tables 5-67 through 5-69 provide analysis within each AEGL zone.

Table 5-66: Estimated Exposure (All AEGL)

Occupancy	Population	Building Counts	Exposure (thousands)
Residential	58,680	23,472	$1,370,235
Commercial	0	1,542	$256,613
Industrial	0	369	$260,922
Agriculture	0	0	$0
Religious	0	378	$134,411
Government	0	152	$84,829
Education	0	32	$165,315
Total	**58,680**	**25,945**	**$2,272,324**

Table 5-66: Estimated Exposure (AEGL 3 >= 20 ppm)

Occupancy	Population	Building Counts	Exposure (thousands)
Residential	36,945	14,778	$636,773
Commercial	0	1,016	$146,401
Industrial	0	247	$198,252
Agriculture	0	0	$0
Religious	0	268	$64,766
Government	0	113	$67,658
Education	0	21	$82,768
Total	**36,945**	**16,443**	**$1,196,618**

Table 5-68: Estimated Exposure (AEGL 2 >= 2 ppm)

Occupancy	Population	Building Counts	Exposure (thousands)
Residential	16,728	6,691	$504,638
Commercial	0	389	$81,239
Industrial	0	72	$37,079
Agriculture	0	0	$0
Religious	0	69	$53,376
Government	0	25	$12,598
Education	0	6	$37,719
Total	**16,728**	**7,252**	**$726,648**

Table 5-69: Estimated Exposure (AEGL 1 >= 0.5 ppm)

Occupancy	Population	Building Counts	Exposure (thousands)
Residential	5,008	2,003	$228,824
Commercial	0	137	$28,973
Industrial	0	50	$25,591
Agriculture	0	0	$0
Religious	0	41	$16,269
Government	0	14	$4,573
Education	0	5	$44,828
Total	**5,008**	**2,250**	**$349,058**

There are 164 critical facilities within the limits of the chemical spill plume. Most are located within the confines of the AEGL 3 >= 20 ppm concentration level. The affected facilities are identified in Table 5-70. Their geographic locations are depicted in Figure 5-59.

Table 5-70: Critical Facilities within Plume Footprint

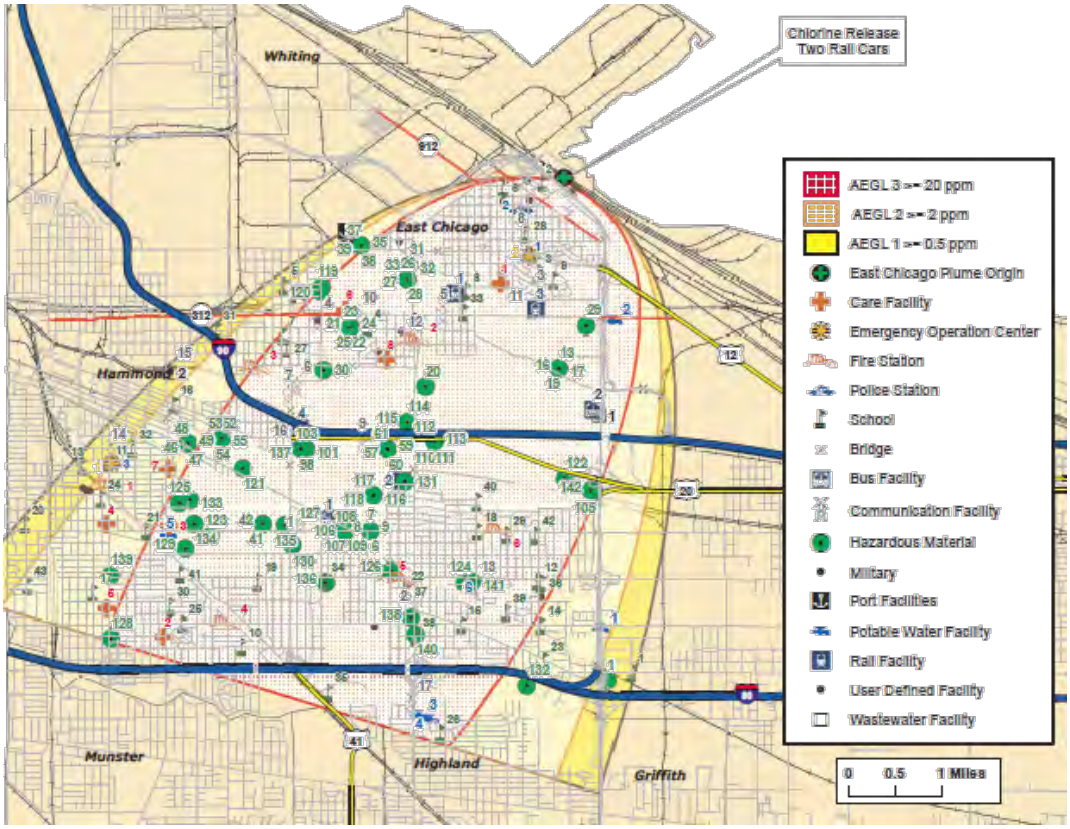
Exposed Critical Facilities	
Bus Facilities	Progressive Transportation Svc
	East Chicago Bus Transit
Care Facilities	St Catherine Hospital Inc
	Columbia Medical Center
	Concentra Medical Center
	Medical Clinics Of America
	South Side Medical Clinic
	Community Health Center
	Ophelia Steen Family And Health
	Lake County Nursing & Rehabilitation Center
Communication Facilities	WJOB, Hammond
	NEW, Hammond
	East Chicago 911, 2301 E Columbus Dr.
	T-Mobile, 4720 Railroad
	Cell Tower, 1110 E Chicago Ave
	Cell Tower, 5303 Indianapolis Blvd
	Cell Tower, 5318 Indianapolis Blvd
	T_Mobile, 3625 Pulaski
	NIPSCO, 2301-07 Michigan Ave
	Cell Tower, 418 E Chicago
	Cell Tower, 4321 Fir Street
	Fire Station, 149th And Kennedy
	Unknown, 169th & Parrish
	City Hall, 5811 Calumet Ave
	Sanitary District, 5143 Columbia Ave
	Rhodia, 2000 E Michigan
	Bradley Pumpkin Store, 8000 Kennedy
Emergency Operation Centers	Hammond Civil Defense
	East Chicago Public Safety
Fire Departments	Hammond Fire Dept
	East Chicago Fire Dept Station 3
	East Chicago Fire Dept Station 4
	Hammond Fire Station #7
	Hammond Fire Station #6
	Hammond Fire Station #8
Hazardous Materials Sites	Amg Resources Corp.
	Silgan Containers Corp.
	Citgo Petroleum Corp.
	Du Pont East Chicago Plant
	Union Tank Car Co. Plant 1
	National Briquette Corp.
	National Processing Co.

Exposed Critical Facilities	
	National Refractories, & Minerals Corp.
	Pollution Control Inds. Inc.
	Phillips Petroleum Co. East Chicago Term
	Dietrich Ind. Inc.
	Davies Imperial Coatings Inc.
	Jupiter Aluminum Corp.
	Equilon East Chicago Terminal
	Rhodia Inc.
	Aga Gas Inc.
	Hammond Lead Prods. Halox Hammond Expan
	"Hammond Group Inc., Halstab Div."
	Harbison Walker Refractories - Hammond P
	Lasalle Steel Co.
	Great Lakes Metals Llc.
	Hammond LLC
	Wolverine
	165th Street Complex
	Ameritech
	Cintas #319
	D & D Industries
	First Transit Inc
	Gas City Pantry
	Hammond Operating Headquarters
	Huhtamaki Food Service Inc
	IHB Gibson Yard
	Illco
	Illiana Transit Warehouse
	Lear Corporation
	Patten Industries
	Purdue University Calumet
	Resco Products Inc
	SBC
	Speedway #8335
	Speedway #8332
	United Parcel Service
	Linde Gas, LLC
Military Facilities	National Guard Armory
Police Departments	East Chicago Police Dept
	Lake County Sheriff
	Hammond Police Dept
Port Facilities	Mobil Oil Corp., Calumet River Branch So
	CITGO Petroleum Corp. East Chicago Dock.
Schools	Grissom Elementary School
	Eugene Field Elementary School
	Benjamin Franklin Elementary School
	Carrie Gosch Elementary School
	Benjamin Harrison Elementary School
	Abraham Lincoln Elementary School

Exposed Critical Facilities	
	William Mckinley Elementary School
	George Washington Elementary School
	Joseph L Block Jr High School
	Donald E Gavit Middle/High School
	Hammond High School
	Morton Senior High School
	Area Career Center
	Charles N Scott Middle School
	Lee L Caldwell Elementary School
	Columbia Elementary School
	Thomas A Edison Elementary School
	Warren G Harding Elementary School
	Thomas Jefferson Elementary School
	Kenwood Elementary School
	Maywood Elementary School
	Morton Elementary School
	Orchard Drive Elementary School
	Lew Wallace Elementary School
	Frank O'Bannon Elementary School
	Judith Morton Johnston Elementary
	St Stanislaus School
	Indiana Harbor Catholic School
	Saint Catherine Of Siena School
	Saint John Bosco School
	Bishop Noll Institute
	Henry W Eggers Elementary/Middle School
	Intergenerational Center
	Purdue University Calumet
	Sawyer College
	Hammond Head Start
	Pied Piper Preschool
	Woodland Childcare
	Indiana College Of Commerce
	Gibson Nature Center
	Purdue Entrepreneurial Center
	The Shepherd's Academy
	City Baptists School
Potable Water Facilities	Cline Ave (Peoples Water)
	East Chicago Booster
	JR Bradley Pump Station
	Kennedy Ave Storage
	Water Department
	Water Tower
Rail Facilities	Arro Packaging Co: East Chicago
	MDT Transloading Services: Hammond
	Citgo Petroleum Corp: East Chicago
	Southshore Train Station (HMD)
User Defined Facilities	Main Library

Exposed Critical Facilities	
	East Chicago Public Library
	Bessie Owens Community Recreation Center
	Heritage Hall
	Martin Luther King Center
	Penn Center
	Roberto Clemente Center
	Roxana Center
	151st St Center
	City Hall
	Central Services
	Post Office
	Post Office
	City Court
	Senior Citizens Building
	Hunter Senior Citizen Building
	Hammond Animal Control
	Hammond City Offices
	Hammond Health Dept
	Hammond Recycling Dept
	Hammond Sanitation Gargage
	Hammond Civic Center
	E.B. Hayward Library
	Howard Library
	Jean Shepherd Community Center
Wastewater Facilities	East Chicago Sanitary District
	Hammond Sanitary District WWTP

Figure 5-59: Essential Facilities within Plume Footprint



Gary/Hammond Analysis

The U.S. EPA's ALOHA (Areal Locations of Hazardous Atmospheres) model was utilized to assess the area of impact for an anhydrous ammonia release at the intersection of I-80/94 and Cline Avenue. The location is located on the boundary of the communities of Hammond and Gary.

Anhydrous ammonia is a clear colorless gas with a strong odor. Contact with the unconfined liquid can cause frostbite. Though the gas is generally regarded as nonflammable, it can burn within certain vapor concentration limits with strong ignition. The fire hazard increases in the presence of oil or other combustible materials. Vapors from an anhydrous ammonia leak initially hug the ground, and prolonged exposure of containers to fire or heat may cause violent rupturing and rocketing. Long-term inhalation of low concentrations of the vapors or short-term inhalation of high concentrations has adverse health effects. Anhydrous ammonia is generally used as a fertilizer, a refrigerant, and in the manufacture of other chemicals.

Source: CAMEO

Anhydrous ammonia is a common chemical used in industrial operations and can be found in either liquid or gas form. Rail and truck tankers commonly haul anhydrous ammonia to and from facilities.

For this scenario, moderate atmospheric and climatic conditions with a slight breeze from the west were assumed. The target area was chosen due to its proximity to residential and commercial interests in the area.

The geographic area covered in this analysis is depicted in Figure 5-60.

Figure 5-60: Location of Chemical Release

The ALOHA atmospheric modeling parameters were based upon a westerly wind speed of five miles per hour. The temperature was 68°F with 75% humidity and partly cloudy skies.

The source of the chemical spill is a horizontal, cylindrical-shaped tank. The diameter of the tank was set to 6.08 feet and the length set to 53 feet (11,500 gallons). At the time of its release, it was estimated that the tank was 85% full. The anhydrous ammonia in this tank is in its liquid state.

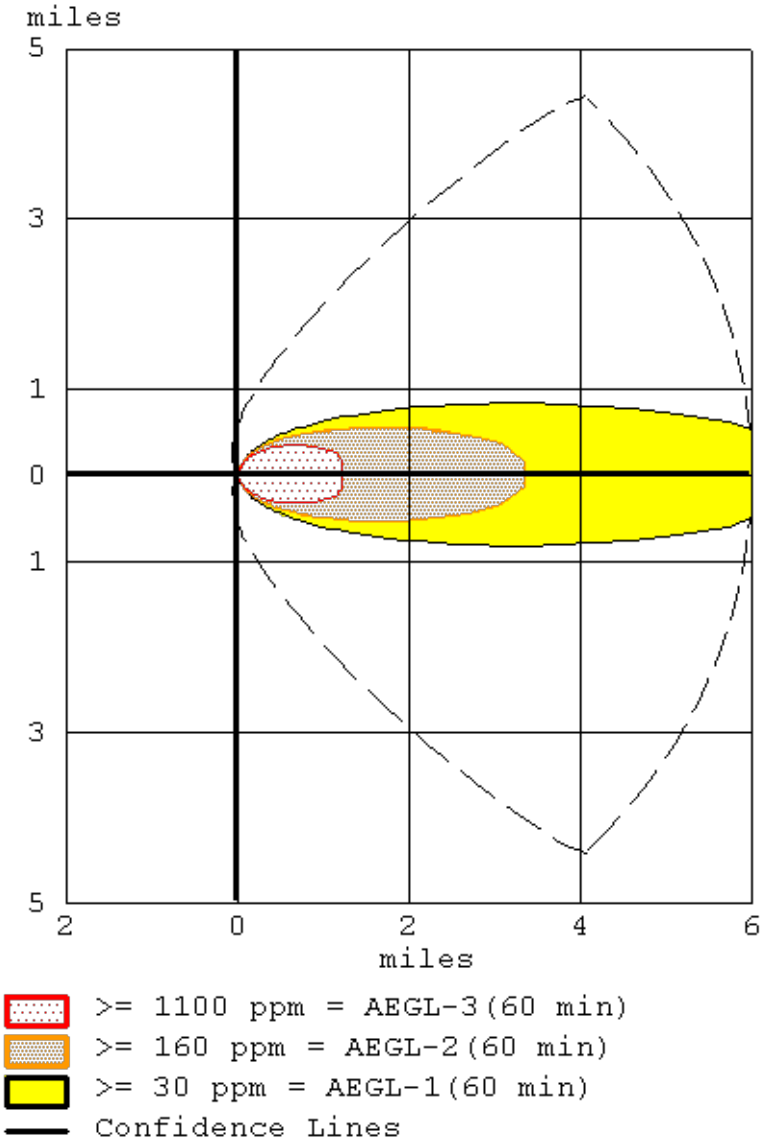
This release was based on a leak from a 2.5-inch-diameter hole, 12 inches above the bottom of the tank.

Figure 5-61: ALOHA Plume Modeling Parameters

```
SITE DATA:
  Location: HAMMOND, IN, INDIANA
  Building Air Exchanges Per Hour: 0.29 (sheltered single storied)
  Time: February 12, 2010  1115 hours CST (user specified)

CHEMICAL DATA:
  Chemical Name: AMMONIA                  Molecular Weight: 17.03 g/mol
  AEGL-1(60 min): 30 ppm   AEGL-2(60 min): 160 ppm   AEGL-3(60 min): 1100 ppm
  IDLH: 300 ppm      LEL: 160000 ppm      UEL: 250000 ppm
  Ambient Boiling Point: -28.9° F
  Vapor Pressure at Ambient Temperature: greater than 1 atm
  Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 5 miles/hour from W at 10 meters
  Ground Roughness: open country          Cloud Cover: 5 tenths
  Air Temperature: 68° F                  Stability Class: C
  No Inversion Height                     Relative Humidity: 75%

SOURCE STRENGTH:
  Leak from hole in horizontal cylindrical tank
  Flammable chemical escaping from tank (not burning)
  Tank Diameter: 6.08 feet                Tank Length: 53 feet
  Tank Volume: 11500 gallons
  Tank contains liquid                    Internal Temperature: 68° F
  Chemical Mass in Tank: 24.9 tons        Tank is 85% full
  Circular Opening Diameter: 2.5 inches
  Opening is 12 inches from tank bottom
  Release Duration: 13 minutes
  Max Average Sustained Release Rate: 7,730 pounds/min
     (averaged over a minute or more)
  Total Amount Released: 45,152 pounds
  Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).
```

Using the settings above, approximately 45,152 pounds of material would be released (7,730 pounds per minute). The images in Figures 5-62 and 5-63 depict the plume footprint generated by ALOHA. As the substance moves away from the source, the level of substance concentration decreases. Each color-coded area depicts a level of concentration measured in parts per million.

Figure 5-62: Plume Footprint Generated by ALOHA



The red buffer (AEGL 3 >= 1100 ppm) extends no more than one mile from the point of release after one hour. The orange buffer (AEGL 2 >= 160 ppm) extends no more than three miles from the point of release after one hour. The yellow buffer (AEGL 1 >= 30 ppm) extends more than six miles from the point of release after one hour. The dashed lines depict the level of confidence within the confines of the entire plume footprint.

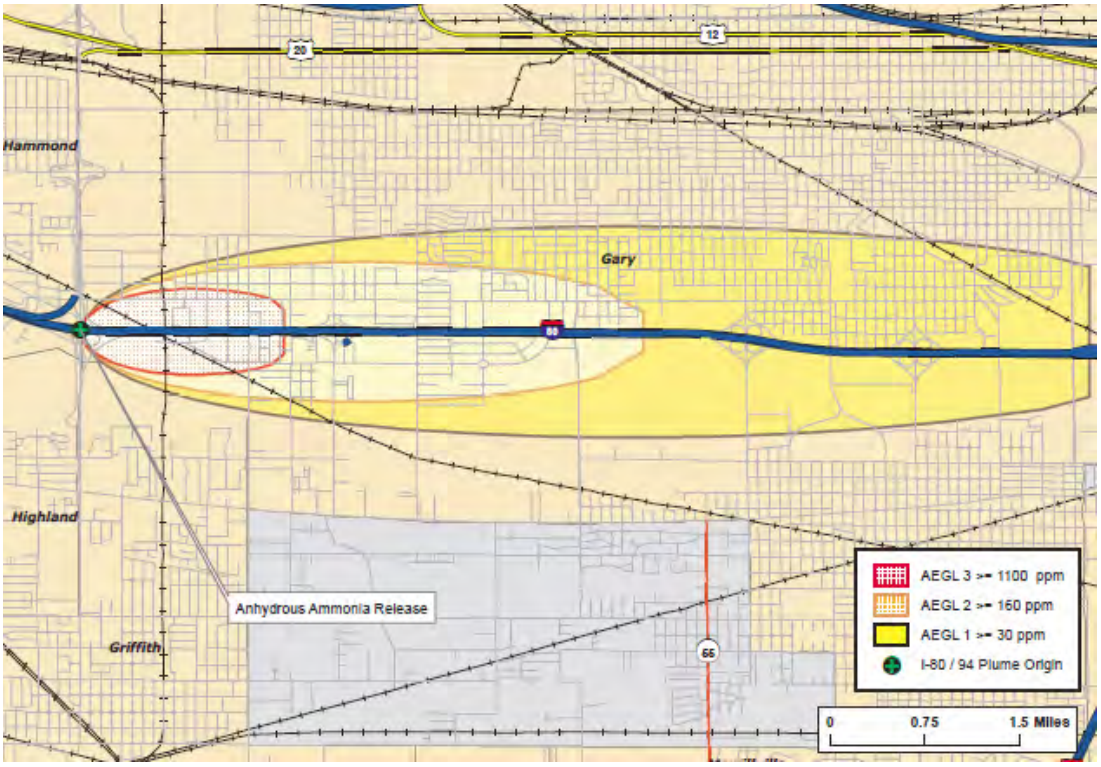
Acute Exposure Guideline Levels (AEGLs) are intended to describe the health effects on humans due to once-in-a-lifetime or rare exposure to airborne chemicals. The National Advisory Committee for AEGLs is developing these guidelines to help both national and local authorities, as well as private companies, deal with emergencies involving spills or other catastrophic exposures.

- AEGL 1: Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic non sensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

- AEGL 2: Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

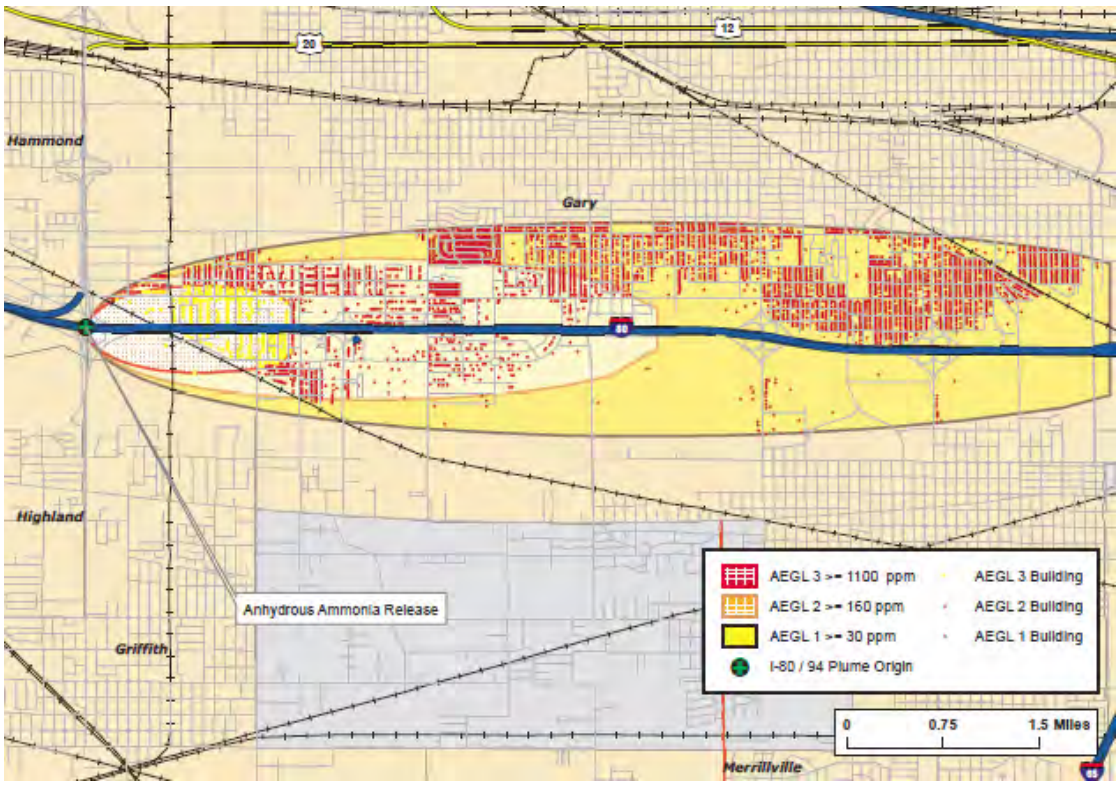
- AEGL 3: Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Figure 5-63: ALOHA Plume Footprint Overlaid in ArcGIS



The Lake building inventory point layer was added to ArcMap and overlaid with the plume footprint. The building inventory point layer was then intersected with each of the four footprint areas to classify each building inventory point based upon the plume footprint in which it is located. Figure 5-64 depicts the Lake building inventory points after the "intersect" process.

Figure 5-64: Lake County building inventory Points Classified By Plume Footprint



By summing the building inventory points within all AEGL zones (AEGL 3 >= 1100 ppm, AEGL 2 >= 160 ppm and AEGL 1 >= 30 ppm), the GIS overlay analysis predicts that as many as 5,615 buildings could be exposed at a replacement cost of $690 million. If this event were to occur, approximately 12,310 people would be affected.

The results of the analysis against the building inventory points are depicted in Tables 5-71 through 5-74. Table 5-71 summarizes the results of the chemical spill within all AEGL zones (AEGL 3 >= 1100 ppm, AEGL 2 >= 160 ppm, and AEGL 1 >= 30 ppm). Tables 5-72 through 5-74 provide analysis within each AEGL zone.

Table 5-71: Estimated Exposure (All AEGL)

Occupancy	Population	Building Counts	Exposure (thousands)
Residential	12,310	4,924	$443,220
Commercial	0	259	$60,781
Industrial	0	9	$15,356
Agriculture	0	0	$0
Religious	0	313	$51,961
Government	0	102	$21,447
Education	0	8	$98,075
Total	**12,310**	**5,615**	**$690,841**

Table 5-72: Estimated Exposure (AEGL 3 >= 1100 ppm)

Occupancy	Population	Building Counts	Exposure (thousands)
Residential	738	295	$23,035
Commercial	0	19	$4,358
Industrial	0	1	$37
Agriculture	0	0	$0
Religious	0	16	$6,462
Government	0	1	$263
Education	0	1	$3,802
Total	**738**	**333**	**$37,957**

Table 5-73: Estimated Exposure (AEGL 2 >= 160 ppm)

Occupancy	Population	Building Counts	Exposure (thousands)
Residential	2,645	1,058	$100,999
Commercial	0	52	$15,586
Industrial	0	2	$896
Agriculture	0	0	$0
Religious	0	73	$11,508
Government	0	34	$3,380
Education	0	0	$0
Total	**2,645**	**1,219**	**$132,368**

Table 5-74: Estimated Exposure (AEGL 1 >= 30 ppm)

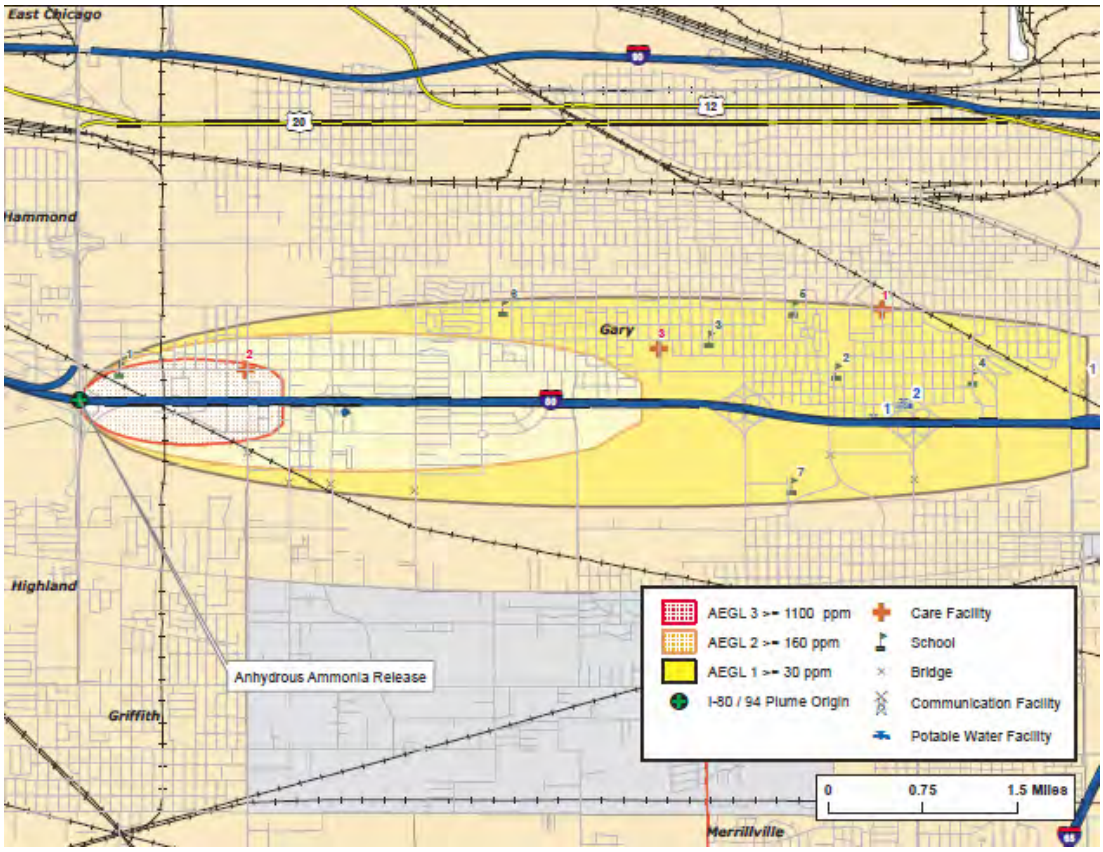
Occupancy	Population	Building Counts	Exposure (thousands)
Residential	8,928	3,571	$319,187
Commercial	0	188	$40,837
Industrial	0	6	$14,424
Agriculture	0	0	$0
Religious	0	224	$33,991
Government	0	67	$17,804
Education	0	7	$94,273
Total	**8,928**	**4,063**	**$520,516**

There are 13 critical facilities within the limits of the chemical spill plume. Most are located within the confines of the AEGL 1 >= 30 ppm concentration level. The affected facilities are identified in Table 5-75. Their geographic locations are depicted in Figure 5-65.

Table 5-75: Critical Facilities within Plume Footprint

Exposed Critical Facilities	
Care Facilities	Gary 21ST Avenue
	Gary Black Oak
	Timberview Health Care Center
Communication Facilities	WLTH Radio Tower
Potable Water Facilities	28th & Madison (storage)
	27th & Washington (storage)
Schools	Grissom Elementary School
	Theodore Roosevelt High School
	Benjamin Banneker Elementary School
	George Washington Carver School
	McCullough Academy
	Alain L Locke Elementary School
	Gary Lighthouse Charter School

Figure 5-65: Essential Facilities within Plume Footprint



Vulnerability to Future Assets/Infrastructure for Hazardous Materials Release

Any new development within the county will be vulnerable to these events, especially development along major roadways.

Analysis of Community Development Trends

Because the hazardous material hazard events may occur anywhere within the county, future development will be impacted. The major transportation routes and the industries located in Lake County pose a threat of dangerous chemicals and hazardous materials release.

5.3.8 FIRE HAZARD

Hazard Definition

This plan will identify four major categories of fires within the county: tire/scrap fires, structural fires, wildfires, and arson.

Tire Fires

The state of Indiana generates thousands of scrap tires annually. Many of those scrap tires end up in approved storage sites that are carefully regulated and controlled by federal and state officials. However, scrap tires are sometimes intentionally dumped in unapproved locations throughout the state. Lake County has a number of approved locations for tire disposal and storage, but the number of unapproved locations cannot be readily determined. These illegal sites are owned by private residents who have been continually dumping waste and refuse, including scrap tires, at those locations for many years.

Tire disposal sites can be fire hazards, in large part, because of the enormous number of scrap tires typically present at one site. This large amount of fuel renders standard firefighting practices nearly useless. Flowing and burning oil released by the scrap tires can spread the fire to adjacent areas. Tire fires differ from conventional fires in the following ways:

- Relatively small tire fires can require significant fire resources to control and extinguish.
- Those resources often cost much more than Lake County government can absorb compared to standard fire responses.
- There may be significant environmental consequences of a major tire fire. Extreme heat can convert a standard vehicle tire into approximately two gallons of oily residue that may leak into the soil or migrate to streams and waterways.

Structural Fires

Lightning strikes, poor building construction, and building condition are the main causes for most structural fires in Indiana. Lake County has a few structural fires each year countywide.

Wildfires

Approximately 35% to 55% of Indiana's land base is heavily wooded or forested. When hot and dry conditions develop, forests may become vulnerable to devastating wildfires. In the past few decades an increased commercial and residential development near forested areas has dramatically changed the nature and scope of the wildfire hazard. In addition, the increase in structures resulting from new development strains the effectiveness of the fire service personnel in the county.

Arson

It is important to note that arson is a contributing factor to fire-related incidents within the county. According to the United States Fire Administration, approximately 22% of the total fires reported in the nation from 2001 to 2002 were of incendiary or suspicious nature.

Fire at vacant building, September 2004, East Chicago; *Source: NWI Times*

Previous Occurrences

There was one significant tire fire in Lake County in 1995. The fire broke out in the urban area of East Chicago, forcing the evacuation of many residents and businesses. It burned for three months and was extremely costly to the county in terms of resources.

In Lake County, there have not been many structural fires with significant numbers of deaths or injuries; however there have been a number of more minor occurrences, depicted in Table 5-76.

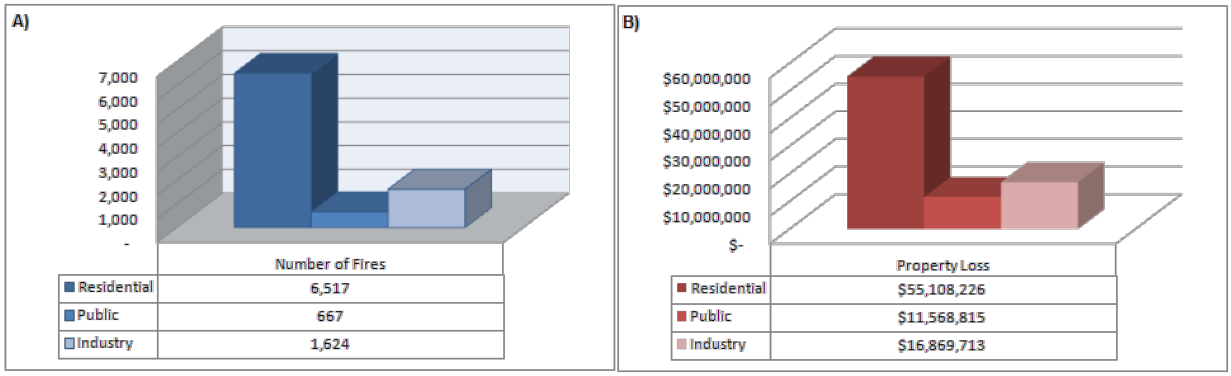
Table 5-76: Lake County Historical Structural Fires

Year	Location	Description
1993	Gary	A series of fires involving auto fluff piles broke out at H&H Recycling on Cline Avenue. Nearby schools and residences were evacuated.
1998	Gary	A major fire involving an entire block caused the temporary closure of a number of businesses. Five buildings were impacted by this fire.
2001	Gary	A fire forced the evacuation of 150 elderly residents from Gary senior citizen housing.
2003	Hammond	An apartment fire resulted in the evacuation and displacement of apartment residents.

Source: Lake County Hazard Analysis

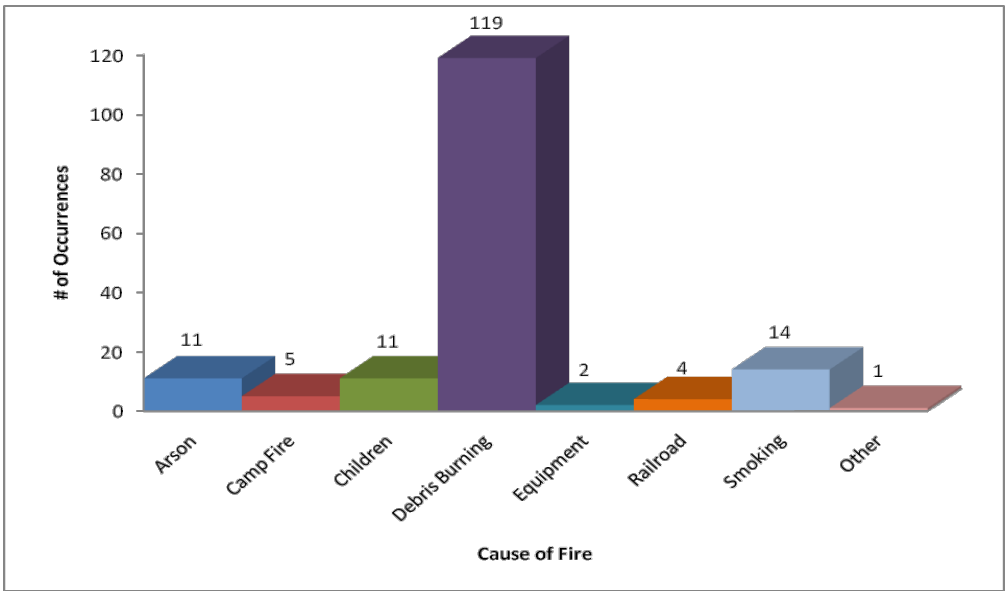
Records of structural fires in the state of Indiana between January 1, 2007 and December 31, 2007 were obtained from the Fire Service Safety and Risk Management department of the Indiana Department of Homeland Security. Figure 5-66 A and B illustrates the numbers of annual structural fires and the associated property loss respectively, categorized by property type.

Figure 5-66: 2007 Indiana Structural Fires



According to the Indiana Department of Natural Resources, there have been 167 wildfires in Lake County in the past decade. In the summer of 2000, the Lake Ridge Area in central Lake County was significantly impacted when a wildfire threatened nearly 300 acres of land. Extensive resources, including 150 fire personnel, were required to fight the fire and assist with evacuations. Figure 5-67 displays the data by cause of the fire.

Figure 5-67: Lake County Wildfires (1998-2009)



Geographic Location for Fire Hazard

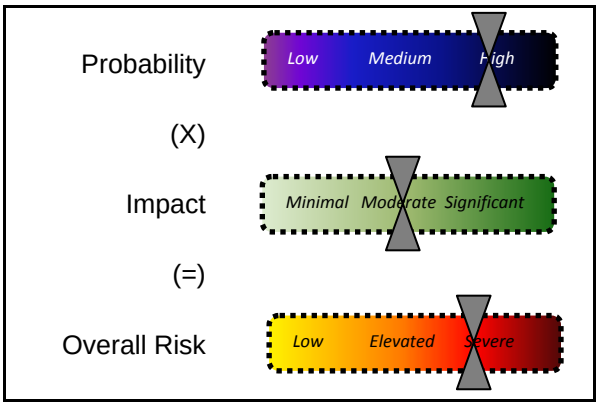
Fire hazards occur countywide and therefore affect the entire county. The heavily forested areas in the county have a higher chance of widespread fire hazard.

Hazard Extent for Fire Hazard

The extent of the fire hazard varies both in terms of the severity of the fire and the type of material being ignited. All communities in Lake County are affected by fire equally.

Risk Identification for Fire Hazard

Based on historical information, the probability of a fire is high. In Meeting #2, the planning team determined that the potential impact of a fire is moderate; therefore, the overall risk of a fire hazard for Lake County is severe.



Vulnerability Analysis for Fire Hazard

This hazard impacts the entire jurisdiction equally; therefore, the entire population and all buildings within the county are vulnerable to fires and can expect the same impacts within the affected area.

Table 5-4 lists the types and numbers of all essential facilities in the area. Critical facility names and locations are included in Appendix E.

The building exposure for Lake County, as determined from the building inventory, is included in Table 5-5. Because of the difficulty predicting which communities are at risk, the entire population and all buildings have been identified at risk.

Critical Facilities

All critical facilities are vulnerable to fire hazards. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural damage from fire and water damage from efforts extinguishing fire. Table 5-4 lists the types and numbers of essential facilities in the area. Critical facility names and locations are included in Appendix E.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is provided in Table 5-5. Impacts to the general buildings within the county are similar to the damages expected to the critical facilities. These impacts include structural damage from fire and water damage from efforts to extinguish the fire.

Infrastructure

During a fire the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable, it is important to emphasize that any number of these items could become damaged during a fire. Potential impacts include structural damage resulting in impassable roadways and power outages.

Vulnerability to Future Assets/Infrastructure for Fire Hazard

Any future development will be vulnerable to these events.

Analysis of Community Development Trends

Fire hazard events may occur anywhere within the county, because of this future development will be impacted.

6.0 MITIGATION STRATEGIES

The goal of mitigation is to reduce the future impacts of a hazard including property damage, disruption to local and regional economies, and the amount of public and private funds spent to assist with recovery. The goal of mitigation is to build disaster-resistant communities. Mitigation actions and projects should be based on a well-constructed risk assessment, provided in Section 4 of this plan. Mitigation should be an ongoing process adapting over time to accommodate a community's needs.

6.1 COMMUNITY CAPABILITY ASSESSMENT

The capability assessment identifies current activities used to mitigate hazards. The capability assessment identifies the policies, regulations, procedures, programs, and projects that contribute to the lessening of disaster damages. The assessment also provides an evaluation of these capabilities to determine whether the activities can be improved in order to more effectively reduce the impact of future hazards. The following sections identify existing plans and mitigation capabilities within all of the communities listed in Section 3.0 of this plan.

6.1.1 NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

The county and all of the communities within the county are members of the NFIP. HAZUS-MH identified approximately 9,791 households located within the Lake County Special Flood Hazard Area; 5,319 households paid flood insurance, insuring $566,009,099 in property value. The total premiums collected amounted to $3,679,750, which on average was $691.81 annually. As of November 30, 2006, 1,708 claims were filed totaling $11,161,122. The average claim was $6,534.61.

The county and incorporated areas do not participate in the NFIP'S Community Rating System (CRS). The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: 1) reduce flood losses; 2) facilitate accurate insurance rating; and 3) promote the awareness of flood insurance.

Table 6-1 identifies each community and the date each participant joined the NFIP.

Table 6-1: Additional Information on Communities Participating in the NFIP

Community	Participation Date	FIRM Date	CRS Date	CRS Rating	Flood Plain Zoning Ordinance Adopted Last
Town of Cedar Lake	12/28/73	03/15/82	N/A	N/A	
City of Crown Point	11/23/73	03/18/80	N/A	N/A	
Town of Dyer	01/25/74	05/15/84	N/A	N/A	
City of East Chicago	04/12/74	06/04/80	N/A	N/A	
City of Gary	06/28/74	03/16/81	N/A	N/A	
Town of Griffith	04/18/72	02/26/71	N/A	N/A	
City of Hammond	03/15/74	03/16/81	N/A	N/A	

Community	Participation Date	FIRM Date	CRS Date	CRS Rating	Flood Plain Zoning Ordinance Adopted Last
Town of Highland	05/19/72	05/19/72	N/A	N/A	2006
City of Hobart	04/12/74	12/04/79	N/A	N/A	1992
Lake County	12/06/74	09/02/81	N/A	N/A	1992
City of Lake Station	07/02/76	09/05/79	N/A	N/A	1996
Town of Lowell	12/21/73	12/04/79	N/A	N/A	2007
Town of Merrillville	07/19/74	10/15/81	N/A	N/A	1993
Town of Munster	12/14/73	06/16/83	N/A	N/A	1993
Town of New Chicago	05/31/74	01/02/80	N/A	N/A	
Town of Schererville	11/30/73	05/01/80	N/A	N/A	
Town of Schneider	12/17/73	08/01/80	N/A	N/A	2001
Town of St. John	11/30/73	11/01/79	N/A	N/A	1996
City of Whiting	01/10/75	03/06/81	N/A	N/A	2004
Town of Winfield	09/02/81	09/02/81	N/A	N/A	2006

6.1.2 PLANS AND ORDINANCES

Lake County and its incorporated communities have a number of plans and ordinances in place to ensure the safety of residents and the effective operation of communities. Table 6-2 lists some of the plans.

Table 6-2: Description of Zoning Plans/Ordinances

Community	Comp Plan	Zoning Ord	Subd Control Ord	Erosion Control	Storm Water Mgmt	Burning Ord	Seismic Ord	Bldg. Stndrds
Town of Cedar Lake	2007	Ongoing	1989	2006	2006	2004	N/A	Internat'l Standards
City of Crown Point	2005	2008	2006	2006	2006	2007	N/A	2006
Town of Dyer	2004	2007	1994	1992	In Process	1984	N/A	2008
City of East Chicago	2008						N/A	
City of Gary	2008	2007					N/A	
Town of Griffith	1999	2007	2007	2008	2008	2005	N/A	2007
City of Hammond	2007	2003	1983	2008	2008	1965	N/A	2008
Town of Highland		2003					N/A	
City of Hobart					2005		N/A	
Lake County	2003	2001			2006		N/A	
City of Lake Station	1988	1995	1969	2008	2008	2006	N/A	1985
Town of Lowell	1995	1998	2006	2005	2006	2005	N/A	1995
Town of Merrillville	1997	2006	1992	N/A	2007	2005	N/A	2008
Town of Munster	2009	2008	2009	2005	2007	N/A	N/A	2005
Town of New Chicago	N/A						N/A	
Town of Schererville	2009						N/A	2008
Town of Schneider							N/A	
Town of St. John	2005				2006		N/A	
City of Whiting	2010	2010	2010			1979	N/A	2003
Town of Winfield	2007	1997	1997	N/A	In Process	N/A	N/A	State Standards

Fire Insurance Ratings

Table 6-3 lists Lake County's fire departments and available information.

Table 6-3: Lake County Fire Departments, Ratings, and Number of Firefighters

Fire Department	Fire Insurance Rating	Number of Firefighters
Cedar Lake Fire	In Town: 7 Out of Town: 9	35
Crown Point Fire	City: 5 Township: 7	50
Dyer Fire	4	34
East Chicago Fire	3	85
Gary Fire		241
Griffith Fire	5	45
Hammond Fire	3	171
Highland Fire	4	40
Hobart Fire	In Town: 4 Out of Town: 9	
Lake Dalecarlia Fire		
Lake Hills Fire		27
Lake Ridge Fire	Areas w/ hydrants: 5 w/o hydrants: 9	22
Lake Station Fire		60
Lake of Four Seasons Fire	Winfield: 5; In LOFS: 5; West Porter County Fire Protection District: 6; Winfield Township (excluding LOFS): 6	60
Lowell Fire	In Town: 5 Out of Town: 9	33
Munster Fire	4	59
New Chicago Fire		
Ross Township Fire	In Town & Unincorporated w/ hydrants: 7; Unincorporated w/o hydrants: 9	125
St. John Fire	In Town: 5 Out of Town: 7	51
Schererville Fire	5	42
Schneider Fire		13
Shelby Fire		
Whiting Fire	5	14
BP Amoco Fire	N/A	55
USS Fire	N/A	78

Land Use Plan

Lake County's land use plan is included in the Lake County Comprehensive Plan, adopted in 1996. Many of the communities within Lake County also have comprehensive plans that address existing and future land use. The respective adoption/update dates are listed in Table 6-2.

6.2 MITIGATION GOALS

In Section 5.0 of this plan, the risk assessment identified Lake County as prone to a number of natural and technological hazards. The MHMP planning team members understand that although hazards cannot be eliminated altogether, Lake County can work toward building disaster-resistant communities. The Polis Center conducted interviews with each community within the county, including unincorporated Lake County. Following is a list of goals on which the

communities based their mitigation action items. The goals represent long-term, broad objectives of the overall vision the county and its communities would like to achieve for mitigation.

Goal 1: Lessen the impacts of hazards to new and existing infrastructure

(a) Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.

(b) Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.

(c) Objective: Minimize the amount of infrastructure exposed to hazards.

(d) Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.

(e) Objective: Improve emergency sheltering in the community.

Goal 2: Create new or revise existing plans/maps for the community

(a) Objective: Support compliance with the NFIP.

(b) Objective: Review and update existing, or create new, community plans and ordinances to support hazard mitigation.

(c) Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.

Goal 3: Develop long-term strategies to educate community residents on the hazards affecting their county

(a) Objective: Raise public awareness on hazard mitigation.

(b) Objective: Improve education and training of emergency personnel and public officials.

6.3 MITIGATION ACTIONS/PROJECTS

Upon completion of the risk assessment and development of the goals and objectives, the planning committee was provided a list of the six mitigation measure categories from the *FEMA State and Local Mitigation Planning How to Guides*. The measures are listed as follows:

- **Prevention:** Government, administrative, or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.

- **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from the hazard area. Examples include acquisition, elevation, structural retrofits, storm shutters, and shatter-resistant glass.

- **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

- **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

- **Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.

- **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

During the community interviews, MHMP members were presented with the task of individually listing potential mitigation activities using the FEMA evaluation criteria. The evaluation criteria (STAPLE+E) involved the following categories and questions.

Social:
- Will the proposed action adversely affect one segment of the population?
- Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?

Technical:
- How effective is the action in avoiding or reducing future losses?
- Will it create more problems than it solves?
- Does it solve the problem or only a symptom?
- Does the mitigation strategy address continued compliance with the NFIP?

Administrative:
- Does the jurisdiction have the capability (staff, technical experts, and/or funding) to implement the action, or can it be readily obtained?
- Can the community provide the necessary maintenance?
- Can it be accomplished in a timely manner?

Political:

- Is there political support to implement and maintain this action?
- Is there a local champion willing to help see the action to completion?
- Is there enough public support to ensure the success of the action?
- How can the mitigation objectives be accomplished at the lowest cost to the public?

Legal:

- Does the community have the authority to implement the proposed action?
- Are the proper laws, ordinances, and resolution in place to implement the action?
- Are there any potential legal consequences?
- Is there any potential community liability?
- Is the action likely to be challenged by those who may be negatively affected?
- Does the mitigation strategy address continued compliance with the NFIP?

Economic:

- Are there currently sources of funds that can be used to implement the action?
- What benefits will the action provide?
- Does the cost seem reasonable for the size of the problem and likely benefits?
- What burden will be placed on the tax base or local economy to implement this action?
- Does the action contribute to other community economic goals such as capital improvements or economic development?
- What proposed actions should be considered but be "tabled" for implementation until outside sources of funding are available?

Environmental:

- How will this action affect the environment (land, water, endangered species)?
- Will this action comply with local, state, and federal environmental laws and regulations?
- Is the action consistent with community environmental goals?

Implementation of the mitigation plan is critical to the overall success of the mitigation planning process. The first step is to decide, based upon many factors, which action will be undertaken first. In order to pursue the top priority first, an analysis and prioritization of the actions is important. Some actions may occur before the top priority due to financial, engineering, environmental, permitting, and site control issues. Public awareness and input of these mitigation actions can increase knowledge to capitalize on funding opportunities and monitoring the progress of an action.

The planning team prioritized mitigation actions based on a number of factors. A rating of high, medium, or low was assessed for each mitigation item and is listed next to each item in Table 5-5. Assuming funding is available, high priority strategies will be implemented within one year, medium priority strategies within three years, and low priority strategies within five years. Additional factors included the STAPLE+E (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) criteria listed in Table 6-4.

Table 6-4: STAPLE+E planning factors

S – Social	Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause relocation of lower income people, and if they are compatible with the community's social and cultural values.
T – Technical	Mitigation actions are technically most effective if they provide a long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E – Environmental	Sustainable mitigation actions that do not have an adverse effect on the environment, comply with federal, state, and local environmental regulations, and are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

For each mitigation action related to infrastructure, new and existing infrastructure was considered. Additionally, the mitigation strategies address continued compliance with the NFIP. While an official cost benefit review was not conducted for any of the mitigation actions, the estimated costs were discussed. The overall benefits were considered when prioritizing mitigation items from high to low. An official cost benefit review will be conducted prior to the implementations of any mitigation actions.

The following tables present potential mitigation projects developed by community representatives and sorted according to jurisdiction, as well as actions that are ongoing or already completed. Since this is the first mitigation plan developed for Lake County, there are no deleted or deferred mitigation items.

6.3.1 Strategies by Community

Unincorporated Lake County

Flooding is the most significant concern for unincorporated Lake County. In a brainstorming meeting held on January 29, 2010, the planning team identified areas for voluntary buy-out programs, places to improve drainage or elevate roads, and a number of other strategies, listed in Table 6-5. The mitigation strategies will be used in future land use planning. Minutes from the meeting are included in Appendix A.

Lake County consists of 11 townships. One of the largest, Calumet Township, encompasses the City of Gary, Town of Griffith, and parts of unincorporated Lake County. Because its geographic location is so large and its population so high, Calumet Township developed its own set of mitigation strategies. Flooding is the most significant concern for the township, which faces a constant threat of levee failure because of its location near the Little Calumet River. Programs designed to assist this area include voluntary buy-outs and the identification higher elevations

where trailer homes could be relocated. Calumet Township is also concerned with the sewer system, which combines storm and sanitary waste and could create significant health hazards. The township's mitigation strategies are listed toward the end of Table 6-5.

Table 6-5: Unincorporated Lake County Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Establish a first response hazmat team	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Hazmat	Complete	The County has a hazmat team.
Continue to Pursue Opportunities for Intergovernmental Cooperation Capital Improvement Projects that address severe flooding and erosion problems threatening residential areas and public facilities	Goal: Develop long term strategies to reduce flooding Objective: Address problems of a regional nature cooperatively with other governmental units.	Flood	Completed	County Surveyor's Office/Drainage Board will continue to successfully implement intergovernmental cooperative projects: Little Calumet (North) Watershed: *Highland Industrial Park/Spring Street Ditch-Highland *Teibles Ponds/Schererville & Dyer Ditch – INDOT/Teibles *Crown Point Storage Facilities/Beaver Dam #5 – Crown Point/White Hawk *Hartsdale Pond/Spring Street Ditch – Highland/Schererville *Downtown Schererville/Spring Street Ditch – Schererville *Avenue "H" Tiled Drain/Spring Street Ditch-Schererville/Griffith *Cady Marsh Ditch LOMR– Highland/Griffith *Broadfield/Beaver Dam #2 – Merrillville Schererville Fire Station/Turkey Creek – Schererville Kankakee (South) Watershed: *Schneider Storm Sewers/Singleton - Public Works; *Spring Run Storage Facility–Jensen
Distribute weather radios to residents in mobile homes, nursing homes, and assisted living facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm	Ongoing	The County EMA has distributed weather radios to most schools and hospitals and is currently making an effort to make the radios more available to other critical facilities.
Continue Implementation of Stormwater Ordinance in the County	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Flood	Ongoing	The County Surveyor's Office/Drainage Board and Plan Commission will continue to implement. Updates will be made periodically.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Continue Maintenance Program of Principal Regulated Drain System in Lake County	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	Ongoing	The County Surveyor's Office/Drainage Board will concentrate drainage board funds on waterways that will provide greatest drainage benefit.
Pursue Federal funding for significant identified flooding problems in unincorporated areas, along regulated drains. Ranburn Woods, Schererville Heights, Baldwin Hills, Stateline reservoir	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	Ongoing	Working with Drainage Board, areas legislators and Congressman Visclosky, seek federal funding for projects of major significance; U.S. Corps of Engineers programs are targeted.
Integrate current local datasets with FEMA and EMA datasets to provide on the spot analysis for rapid response using computerized parcel data system & GIS	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Ongoing	This project is ongoing, but additional funding will be sought from federal, state, and local resources to create new and maintain current data.
Evaluate current training and increase if necessary for the following: elected officials, department heads; the goal is to improve emergency response and damage assessment reporting	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Tornado, Flood, Thunderstorm, Earthquake, Winter Storm, Fire	Ongoing/ High	The County EMA will oversee this project and work closely with elected officials and department heads in the county. Funding has not been secured as of 2010, but state and federal sources are an option. Implementation will begin within one year.
Improve Dike Ditch and levee west of U.S. 41 in West Creek Township; levee, which protects almost 3,000 acres is deteriorating	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The EMA director will work with IDHS and IDNR to coordinate this project. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within one year.
Conduct stream maintenance along Turkey Creek and its tributaries and maintain debris management in Singleton Ditch	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood	High	The County EMA will oversee this project. IDHS and IDNR are potential funding sources. If funding is available, implementation will begin within one year.
Institute a buy-out plan for approximately 20 homes in Shelby, Wildwood, Pons Riverside, and Ranburn Woods areas	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP for each jurisdiction in community.	Flood	High	The County EMA oversees the implementation of the project. Funding has not been secured as of 2010 but will be sought from funding sources such as IDHS. Implementation, if funding is available, is forecasted to begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Procure back-up generators/transfer switches for Lions Club in Shelby and Multi-Purpose Center in Calumet Township	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm	High	The County EMA will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within one year.
Institute a mass notification system similar to Reverse 911	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The County EMA oversees the implementation of the project. Local resources will be used to install and maintain the system. Additional funding will be sought from other funding sources. Implementation, if funding is available, is forecasted to begin within one year.
Purchase new snow removal equipment and pre-treatment equipment and supplies	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	High	The County EMA will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within one year.
Complete a comprehensive drainage study to determine future risk areas and identify solutions	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Flood	High	Seek Federal funding through congressional appropriation to fund comprehensive analysis and plan for future. The County Surveyor will lead efforts on this project. If funding is available, implementation will begin within one year.
Conduct a sewer upgrade to separate stormwater and sanitary sewer lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	The EMA director will work with INDOT and IDNR to evaluate the current conditions of the community's sewer system and develop a plan. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within three years.
Elevate Chase St. from 25th to 35th in Calumet Township, SR 2 at the viaduct east of U.S. 41 in West Creek Township, and Main Street west of Lowell	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	The County EMA will oversee this project, working with highway departments. INDOT, IDHS, and IDNR are potential funding sources. If funding is available, implementation will begin within three years.
Conduct hazmat training and procure equipment	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Hazmat	Medium	The County EMA and hazmat team will coordinate this project. Funding will be sought from community grants and state resources. Implementation will begin within three years.
Establish a new shelter at Lake Dalecarlia	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat	Medium	The County EMA will oversee the implementation of this project. Local resources and IDHS grants will be sought to procure the materials. Implementation, if funding is available, is forecasted to begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Install dry hydrants throughout the county	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm, Hazmat, Fire	Medium	The County EMA will work with local fire departments to implement this project. Funding will be sought from community grants and state and federal resources. If resources are available, implementation will begin within three years.
Improve capacity to respond and remediate future flood events. Purchase sandbagging machines, portable pumps for north/south watersheds	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood	Medium	The County Surveyor will coordinate this effort. Funding will be sought from federal, state, and local sources, including the PDM program and FEMA grants. If funding is available,, implementation will begin within three years.
Continue coordination of flood response agencies to increase the capacity to address flood issues	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Flood	Medium	The County EMA, Highway Department, and Surveyor's Office will coordinate this project. Funding sources may include FEMA, IDHS, and community grants, as well as local resources. If funding is available, implementation will begin within three years.
Distribute literature advising that residents, schools, healthcare facilities, and other critical facilities bolt bookshelves to walls and secure water heaters	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Earthquake	Low	The County EMA will work with schools, healthcare facilities, and public officials to create and distribute the literature. Local resources will be used for funding. If funding is available, implementation will begin within five years.
Bury existing power lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Earthquake, Thunderstorm, Winter Storm	Low	The County EMA, municipalities, and utility companies will oversee the implementation of this project. Local and corporate resources will be used to prioritize power lines and bury them. The project is forecasted to be complete within approximately five years.
Purchase and install new warning sirens in southern Lake County	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat	Low	The County EMA oversees the implementation of the project. Local resources will be used to install and maintain the warning systems. Additional funding will be sought from other funding sources, e.g. PDM program, to expand the warning system coverage area. Implementation, if funding is available, is forecasted to begin within three years.
CALUMET TOWNSHIP MITIGATION STRATEGIES				
Implement a program for public education regarding flooding	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county. Objective: Raise public awareness on hazard mitigation.	Flood	Ongoing	This is an ongoing effort in Calumet Township.
Purchase generator/transfer switch for Gary Sanitary District	Goal: Lessen the impacts of hazards to new and existing infrastructure. Objective: Improve emergency sheltering in community.	Flood, Tornado, Earthquake, Thunderstorm, Winter Strom, Hazmat, Fire	High	Calumet Township plans to install an alternate power source fueled by Diesel underground tanks. Potential funding sources include the PDM program. If funding is available, implementation will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Update the evacuation plan for hazardous materials spills	Goal: Create new or revised existing plans/maps for the community. Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Hazmat	Medium	The Gary EMA and fire departments will oversee the implementation of this project. Calumet Township will serve as a local resource to assist with updating existing plans. Implementation will begin within three years.
Harden and flood proof the Calumet Township Multi-Purpose Center, Genesis Center, courthouse, critical facilities, and other public buildings	Goal: Lessen the impacts of hazards to new and existing infrastructure. Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Fire	Medium	Calumet Township will assist the City of Gary's EMA to identify additional structures within our township to be hardened. Funding sources may include the PDM program, FEMA, and community grants. Implementation will begin within three years.
Procure 4WD emergency vehicles for rescue and recovery	Goal: Lessen the impacts of hazards to new and existing infrastructure. Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Low	Calumet Township will coordinate with the City of Gary's EMA to identify funding from grants and federal sources. Implementation will begin within five years.
Distribute weather radios to schools	Goal: Lessen the impacts of hazards to new and existing infrastructure. Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm	Low	Calumet Township will submit a request for radios t the City of Gary's EMS as a local resource for inclusion. If funding is available through community or state grants, implementation will begin within five years.
Revise and strengthen mutual aid agreements between the City of Gary and Calumet Township	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county. Objective: Improve education and training of emergency personnel and public officials.	Winter Storm, Hazmat	Low	Calumet Township officials with work Gary's EMA to evaluate and revise/strengthen current mutual aid agreements. Local resources will be used, and implementation will begin within five years.

Town of Cedar Lake

The Town of Cedar Lake is located southwest of central Lake County. According to the planning team, the most significant hazards facing the community are tornadoes and winter storms. Cedar Lake's flooding concerns focus more on flash flooding than riverine flooding. Following is a future land use map from Cedar Lake's Comprehensive Plan. Much of the flash flooding that was identified in Section 5.0 occurs in commercial and residential areas, and is therefore of high concern to the town. The mitigation strategies will be used in future land use planning. A meeting was held on January 13, 2010 to brainstorm mitigation strategies that would address issues relating to the town's potential hazards. The strategies are described in Table 6-6. Minutes from the brainstorming session are in Appendix A.

Figure 6-1: Cedar Lake Future Land Use Map

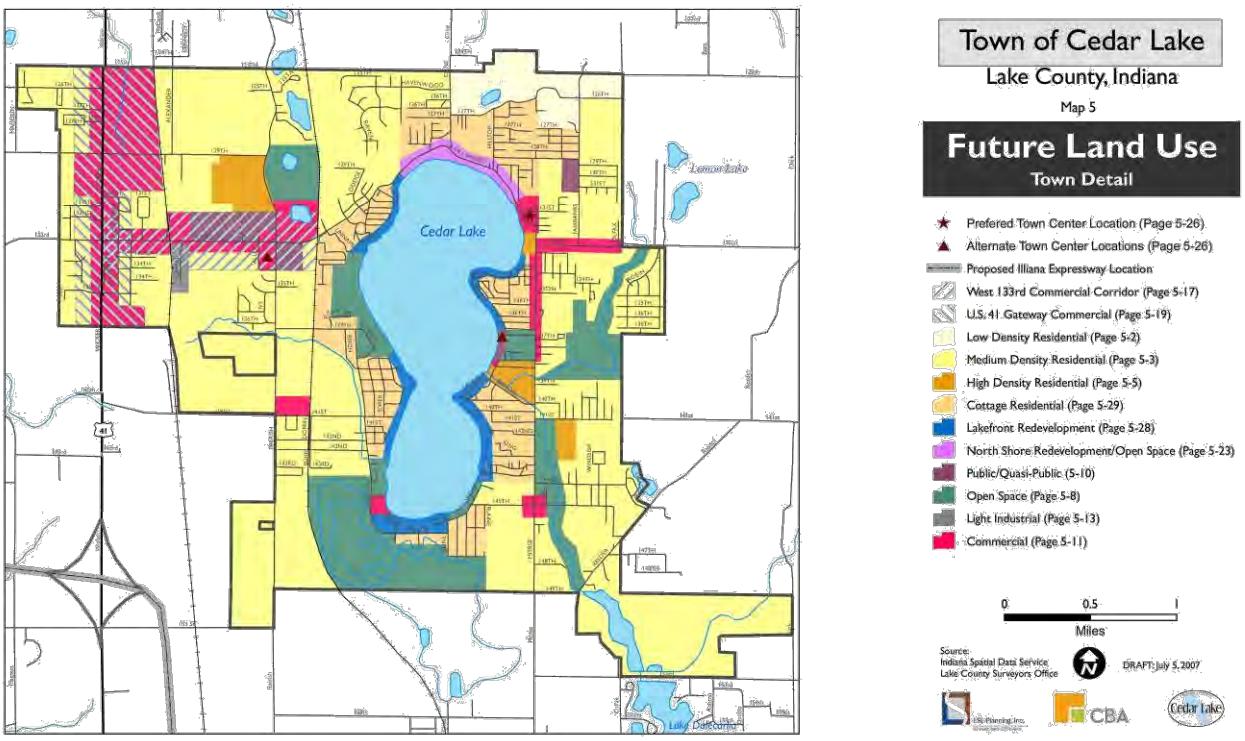


Table 6-6: Cedar Lake Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Improve drainage to Sleepy Hollow Ditch	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Complete	The Town of Cedar Lake has completed this strategy.
Include flood best management practices (BMPs) in Cedar Lake Comprehensive Plan	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Flood	Complete	The Town of Cedar Lake has completed this strategy.
Implement wetland retention in the southern portion of the town to mitigate flooding	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Complete	The Town of Cedar Lake has completed this strategy.
Update zoning ordinances and incorporate into GIS layer	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Flood	Complete	The Town of Cedar Lake is currently working on this strategy

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Establish mutual aid agreements	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Hazmat, Fire	Complete	The Town of Cedar Lake has mutual aid agreements with the Lake County Fire Association and County Hazmat Team.
Implement a program to improve communications for students	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Complete	The Town of Cedar Lake has communications systems installed on school buses and weather radios in all schools
Bury new power lines in the community	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Winter Storm	Ongoing	The Town of Cedar Lake requires all new subdivisions to bury power lines.
Enforce floodplain ordinances for new construction	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Flood	Ongoing	The Town of Cedar Lake enforces its floodplain regulations.
Institute a buy-out plan for repetitive loss properties; conduct a study for Brownfields redevelopment of fuel soils along Morris Street	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP.	Flood	High	The Town of Cedar Lake will work with the County EMA to oversee the implementation of the project. Local resources, including the County Surveyor, will be used to determine potential buy-out areas. Additional funding will be sought from IDHS, EPA, and FEMA. Implementation, if funding is available, is forecasted to begin within one year.
Install curbs and gutters to improve drainage	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities with means to guard against damage caused by secondary effects of hazards.	Flood	High	The Town of Cedar Lake is approximately 16% finished with this strategy, but will need additional funding from state and federal sources to continue. Implementation, if funding is available, is forecasted to begin within one year.
Adjust the height of Cedar Creek Dam to regulate discharge from the lake (dam overtopped during 2008 flooding)	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	High	The Town of Cedar Lake will work with the County EMA and DNR to oversee this project. Funding has not been secured as of 2010, but state and federal grants are an option. Implementation, if funding is available, will begin within one year.
Install a new siren on the southwest side of the town	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the town.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	High	The Town Board oversees implementation of the project. Local resources will be used to evaluate, install, and maintain the warning systems. Additional funding will be sought from other funding sources, e.g. PDM program, to expand the warning system coverage area. Implementation, if funding is available, is forecasted to begin within one year.
Introduce Nixle to the residents of Cedar Lake	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Town of Cedar Lake has implemented Nixle, but needs funding to publicize it. FEMA and the PDM program are possible sources of funding. If resources are available, implementation will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Implement new plans for public education including distribution of first aid kits, weather radios, and pamphlets	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Town will work with the County EMA and area schools, healthcare facilities, and businesses to implement this project. Funding will be sought from local sources and FEMA. Implementation, if funding is available, will begin within one year.
Procure emergency generators and/or transfer switches for the City Hall	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in the community.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm, Hazmat, Fire	High	The Town of Cedar Lake will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within one year.
Replace culverts and broken field tiles	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	The Town of Cedar Lake will oversee the implementation of this project. Funding has not been secured as of 2010, but INDOT is a possible funding source. Implementation, if funding is available, will begin within three years.
Remove the abandoned railroad viaduct to relieve flooding issues	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	Medium	The Town of Cedar Lake will oversee this project. Funding has not been secured as of 2010, but state and federal grants are an option. Implementation, if funding is available, will begin within three years.
Purchase new snow removal equipment and pre-treatment equipment and supplies	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Medium	The Town Board will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within three years.
Update flood ordinances for new subdivisions	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Flood	Low	The Town of Cedar Lake will oversee implementation of this project. Local resources will be used to update the community ordinance. Implementation, if funding is available, will begin within five years.
Create an EAP for Cedar Creek Dam	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Low	The dam currently has an EAP; however, in light of the dam overtopping in 2008, the EAP may need to be updated. Cedar Lake and the County will seek funding and assistance from IDNR. Implementation will begin within five years.
Strengthen mutual aid agreements	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Winter Storm	Low	The Cedar Lake Town Board will work with local resources to establish the agreements. If resources are available, implementation will begin within one year.

City of Crown Point

The City of Crown Point is located in central Lake County. According to the planning team, the most significant hazards facing the community are severe thunderstorms and winter storms. Much of the community's land use is residential and commercial; therefore, damage from hazards could significantly threaten the safety of residents and economic development. Figure 6-

2 depicts Crown Point's future land use map. The mitigation strategies will be used in future land use planning. A meeting was held on January 12, 2010 to brainstorm mitigation strategies that would address issues relating to the town's potential hazards. The strategies are described in Table 6-7. Minutes from the brainstorming session are in Appendix A.

Figure 6-2: Crown Point Future Land Use Map

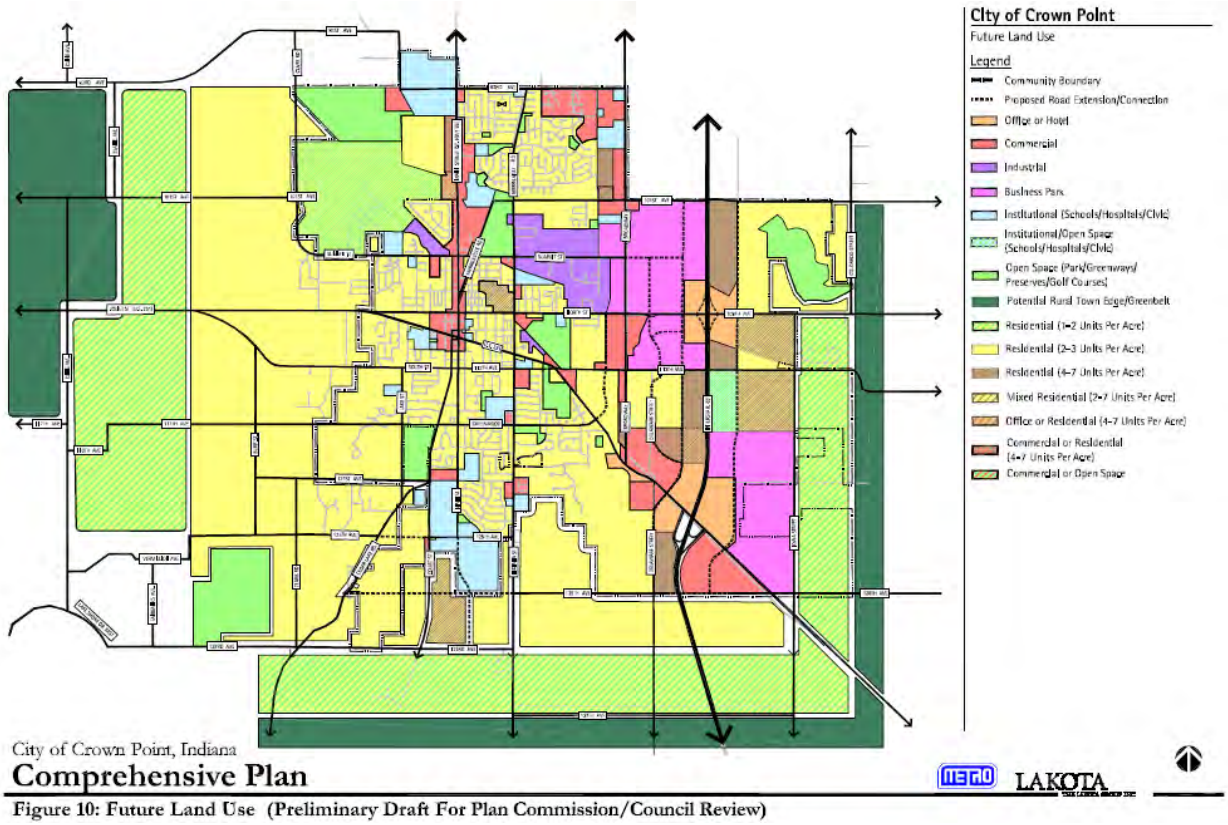


Table 6-7: Crown Point Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Develop an evacuation plan for hazardous materials spills	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Hazmat	Complete	The City of Crown Point has an evacuation plan.
Complete a Blackboard study for mass communication	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Complete	The City of Crown Point has successfully completed the study.
Establish new shelters throughout the community	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Complete	The City of Crown Point has shelters at the high school and Civic Center.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Develop method to alert the public regarding hazards affecting Crown Point	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Complete	The City of Crown Point has a weekly radio show and TV station for announcements.
Upgrade existing and install new warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Thunderstorm	Complete	The City conducted a strategy assessment and installed sirens accordingly. There are seven sirens in Crown Point.
Replace damaged culverts	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Ongoing	The City replaces culverts as needed on an ongoing basis but needs additional funding to continue. The City will seek funding from INDOT and other state sources. Implementation will begin within five years.
Develop educational resources including trailers and brochures to use at schools and for public events	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Earthquake	High	The City EMA will work with schools, healthcare facilities, and public officials to disseminate the educational resources. Funding will be sought from FEMA. If funding is available, implementation will begin within one year.
Complete CSO mitigation project	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The City has plans in place to separate stormwater and sanitary sewer lines but need additional funding to complete the project. Possible sources of funding are EPA, IDNR, and INDOT. Implementation will begin within one year.
Purchase generators/transfer switches for fire departments	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Thunderstorm, Winter Storm	High	The City EMA oversees the implementation of the project. Funding has not been secured as of 2010 but will be sought from funding sources such as IDHS. Implementation, if funding is available, is forecasted to begin within one year.
Harden fire stations to withstand severe wind damage	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Tornado, Thunderstorm	High	The City EMA will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within one year.
Conduct stream maintenance	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood	Medium	The City Emergency Management Department will oversee this project. IDHS and IDNR are potential funding sources. If funding is available, implementation will begin within three years.
Conduct a study for Combined Sewer Operation Recommendations	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Flood	Medium	The County EMA and surveyor will work with IDEM to conduct this study. Funding has not been secured as of 2010, but IDEM is a possible source. Implementation, if funding is available, will begin within three years.
Connect schools to NOAA's radio system for hazmat spill alerts	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Medium	The City EMA will work with local schools to oversee this project. Funding has not been secured as of 2010, but local resources and community grants are an option. Implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Purchase equipment for containing spills, e.g. absorbent materials	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Hazmat	Medium	The City relies on County resources for hazmat spills but would like to have enough training to be at an operational level. The City EMA will work with local first responders to oversee this project. Funding will be sought from the PDM program and community grants. If funding is available, implementation will begin within three years.
Create a database for identification of special needs population and institute a plan for rescue and recovery	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Medium	The City EMA will work with local health care facilities to coordinate this project. Local resources will be used. State and federal resources may be sought to help publicize the voluntary plan. Implementation will begin within three years.
Purchase a bucket truck for tree trimming	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Medium	The City will work with the County and neighboring communities to oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within three years.
Install inertial valves at critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Earthquake	Low	The City EMA will oversee implementation of this project. Funding has not been secured as of 2010, but the PDM program and community grants are an option. If funding is available, implementation will begin within three years.
Assess and upgrade drainage system along major roadways	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Low	The City will work with the INDOT to implement this project. Funding as not been secured as of 2010, but INDOT and IDNR are potential sources. Implementation, if funding is available, will begin within five years.
Improve the conveyance system for ditches to improve water quality	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	Low	The Emergency Management Department will work with IDNR and EPA to oversee implementation of this project. Local, state, and federal funding will be sought. Implementation will begin within five years.

Town of Dyer

The Town of Dyer is located in western Lake County. The most significant hazards facing the community are tornadoes/thunderstorms and winter storms. The Town of Dyer recently partnered with Christopher B. Burke Engineering, Ltd to complete a multi-hazard mitigation plan for the town. According to that plan, much of the current land use is residential; the residential land use is expected to continue to grow in the future. Dyer's MHMP was created in 2007 and allowed the community to pursue funding for some of its highest priority mitigation strategies. The mitigation strategies will be used in future land use planning. A meeting was held on January 13, 2010 to update the mitigation strategies that were recorded in the 2007 MHMP. The strategies are described in Table 6-8. Minutes from the brainstorming session are in Appendix A.

Table 6-8: Dyer Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Complete a detailed flood study of Hart Ditch from the bridge crossing at Hart Street to the bridge crossing at U.S. Route 30	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Complete	The Town of Dyer completed this strategy with mitigation funding from the Town MHMP.
Minimize flooding by diverting or retaining stormwater	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	In Progress	The Town of Dyer completed Phase I of this project in the Beren's Monaldi area, Sandy Ridge Subdivision, and Northgate Subdivision with resources acquired through the Town MHMP. Phase II will begin in April 2010 with an anticipated completion date of July 2010.
Enforce development restrictions to comply with the NFIP	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP for each jurisdiction in community.	Flood	Ongoing	The Town of Dyer does not allow development in the Special Flood Hazard Ordinance.
Enforce existing snow routes to allow for snow removal activities	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Winter Storm	Complete	The Town of Dyer posts signs to prohibit parking on streets when snow accumulation of more than two inches is expected.
Improve stormwater drainage to decrease localized damage caused by pooling in yards, basements, and streets	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Ongoing	DPW and the County Surveyor's Office currently have a program to maintain stormwater management; however, additional funding may be required from FEMA and SW Utility. Implementation will begin within three years.
Enhance coordination and collaboration between the Town of Dyer and Red Cross of Northwest Indiana	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Ongoing	The Town of Dyer continues to improve its relationship with Red Cross. This is an ongoing project.
Increase number of personnel who are certified to OSHA III Technician Level	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials.	Hazmat	Ongoing	All fire fighters are trained to the Awareness in Operations Level. The fire departments will use local resources to continue to train more to the Technician level.
Upgrade existing and install new warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Thunderstorm	Ongoing	The Town currently has siren coverage for 98% of its residential structures.
Participate in the Community Rating System	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP.	Flood	High	DPW (Stormwater), Zoning Department, and IDNR oversee the implementation of the project. Local resources and FEMA will be used for funding. Implementation, if funding is available, is forecasted to begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Procure educational trailers and literature to distribute to schools and town residents at public events	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Storm Water Board will work with schools, healthcare facilities, and public officials to distribute the literature. FEMA and local resources will be used for funding. If funding is available, implementation will begin within one year.
Develop and implement a voluntary immunization program for first responders	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm, Hazmat, Fire	High	The DPW will coordinate with first responders to develop this plan. Local resources and the CDC will be used for funding. If funding and resources are available, implementation will begin within one year.
Distribute weather radios to residents in mobile homes, nursing homes, and major businesses	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm, Flood, Winter Storm	High	The Storm Water Board will oversee implementation of this project. Local resources will be used to determine how many radios are needed and when/where to distribute them. Funding has not been secured as of 2010, but the PDM program and community grants are an option. Implementation, if funding is available, will begin within one year.
Trim trees to minimize the amount/duration of power outages	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Thunderstorm, Winter Storm	High	The NIPSCO and DPW will oversee implementation of this project. Funding has not been secured as of 2010, but the Town will coordinate with NIPSCO to increase the funding of tree maintenance. If funding is available, implementation will begin within five years.
Procure back-up generators for critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm	Medium	Approximately half of Dyer's critical facilities have generators. DPW and police and fire departments will coordinate an effort to procure generators for the remaining critical facilities. Funding will be sought from the PDM program and community grants. Implementation will begin within three years.
Establish a volunteer emergency response team	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	DPW and fire and police departments will oversee this project. Local resources will be used to develop and maintain the team. Implementation will begin within three years.
Purchase a mobile messaging board system to notify residents of traffic conditions, road closures, and other events	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	The police and fire departments will work with local business owners to oversee the implementation of the project. Funding will be sought from community grants and FEMA. Implementation, if funding is available, is forecasted to begin within three years.
Establish safe rooms in all community buildings	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	The DPW will work with police and fire departments to oversee the implementation of this project. Local resources and FEMA and IDHS grants will be sought to procure the materials. Implementation, if funding is available, is forecasted to begin within three years.
Apply to become an NWS Storm Ready Community	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Thunderstorm, Winter Storm	Medium	The Storm Water Board will oversee this project. Local resources will be used to complete and submit the application. If funding and resources are available, implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Improve railroad warnings at key intersections	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Hazmat	Low	DPW will oversee this project. Funding will be sought from INDOT. If funding is available, implementation will begin within five years.
Add GPS units to snow plows and emergency vehicles	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Low	Local first responders will coordinate this effort. Local resources and community grants will be used for funding. Implementation will begin within five years.

City of East Chicago

The City of East Chicago is located in northwest Lake County. Most of the flooding issues in the city stem from the combined sewer system; therefore, the most important project is the renovation of the Clive Avenue North Pumping Station. Because East Chicago is heavily industrial, the community faces a significant threat from hazardous materials releases and fires/explosions. The mitigation strategies will be used in future land use planning. A meeting was held on January 12, 2010 to develop mitigation strategies to alleviate hazmat releases and other disasters. The strategies are described in Table 6-9. Minutes from the brainstorming session are in Appendix A.

Table 6-9: East Chicago Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Institute Reverse 911	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat	Complete	The City of East Chicago uses the County's rapid notify system.
Trim trees to minimize the amount/duration of power outages	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Winter Storm	Ongoing	NIPSCO performs tree trimming for the City on a regular basis.
Improve shelters throughout the community	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Ongoing	The City of East Chicago has shelters that need improvements and resources. Funding will be sought from IDHS and FEMA, as well as community grants. This project is ongoing.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Rehabilitate the 145th Street Pumping Station to relieve flooding for several hundred homes	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The City will work with the INDOT and IDNR to implement this project. Funding as not been secured as of 2010, but INDOT and IDNR are potential sources along with any available funding from the City's existing budget. Implementation, if funding is available, will begin within one year.
Install backflow valves in the Roxana neighborhood	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	High	The City EMA will work with IDNR to oversee implementation of this project. FEMA, IDHS, and IDNR are proposed sources of funding. Implementation will begin within one year.
Harden all four fire stations and the police station	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weatherproofing.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	High	East Chicago EMA will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. Implementation, if funding is available, will begin within one year.
Conduct a sewer upgrade to separate storm water and sanitary sewer lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood	High	The EMA director will work with INDOT and IDNR to evaluate the current conditions of the community's sewer system and develop a plan. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within one year.
Develop and implement a voluntary immunization program for first responders	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Tornado, Flood, Thunderstorm, Winter Storm, Hazmat, Fire	High	East Chicago will work with Police, Fire, EMS and Health Department for implementation. Local resources and state and federal grants will be used to fund the organization and supplies. Implementation will begin within one year.
Procure back-up generator/transfer switch for the WWTP and schools	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm	High	The City EMA will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within five years.
Upgrade existing and install new warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Medium	The City EMA oversees the implementation of the project. East Chicago currently has six sirens but requires two more. Funding will be sought from the PDM program. Implementation, if funding is available, is forecasted to begin within one year.
Distribute weather radios to schools	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm	Medium	East Chicago EMA is making an effort to make radios available to all critical facilities. FEMA, IDHS, and local funding are options. Implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Conduct hazmat training and procure equipment	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials.	Hazmat	Medium	East Chicago EMA will coordinate this project. Funding will sought from community grants and state resources. Implementation will begin within three years.
Implement new plans for public education including distribution of first aid kits, weather radios, and pamphlets	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	East Chicago EMA will work with the County EMA and area schools, healthcare facilities, and businesses to implement this project. Funding will be sought from local sources and FEMA. Implementation, if funding is available, will begin within three years.
Purchase equipment for containing spills, e.g. absorbent materials	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Hazmat	Medium	The City relies on County for hazmat spills but would like to have enough training to be at an operational level. The City EMA will work with local first responders to oversee this project. Funding will be sought from the PDM program and community grants. If funding is available, implementation will begin within three years.
Strengthen mutual aid agreements	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials.	Tornado, Flood, Thunderstorm, Winter Storm, Hazmat, Fire	Low	East Chicago EMA will work with local resources to establish the agreements. If resources are available, implementation will begin within five years.
Produce 4WD emergency vehicles for rescue and recovery	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Thunderstorm, Winter Storm, Hazmat, Fire	Low	The City EMA will coordinate this project. Funding will be sought from community grants and state and federal sources. Implementation will begin within five years.
Purchase new snow removal equipment and pre-treatment equipment and supplies	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Low	The City EMA will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within five years.
Purchase a sewer vacuum truck for preventative maintenance	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Low	East Chicago EMA will oversee this project. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within five years.

City of Gary

The City of Gary is located in north central Lake County. Because of its location near the Little Calumet River, the community has a significant threat of levee failure. The Little Calumet River project will drastically reduce the possibility of a levee break and will improve flooding in the community overall. A description of the project is available in Appendix B. The mitigation strategies will be used in future land use planning. A meeting was held on January 29, 2010 to develop mitigation strategies to alleviate flooding and other hazards. The strategies are described in Table 6-10. Minutes from the brainstorming session are in Appendix A.

Stage VI of the Little Cal Project; located between Kennedy Ave to Cline on north side of the river; *Source: USACE*

Table 6-10: Gary Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Implement a program for public education regarding flooding	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Flood	Ongoing	The Gary Sanitary District conducts flood-related public education.
Assess and upgrade drainage systems along I-65 exit, Clay Ave, 15th Ave, 5th Ave, I-80/94	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The City received a $500K grant to survey areas of concern but needs funding to implement improvements. The City EMA will oversee this project. Funding will be sought from IDHS and IDNR. If funding is available, implementation will begin within one year.
Conduct a sewer upgrade to separate stormwater and sanitary sewer lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The EMA director will work with INDOT and IDNR to evaluate the current conditions of the community's sewer system and develop a plan. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within one year.
Secure funding to complete construction of the levees	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The City of Gary and surrounding communities need additional funding to complete the Little Cal project, which will drastically reduce flooding. Potential sources are INDOT, IDNR, and other state and federal sources. Implementation will begin within one year.
Institute a buy-out plan for properties along 25th and Clay to State St (approx 50 homes); Black Oak and East Glen Park areas; and 35th Ave.	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP for each jurisdiction in community.	Flood	High	The City EMA oversees the implementation of the project. Funding has not been secured as of 2010 but will be sought from funding sources such as IDHS. Implementation, if funding is available, is forecasted to begin within one year.
Retrofit critical facilities with backflow valves and inertial valves	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Flood, Earthquake	High	The City EMA will work with City Planners to coordinate this project. Funding has not been secured as of 2010, but the PDM program is an option. If funding is available, implementation will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Purchase generator/transfer switch for Gary Sanitary District	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The City EMA will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within one year.
Procure 4WD emergency vehicles for rescue and recovery	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Low	The City EMA will coordinate this project. Funding will be sought from community grants and state and federal sources. Implementation will begin within five years.
Construct a viaduct for railroad crossing on the west side of the City; currently, the tracks cut off emergency transportation	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	The City EMA will work with City Planners and the rail company to coordinate this project. Funding will be sought from community grants, state and federal sources, and the rail company. Implementation will begin within three years.
Update the evacuation plan for hazardous materials spills	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Hazmat	Medium	The City EMA and fire departments will oversee the implementation of this project. Local resources will be used to update the plans. Implementation will begin within five years.
Harden and flood-proof the Cal Township Multi-Purpose Center, Genesis Center, courthouse, critical facilities, and other public buildings	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Fire	Medium	The City EMA will oversee the implementation of this project. Local resources will be used to identify the required structures to be hardened. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. Implementation, if funding is available, will begin within three years.
Conduct a commodity flow study	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Low	Community planners and local government leaders will coordinate this study. Funding will be requested from community grants or IDHS. Implementation will begin within five years.
Distribute weather radios to schools	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm	Low	The City EMA will oversee implementation of this project. Local resources will be used to determine how many radios are needed and when/where to distribute them. Funding has not been secured as of 2010, but the PDM program and community grants are an option. Implementation, if funding is available, will begin within five years.
Revise and strengthen mutual aid agreements between the City and Calumet Township	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Winter Storm, Hazmat	Low	The EMA director will work with Cal Township officials to establish the agreement. If resources are available, implementation will begin within five years.

Town of Griffith

The Town of Griffith is located in northwest Lake County. Flooding is a main concern, and one of the top projects discussed in the mitigation brainstorming session on February 26, 2010 was separation of stormwater and sanitary sewer lines; many homes in the town have sump pumps connected to the sewer lines. Additional strategies are described in Table 6-11. The mitigation strategies will be used in future land use planning. Minutes from the brainstorming session are in Appendix A.

Table 6-11: Griffith Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Develop an evacuation plan for hazardous materials spills	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Hazmat	Complete	The Town has evacuations plans in place.
Establish adequate sheltering in the town	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Complete	The Town has identified schools as shelters and developed plans with Red Cross, church groups, school administrators, and local volunteers.
Institute a mass notification system	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Complete	The Town implemented a Call1 system after its recent tornado.
Distribute weather radios to schools and police dispatch center	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm	Complete	The Town has successfully completed this strategy.
Install generators in critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Tornado, Earthquake, Thunderstorm, Winter Storm	In Progress	Griffith is currently installing natural gas generators in all fire stations.
Upgrade existing and install new warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	In Progress	Upgrades, including backup battery systems, are in progress.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Develop a public education program to explain hazards affecting the town	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	In Progress	The Town is in the process of creating an emergency handout that will be mailed to all residents.
Conduct stream maintenance	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood	Ongoing	The Town has an ongoing program to maintain streams and ditches. There is currently a federal project in progress for Cady Marsh Ditch.
Trim trees to minimize the amount/duration of power outages	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Winter Storm	Ongoing	Griffith has an existing tree trimming plan for its parks; NIPSCO handles other areas within the community.
Assess and upgrade drainage system along N. Broad St. from 45th to Ridge Rd and along W. Main St from Elgin to Kennedy	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The Town will work with the County and INDOT to implement this project. Funding as not been secured as of 2010, but INDOT and IDNR are potential sources. Implementation, if funding is available, will begin within one year.
Conduct a sewer upgrade to separate stormwater and sanitary sewer lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The Town Board will work with INDOT and IDNR to evaluate the current conditions of the community's sewer system and develop a plan. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within low years.
Conduct a study to review levee infrastructure; existing levee does not meet certification standards due to pipes running through levee walls	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Flood	High	The Town Board and surveyor will work with IDNR to conduct this study. Funding has not been secured as of 2010, but IDHS and IDNR are possible sources. Implementation, if funding is available, will begin within one year.
Harden all three fire stations and the police station	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	High	The Town Board will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. Implementation, if funding is available, will begin within one year.
Conduct a commodity flow study	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Medium	Community planners and local government leaders will coordinate this study. Funding will be requested from community grants or IDHS. Implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Bury new power lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Earthquake, Thunderstorm, Winter Storm	Medium	The Town planning team will oversee this project and develop an ordinance to require new power lines to be buried. Local resources will be used to develop and publicize the ordinance. Implementation will begin within three years.
Develop a database of special needs populations	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Winter Storm	Medium	The Town Board will work with utility companies and healthcare staff to identify the population. Local resources will be used to create the database. Implementation will begin within three years.
Install inertial valves at critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Earthquake	Low	The Town Board will oversee implementation of this project. Funding has not been secured as of 2010, but the PDM program and community grants are an option. If funding is available, implementation will begin within five years.

City of Hammond

The City of Hammond is located in northwest Lake County. Flooding is the main concern for Hammond. Completion of the Little Cal Project will significantly improve current conditions. In 2007, Hammond partnered with Christopher B. Burke Engineering, Ltd to complete a multi-hazard mitigation plan for the city. The strategies in Table 6-12 are updates of those created for the city MHMP. The mitigation strategies will be used in future land use planning.

Table 6-12: Hammond Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Conduct a sewer upgrade to separate stormwater and sanitary sewer lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Complete	The City has implemented a citywide Sewer Modeling Project.
Develop a flood preparedness and response plan	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Flood	Complete	The City currently has a response plan in place for flooding.
Enforce codes requiring mobile homes to have tie-downs	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Tornado, Thunderstorm	Complete	The City of Hammond has measures in place to certify that mobile homes meet manufacturer's minimum installation requirements.
Maintain channels and storm sewers to reduce localized flooding	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood	Ongoing	The City of Hammond has ongoing debris maintenance in progress.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Conduct detailed flood studies to determine Base Flood Elevations for waterways connected to Lake Michigan	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing, or create new, community plans and ordinances to support hazard mitigation.	Flood	Ongoing	The City has completed most of its flood studies and is in the progress of finishing studies for Lake George and Wolf Lake.
Restrict development within the 100- and 500-year floodplains	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing, or create new, community plans and ordinances to support hazard mitigation.	Flood	Ongoing	The City does not allow new development in the floodplains.
Enhance coordination and collaboration between the City of Hammond and Red Cross of Northwest Indiana	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Ongoing	The City of Hammond continues to improve its relationship with Red Cross. This is an ongoing project.
Increase number of personnel who are certified to OSHA III Technician Level	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials.	Hazmat	Ongoing	All fire fighters are trained to the Awareness in Operations Level. The fire departments will use local resources to continue to train more to the Technician level.
Update and enhance HAZUS-MH with local GIS data to improve future HAZUS-MH modeling	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood/Levee Failure	High	DPW will oversee implementation of this project. Funding will come from local resources, the PDM program, and FEMA. If funding is available, implementation will begin within one year.
Develop an education program informing property owners within the “Levee Protection Zone” that their properties are still at risk from flooding	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Flood/Levee Failure	High	DPW and City EMA will oversee implementation of this project. Local resources and FEMA funding will be used. If funding is available, implementation will begin within one year.
Participate in the Community Rating System	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP.	Flood	High	DPW (Stormwater), Zoning Department, and IDNR oversee the implementation of the project. Local resources and FEMA will be used for funding. Implementation, if funding is available, is forecasted to begin within one year.
Install a warning siren near the intersection of I-94 and Indianapolis Boulevard	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	High	The City EMA oversees the implementation of the project. Local resources will be used to evaluate, install, and maintain the warning systems. Additional funding will be sought from other funding sources, e.g. PDM program, to expand the warning system coverage area. Implementation, if funding is available, is forecasted to begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Adopt a resolution requiring Weather Alert Radios in municipally owned critical facilities. Promote Weather Alert Radios to all non-municipally owned critical facilities and all other City residents and businesses.	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Fire	High	The City EMA and first responders will oversee implementation of this project. Local resources will be used to create the ordinance; FEMA will be approached for funding the radios. Implementation will begin within one year.
Establish public outreach programs to educate residents on the hazards affecting the City	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The City has already begun a program in which it distributes manuals. With the help of schools and healthcare facilities, The City EMA will improve the program to offer more information and reach wider audiences. Local resources will be used for funding. If funding and resources are available, implementation will begin within one year.
Develop and implement a voluntary immunization program for first responders	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm, Hazmat, Fire	High	The Plan Commission will coordinate with first responders to develop this plan. Local resources and the CDC will be used for funding. If funding and resources are available, implementation will begin within one year.
Trim trees to minimize the amount/duration of power outages	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Thunderstorm, Winter Storm	High	The NIPSCO and DPW will oversee implementation of this project. Funding has not been secured as of 2010, but the Town will coordinate with NIPSCO to increase the funding of tree maintenance. If funding is available, implementation will begin within five years.
Procure back-up generators for critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm	Medium	Many of Hammond's critical facilities have generators. DPW and police and fire departments will coordinate an effort to procure generators for the remaining critical facilities. Funding will be sought from the PDM program and community grants. Implementation will begin within three years.
Develop a "Good Neighbor Program" to encourage residents to maintain contact with their neighbors during emergencies	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	The City EMA will coordinate this effort. Local resources will be used for funding. If funding is available, implementation will begin within three years.
Establish safe rooms in all community buildings	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	The Plan Commission and Zoning Department will oversee the implementation of this project. Local resources and FEMA and IDHS grants will be sought to procure the materials. Implementation, if funding is available, is forecasted to begin within three years.

Town of Highland

2009 Riverfront Development District; *Source: Redevelopment District*

The Town of Highland is located in northwest Lake County. Highland is currently completing a riverfront redevelopment project that will ensure the community's sustainability. The mitigation brainstorming session on January 12, 2010 identified urban flooding as a main concern, and the following strategies seek to mitigate potential flooding to protect the new development, as well as existing structures. The mitigation strategies will be used in future land use planning. Minutes from the brainstorming session are in Appendix A.

Table 6-13: Highland Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Establish stormwater retention ordinance for new development	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Flood	Complete	The Town has completed this project.
Develop an LEPC	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials.	Hazmat	Complete	The Town of Highland has an active LEPC.
Harden and improve dike	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Earthquake, Thunderstorm, Winter Storm	Complete	The Town has successfully hardened the dike.
Flood-proof flood stations along the levee and provide with generators	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Complete	The Town has successfully completed this project.
Repair storm sewers	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The Public Works Director will work with INDOT and IDNR to evaluate the current conditions of the community's sewer system and develop a plan. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within three years.
Complete a watershed study	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Flood	High	The Town Public Works Director and surveyor will work with IDEM to conduct this study. Funding has not been secured as of 2010, but IDEM is a possible source. Implementation, if funding is available, will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Construct retention ponds to reduce localized flooding	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The Town Public Works Director will oversee the implementation of this project. Funding has not been secured as of 2010, but INDOT is a possible funding source. Implementation, if funding is available, will begin within one year.
Replace culverts near Spring Creek	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The Town Public Works Director will oversee the implementation of this project. Funding has not been secured as of 2010, but INDOT is a possible funding source. Implementation, if funding is available, will begin within one year.
Institute a buy-out plan for two homes along Cady Marsh Ditch	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP.	Flood	High	The Town Building Commissioner oversees the implementation of the project. Funding has not been secured as of 2010 but will be sought from funding sources such as IDHS. Implementation, if funding is available, is forecasted to begin within one year.
Purchase generators for Lincoln Center and Town Hall	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Town Fire Chief/Emergency Management Director oversees the implementation of the project. Funding has not been secured as of 2010 but will be sought from funding sources such as IDHS. Implementation, if funding is available, is forecasted to begin within one year.
Strengthen mutual aid response agreements	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Winter Storm, Hazmat	High	The Fire Chief/Emergency Management Director will work with local resources to strengthen the agreements. If resources are available, implementation will begin within one year.
Conduct stream maintenance on Little Cal River	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood	Medium	The Town Public Works Director will oversee this project. IDHS and IDNR are potential funding sources. If funding is available, implementation will begin within three years.
Elevate Kennedy overpass and Cline Ave	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	The Town Engineer will oversee this project, working with highway departments and the County Surveyor. INDOT, IDHS, and IDNR are potential funding sources. If funding is available, implementation will begin within three years.
Install inertial valves and backflow valves at critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Flood, Earthquake	Medium	The Town Fire Chief/Emergency Management Director will oversee implementation of this project. Funding has not been secured as of 2010, but the PDM program and community grants are an option. If funding is available, implementation will begin within three years.
Conduct a commodity flow study	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Medium	Community planners and local government leaders will coordinate this study. Funding will be requested from community grants or IDHS. Implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Combine the fire department, police department, and town hall into a new EOC	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	The Town Fire Chief/Emergency Management Director will oversee the implementation of this project. Funding has not been secured as of 2010, but local resources and the pre-disaster mitigation program and community development grants are possible funding sources. Implementation of this project will begin within three years.
Establish safe rooms in public buildings	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Tornado, Thunderstorm	Medium	The Fire Chief/Emergency Management Director will work with local shelters, schools, healthcare facilities, and first responders to identify locations to establish safe rooms. The Town may opt to conduct an engineering study to determine best locations. The PDM program or local resources are funding options. If funding is available, implementation will begin within three years.
Conduct a study to evaluate bridge structures, especially on Kennedy Ave and Cline Ave	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Earthquake	Low	The Town Fire Chief/Emergency Management Director will work with INDOT to implement this study. Local resources will also be used. If funding is available, implementation will begin within five years.
Follow up on implementation of Nixle notification system	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat	Low	The Town Fire Chief/Emergency Management Director will work with first responders to oversee this project. Local resources will be used to test the system and FEMA funding will be sought to advertise to the public. If resources are available, implementation will begin within five years
Distribute weather radios to residents in mobile homes, nursing homes, and assisted living facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm	Low	The Town Fire Chief/Emergency Management Director will oversee implementation of this project. Local resources will be used to determine how many radios are needed and when/where to distribute them. Funding has not been secured as of 2010, but the PDM program and community grants are an option. Implementation, if funding is available, will begin within five years.
Purchase new snow removal equipment and pre-treatment equipment and supplies	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Low	The Town Fire Chief/Emergency Management Director will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within five years.

City of Hobart

The City of Hobart is located in northeast Lake County, near three major highways—I-65, I-80/94, and U.S. 30—therefore, hazardous materials releases are of special concern to the community. A brainstorming session was held on January 12, 2010 to discuss mitigation strategies. The mitigation strategies will be used in future land use planning. The strategies are listed in Table 6-14, and minutes from the brainstorming session are in Appendix A.

Table 6-14: Hobart Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Purchase new snow removal equipment and pre-treatment equipment and supplies	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Complete	The City has good snow equipment.
Assess and upgrade the City's drainage infrastructure	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	In Progress	The City is working on a stormwater master planning effort to begin the process of designing engineered solutions to mitigate stormwater impact on streets and neighborhoods.
Rebuild the community center	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	In Progress	This project is in progress and almost complete. Funding may be required for a generator so that the center can function as a shelter.
Replace damaged culverts	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Ongoing	The City has a program to maintain culverts as needed.
Bury new power lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Earthquake, Thunderstorm, Winter Storm	Ongoing	The City has an ordinance requiring new power lines to be buried.
Reduce inflow and infiltration into the sanitary sewers throughout the City under the Hobart Sanitary District's jurisdiction	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The Hobart Sanitary District (HSD) is beginning to implement projects to significantly reduce and/or eliminate stormwater I&I into the sanitary lines. Funding for various projects will be pursued through all government agencies offering assistance for such efforts. Implementation will begin within one year.
Procure back-up generator/transfer switch for City Hall	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The City EMA will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within one year.
Institute an FM early warning system	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat	High	The City EMA oversees the implementation of the project. Funding will be sought from IDHS and FEMA. Implementation, if funding is available, is forecasted to begin within one year.
Acquire land for construction of detention ponds to mitigate stormwater impact on neighborhoods, lakes, and rivers.	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	Medium	The City EMA and HSD will oversee this project. Funding will be sought from government agencies offering assistance with this effort including USACE, IDNR, and INDOT. Implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Develop an EAP for Lake George and complete any necessary repairs to reduce chances of overtopping	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	The EMA director will work with IDNR and local first responders to develop an EAP. Funding has not been secured as of 2010, but local resources and community grants are an option. Implementation will begin within three years.
Establish public outreach programs to educate residents on the hazards affecting the City; establish Are You Ready? Packets	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	The City will work with schools and healthcare facilities to establish the program and reach wider audiences. Local resources and FEMA will be used for funding. If funding and resources are available, implementation will begin within three years.
Install additional warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Low	The City EMA oversees the implementation of the project. Funding will be sought from IDHS and FEMA. Implementation, if funding is available, is forecasted to begin within five years.

City of Lake Station

The City of Lake Station is located in northeast Lake County. Lake Station recently received a $500,000 grant for the buy-out of approximately 70 structures in the Riverside area. A brainstorming session was held on January 12, 2010 to discuss this and other mitigation strategies. The mitigation strategies will be used in future land use planning. The strategies are listed in Table 6-15, and minutes from the brainstorming session are in Appendix A.

Table 6-15: Lake Station Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Purchase a sewer camera for inspection	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Complete	The City has a sewer camera and truck.
Distribute weather radios to all schools	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm	Complete	All Lake Station schools have weather radios.
Repair broken or damaged culverts	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	In Progress	The City EMA will oversee the implementation of this project. Construction has begun at I-80/94 Burns Ditch. Funding has not been secured as of 2010, but INDOT is a possible funding source. Implementation, if funding is available, will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Construct a new EOC	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	In Progress	Lake Station is constructing a new City Hall to house the Mayor, police, and fire and ambulance stations.
Institute a buy-outs in the Riverside area	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP for each jurisdiction in community.	Flood	Ongoing	The City received a $500K grant to complete buy-outs for this area, but there are a number of other areas that need to be bought out. Additional funding will be sought from IDHS and FEMA. Implementation will begin within one year.
Restrict development within the 100- and 500-year floodplains	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Flood	Ongoing	The City does not allow new development in the floodplain.
Improve critical portable water facilities with backup generators, buried service lines, SCADA, additional monitoring/sampling points, additional pumps, improved chemical containment, etc.	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	Government leaders, City Engineer, and PWD will oversee implementation of this project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, implementation will begin within three years.
Upgrade existing and install new warning sirens and educate the public about the siren alerts	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Fire	High	The City EMA oversees the implementation of the project. Local resources will be used to evaluate, install, and maintain the warning systems. Additional funding will be sought from other funding sources, e.g. PDM program, to expand the warning system coverage area. Implementation, if funding is available, is forecasted to begin within one year.
Implement new plans for public education including distribution of door-to-door flyers	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The City EMA will work with area schools, healthcare facilities, and businesses to implement this project. Funding will be sought from local sources and FEMA. Implementation, if funding is available, will begin within one year.
Procure emergency generators for schools	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm, Hazmat, Fire	High	The City EMA will work with schools to oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within one year.
Institute Rapid Notification System	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	Government leaders, Police and Fire Departments will oversee the implementation of the project. Local resources will be used to install and maintain the system. Additional funding will be sought from other funding sources. If funding is available, this project is forecasted to being within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Develop and implement a Voluntary Immunization Program for first responders	Goal: Develop long-term strategies to educate the community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials.	Flood	High	Government leaders, Police, Fire, EMS, and Public Works Departments will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within one year.
Establish a Swift Water Response Team	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.	Flood	High	Government leaders, Police, Fire, and EMS Departments will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within one year.
Assess and upgrade sanitary system	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The City Engineer and Sanitary Board will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within one year.
Procure emergency portable pumps	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	High	The City Engineer, Sanitary Board, Board of Public Works and Public Work Department will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, implementation will begin within one year.
Procure a vactor truck	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	High	The City Engineer, Sanitary Board, Board of Public Works and Public Work Department will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, implementation will begin within one year.
Develop and implement an EMA/CERT program; educate, train, and acquire appropriate equipment for emergency personnel to support emergency response agencies	Goal: Develop long-term strategies to educate the community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	Government leaders, Police, Fire, and EMS Departments will oversee the implementation of the program. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this program will begin within one year.
Establish an Emergency Response Command Center to secure centralized communication during an emergency situation	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The City Police, Fire, EMS, and Public Works Departments will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Establish a first response hazmat team, conduct appropriate training, and procure equipment	Goal: Develop long-term strategies to educate the community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Hazmat	High	Currently some members of the Fire Department are trained in hazmat response, but the City will seek state and federal funding to be able to establish a full hazmat team. If funding is available, implementation will begin within one year.
Complete a detailed flood study of Deep River, Little Calumet River, and Burns Ditch	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Flood	High	The City Engineer will work with IDNR and the USACE to oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within one year.
Purchase equipment for fire response during flood events	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	High	The City Fire Department will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within one year.
Purchase additional equipment for first responders including pumper and ladder truck for the fire department and two ambulances for EMS	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The City Fire Department will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within one year.
Implement a program for public education regarding hazard preparedness	Goal: Develop long-term strategies to educate the community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	Government leaders and the Fire Department will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within one year.
Install warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.	Tornado, Thunderstorm	High	Government leaders and the City Engineer will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, implementation will begin within one year.
Procure emergency generators for all critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in the community.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm, Hazmat, Fire	High	Government leaders and the Public Works Department will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, implementation will begin within one year.
Elevate roads that frequently flood: Wyoming St; 23rd and 24th at Colorado; 28th Ave; east of Clay, North of Central; 4000 block off of Hwy 51; Old Hobart Rd North	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	The City EMA will oversee this project, working with highway departments. INDOT, IDHS, and IDNR are potential funding sources. If funding is available, implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Install inertial valves and backflow valves at critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Flood, Earthquake	Medium	The City EMA will oversee implementation of this project. Funding has not been secured as of 2010, but the PDM program and community grants are an option. If funding is available, implementation will begin within three years.
Purchase lightning protection systems for key municipal and critical infrastructure	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Flood, Thunderstorm	Medium	The City will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. Implementation of this project will begin within three years.
Purchase new snow removal equipment and pre-treatment equipment and supplies	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Medium	The City EMA will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within three years.
Assess and upgrade stormwater system	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	The City Engineer will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within three years.
Bury power lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Thunderstorm, Winter Storm	Medium	Government leader, City Engineer, and Advisory Plan Commission will oversee this project and develop necessary ordinance(s) to require new and relocated power lines to be buried. Local resources will be used to develop and publicize the ordinance(s) Implementation will begin within three years.
Procure new and/or upgrade existing fire hydrants	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	The City Engineer, Fire Department and Public Works Department will oversee the implementation of the project. Local resources will be used to install and maintain the system. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within one year.
Improve critical potable water facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	Government leaders, City Engineer and Public Works Department will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within three years.
Conduct a commodity flow study	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Medium	Government leaders and the Fire Department will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Construct a new water tower for storage and pressure on the west side of town	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Fire	Medium	Government leaders, City Engineer and Public Works Department will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within three years.
Conduct a detailed study to review levee infrastructure	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Flood	Medium	The City Engineer will work with the USACE to oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within three years.
Map pipeline locations in the community	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Medium	The City Engineer and Fire Department will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within three years.
Develop an emergency snow vehicle fleet	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.	Winter Storm	Medium	Government leaders, Police, Fire, EMS, and Public Works Departments will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within three years.
Update the evacuation plan for hazardous materials spills	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Hazmat	Low	The City EMA and Plan Commission will oversee the implementation of this project. Local resources will be used to develop the plans. Implementation will begin within five years.
Harden the Boys and Girls Club to make it an effective shelter	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Low	The City EMA will oversee the implementation of this project. Local resources and IDHS grants will be sought to procure the materials. Implementation, if funding is available, is forecasted to begin within five years.
Trim trees to minimize the amount/duration of power outages; need bucket truck	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Winter Storm	Low	The City EMA will oversee implementation of this project. Funding has not been secured as of 2010, but the PDM program, INDOT, or IDHS are possibilities. If funding is available, implementation will begin within five years.
Assess and construct a second point for Ingress/Egress for the C.S.L. & INV. CO's Liverpool addition	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Low	The City Engineer will work INDOT and IDNR to oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, this project will begin within five years.
Construct an animal shelter	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Low	Government leaders will oversee the implementation of the project. Funding has not been secured as of 2010, but city, state, and federal funding will be sought. If funding is available, implementation will begin within five years.

Town of Lowell

The Town of Lowell is located in south central Lake County. Lowell's location makes it particularly vulnerable to flooding from failed levees and dams. In 2008, much of downtown Lowell was underwater as a result of Cedar Creek Dam overtopping. A brainstorming session was held on January 12, 2010 to discuss other mitigation strategies. The mitigation strategies will be used in future land use planning. The strategies are listed in Table 6-16, and minutes from the brainstorming session are in Appendix A.

Table 6-16: Lowell Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Establish public outreach programs to educate residents on the hazards affecting the town	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Ongoing	The Town distributes public education literature at Red Cross and in first response buildings.
Conduct a study to determine potential buy-out properties	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP for each jurisdiction in community.	Flood	High	The Town Board oversees the implementation of the project. Local resources will be used to determine potential buy-out areas. Additional funding will be sought from funding sources such as IDHS. Implementation, if funding is available, is forecasted to begin within one year.
Procure sandbagging equipment	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	High	The Town first responders will oversee implementation of this project. Funding has not been secured as of 2010, but Lowell will seek funds from IDHS and community grants. Implementation will begin within one year.
Install three additional warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	High	The Town fire departments oversee the implementation of the project. Funding will be sought from IDHS and FEMA. Implementation, if funding is available, is forecasted to begin within one year.
Purchase new generators for critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Town Board will oversee this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within one year.
Conduct a watershed study	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Flood	Medium	The Town will work with state resources to complete the study. Funding will be sought from state and federal sources. Implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Purchase portable pumps for flooding	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	Medium	The Town first responders will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within three years.
Conduct a study to determine shelter capacity in the town	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat	Medium	The Town Board will work with local shelters to complete this project and will perhaps use HAZUS-MH. If additional shelters or supplies are needed, the PDM program or local resources are funding options. If funding is available, implementation will begin within three years.
Repair older and damaged bridges	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Tornado, Thunderstorm, Flood, Earthquake	Medium	The Town Planners will work with INDOT and local highway department to oversee implementation of this project. Funding has not been secured as of 2010, but INDOT is an option. If funding is available, implementation will begin within three years.
Elevate 205th and Monon	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Low	The Town Planners will oversee this project, working with highway departments. INDOT, IDHS, and IDNR are potential funding sources. If funding is available, implementation will begin within five years.
Upgrade EMS equipment and provide more training to first responders	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Low	The Town relies heavily on the County for hazmat help especially. The Town first responders will request funding for training and equipment from IDHS. If funding is available, implementation will begin within five years.
Establish an emergency vehicle fleet (4WD, snowmobile, water craft)	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood, Winter Storm	Low	The Town Board will coordinate this project. Local resources will be used to survey the availability and create a database. Funding may be sought from FEMA and IDHS. Implementation will begin within five years.
Conduct a commodity flow study	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Low	Community planners and local government leaders will coordinate this study. Funding will be requested from community grants or IDHS. Implementation will begin within five years.
Map pipeline locations in the community	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Low	The Town will work with the County Surveyor to implement this project. Local resources will be used for funding. If funding is available, implementation will begin within five years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Bury new power lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Earthquake, Thunderstorm, Winter Storm	Low	The Town Board, municipalities, and utility companies will oversee the implementation of this project. Local and corporate resources will be used to prioritize power lines and bury them. The project is forecasted to be complete within approximately five years.
Implement a program for distribution of weather radios to the public at a reduced cost	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Low	The Town Board will oversee the implementation of this project. Local resources will be used for research and funding. Implementation will begin within five years.
Develop underground water stores	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Low	The Town Board will oversee this project. Funding will be sought from local, state, and federal sources. Implementation will begin within five years.
Harden fire station to make it an effective shelter	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Low	The Town and Fire Department will oversee implementation of this project. Local resources and IDHS grants will be sought to procure the materials. Implementation, if funding is available, is forecasted to begin within five years.

Town of Merrillville

The Town of Merrillville is located in central Lake County. Merrillville is primarily residential so public safety is of major concern. According to the planning team, the most significant hazard threatening public safety is flooding relating to sewer backup. A brainstorming session was held on January 12, 2010 to discuss other mitigation strategies. The mitigation strategies will be used in future land use planning. The strategies are listed in Table 5-6, and minutes from the brainstorming session are in Appendix A.

Table 6-17: Merrillville Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Use local radio station for weather announcements	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Complete	The Town has a radio station for communication with the public.
Establish shelters in the town	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Complete	The Town Hall is established as a shelter.
Work with neighboring communities to improve sewer backup; add capacity to Town's sewer system	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The Town Planners will work with INDOT and IDNR to evaluate the current conditions of the community's sewer system and develop a plan. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Replace existing or install new culverts in the following areas: Broadway, Beaver Dam Ditch, Turkey Creek	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	Town Planners and DPW will oversee the implementation of this project. Funding has not been secured as of 2010, but INDOT is a possible funding source. Implementation, if funding is available, will begin within one year.
Procure more equipment for volunteer fire departments	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	Currently Merrillville relies on the County to provide first responders in many situations. The Town needs to better equip its volunteer firefighters. Funding will be sought from community grants and local resources. If funding is available, implementation will begin within one year.
Install additional warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	High	The Town has four sirens but needs more coverage. DPW and Town Planners will coordinate this effort. Funding will be sought from FEMA and IDHS. Implementation, if funding is available, is forecasted to begin within one year.
Assess and upgrade drainage system along major roadways	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	DPW will work with the INDOT to implement this project. Funding as not been secured as of 2010, but INDOT and IDNR are potential sources. Implementation, if funding is available, will begin within three years.
Elevate roads in the southeast quadrant of the town	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	Town Planners will oversee this project, working with highway departments. INDOT, IDHS, and IDNR are potential funding sources. If funding is available, implementation will begin within three years.
Construct a retention pond in the northern part of town	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	Town engineers and DPW will oversee the implementation of this project. Funding has not been secured as of 2010, but IDHS is a possible funding source. Implementation, if funding is available, will begin within three years.
Implement a mass notification system such as Nixle	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	Town Planners and DPW oversee the implementation of the project. Funding will be sought from IDHS and FEMA. Implementation, if funding is available, is forecasted to begin within three years.
Purchase new snow removal equipment and pre-treatment equipment and supplies	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Medium	DPW will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within three years.
Distribute literature advising that residents, schools, healthcare facilities, and other critical facilities bolt bookshelves to walls and secure water heaters	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Earthquake	Low	The Planning Department will work with schools, healthcare facilities, and public officials to create and distribute the literature. Local resources will be used for funding. If funding is available, implementation will begin within five years.

Town of Munster

The Town of Munster is located in northwest Lake County. Flooding is absolutely the highest concern, and Munster was hit particularly hard by the 2008 flooding. Completion of the Little Cal Project will significantly reduce the town's vulnerability to flooding. Winter weather is also a common hazard to affect the community. The following map shows the town's snow routes. A brainstorming session was held on January 12, 2010 to discuss other mitigation strategies. The mitigation strategies will be used in future land use planning. The strategies are listed in Table 6-18, and minutes from the brainstorming session are in Appendix A.

Figure 6-5: Munster Snow Routes

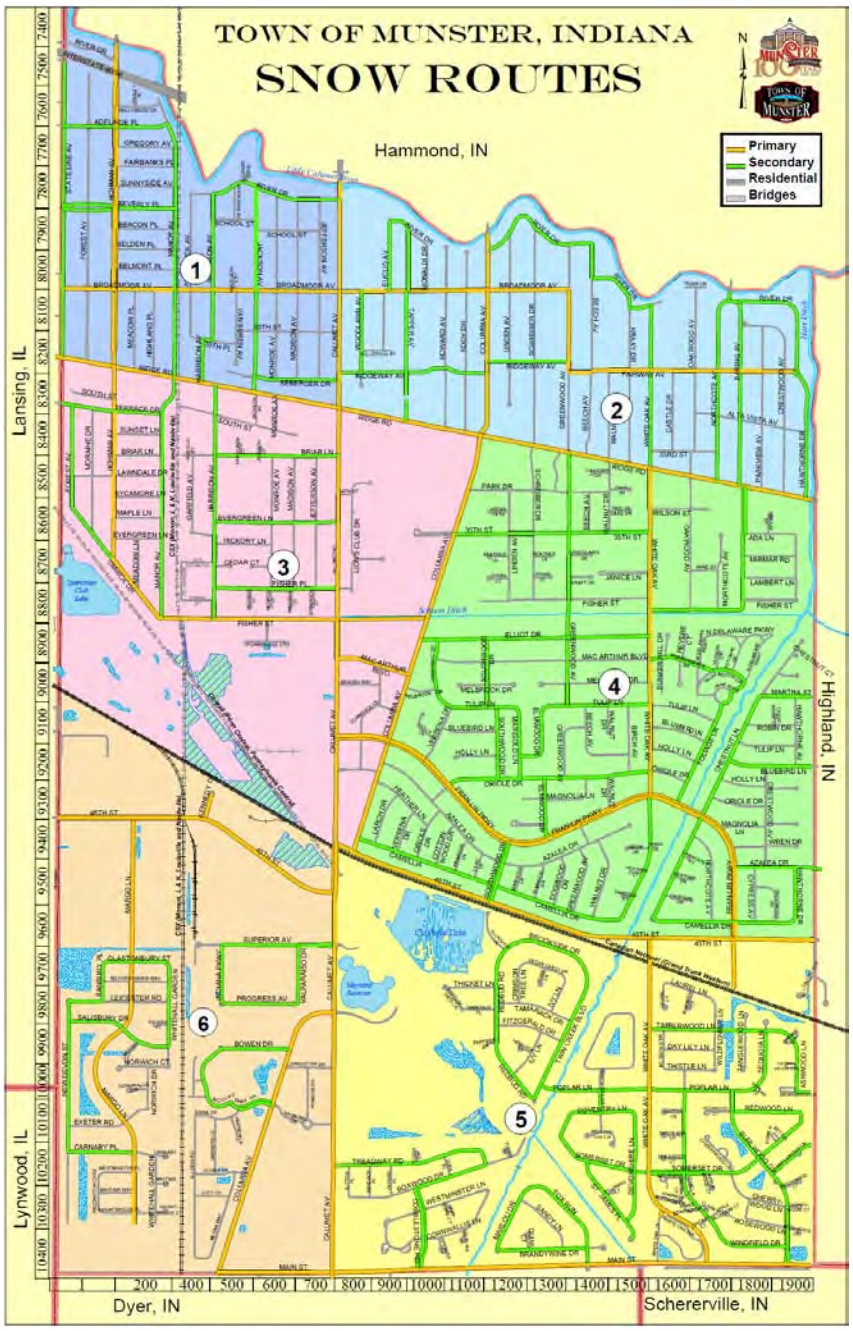


Table 6-18: Munster Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Procure back-up generators for critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Complete	The Town has back-up generators in its critical facilities.
Establish a CERT program	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Complete	The Town has a CERT program.
Establish a mutual aid response agreement	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Hazmat, Fire	Complete	The Town of Munster has agreements with Lake County Fire Association and County Hazmat team.
Bury new power lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Earthquake, Thunderstorm, Winter Storm	Complete	The Town has an ordinance in place requiring new lines to be buried.
Purchase generators for all lift stations	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Prevent flooding in community.	Flood	Ongoing/ High	The Town has installed some generators at lift stations but not all. It is a high priority to complete installation of back-up generators of all lift stations.
Distribute a newsletter for public education regarding potential hazards facing the town	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Ongoing	The Town currently distributes literature on a regular basis.
Conduct a study to evaluate bridge infrastructure at Northcote Ave	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Ongoing	The Town has completed the study and needs funding to implement improvements. Funding will be sought from INDOT, IDNR, IDHS, and FEMA. Implementation will begin within one year.
Conduct a sewer upgrade to separate stormwater and sanitary sewer lines north of Ridge Road	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	DPW will work with INDOT and IDNR to evaluate the current conditions of the community's sewer system and develop a plan. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Institute a buy-out plan for 35 homes behind the levee; convert to green space	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP.	Flood	High	The Plan Commission oversees the implementation of the project. Funding has not been secured as of 2010 but will be sought from funding sources such as IDHS. Implementation, if funding is available, is forecasted to begin within one year.
Formalize a wide area evacuation plan, e.g. hospital evacuation	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Hazmat	High	The Plan Commission and first responders will work with local and state agencies to develop a plan. Funding will be sought from federal and state sources. If funding is available, implementation will begin within one year.
Follow up on implementation of Nixle notification system	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Town's first responders will oversee this project. Local resources will be used to test the system and federal funding will be sought to advertise to the public. If resources are available, implementation will begin within one year.
Conduct stream maintenance in Harts Ditch	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood	Medium	DPW will oversee this project. IDHS and IDNR are potential funding sources. If funding is available, implementation will begin within three years.
Complete a watershed study	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Flood	Medium	The Town engineers will work with state agencies to complete the study. State and federal funding will be sought. Implementation will begin within three years.
Elevate roads that frequently flood	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	DPW will oversee this project, working with highway departments. INDOT, IDHS, and IDNR are potential funding sources. If funding is available, implementation will begin within three years.
Install inertial valves and backflow valves at critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Flood, Earthquake	Medium	DPW will oversee implementation of this project. Funding has not been secured as of 2010, but the PDM program and community grants are an option. If funding is available, implementation will begin within three years.
Improve training and equipment of first responders to the operational level	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Hazmat	Medium	The Town Fire Chiefs will work with the Plan Commission to oversee this project. Funding for training and equipment will be sought from IDHS and local resources. If funding is available, implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Upgrade existing warning sirens and complete installation of lightning detection systems at parks	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Medium	The Plan Commission and DPW oversee the implementation of the project. Funding will be sought from IDHS and community grants. Implementation, if funding is available, is forecasted to begin within three years.
Establish warming centers with supplies (one in north; one in south)	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Winter Storm	Medium	The Plan Commission will work with American Red Cross to establish the shelter. The PDM program or local resources are funding options for supplies. If funding is available, implementation will begin within three years.
Purchase new snow removal equipment and pre-treatment equipment and supplies	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Medium	DPW will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within three years.
Distribute literature advising that residents, schools, healthcare facilities, and other critical facilities bolt bookshelves to walls and secure water heaters	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Earthquake	Low	The Plan Commission will work with schools, healthcare facilities, and public officials to create and distribute the literature. Local resources and FEMA will be used for funding. If funding is available, implementation will begin within five years.
Establish an FM station to alert the public of weather announcements	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Low	The Town Community Development Department will oversee this project. Local resources will be used, and additional funding may be sought from the state. Implementation will begin within five years.
Develop an evacuation plan for domestic animals	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Low	The Plan Commission will work with area shelters to develop an agreement. Local resources will be used. Implementation will begin within five years.
Develop a program to distribute weather radios to all critical facilities, especially nursing homes and schools	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Thunderstorm, Winter Storm	Low	The Plan Commission will oversee implementation of this project. Local resources will be used to determine how many radios are needed and when/where to distribute them. Funding has not been secured as of 2010, but the PDM program and community grants are an option. Implementation, if funding is available, will begin within five years.
Trim trees to minimize the amount/duration of power outages	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Winter Storm	Low	DPW will work with NIPSCO to trim trees more often. Local resources and community grants will be used for funding. Implementation will begin within five years.

Town of New Chicago

The Town of New Chicago is located in northeast Lake County. It is only one square mile in land area and relies primarily on Lake County resources for hazard incidents. A brainstorming session was held on January 11, 2010 to discuss other mitigation strategies. The mitigation strategies will be used in future land use planning. The strategies are listed in Table 6-19, and minutes from the brainstorming session are in Appendix A.

Table 6-19: New Chicago Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Conduct a sewer upgrade to separate stormwater and sanitary sewer lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The EMA director will work with INDOT and IDNR to evaluate the current conditions of the community's sewer system and develop a plan. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within one year.
Install a warning siren on the fire station	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	High	The Town EMA oversees the implementation of the project. Funding will be sought from IDHS and FEMA. Implementation, if funding is available, is forecasted to begin within one year.
Construct a new EOC to be combined with Central dispatch and fire station; current building is out of date regarding building codes	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Town EMA will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. Implementation, if funding is available, will begin within one year.
Develop an evacuation plan for hazardous materials spills	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Hazmat	Medium	The Town EMA will oversee the implementation of this project. Local resources will be used to develop the plans. Implementation will begin within three years.
Purchase new snow removal equipment and pre-treatment equipment and supplies	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Medium	The Town EMA will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within three years.
Purchase new fire hydrants	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Earthquake, Hazmat, Fire	Low	The Town EMA will oversee this project. Funding will be sought from community grants and local resources. Implementation will begin within five years.

Town of Schererville

The Town of Schererville is located in northwest Lake County. Much of the flooding in the community is located along streets that pass through residential areas. Mitigation strategies were recorded to reflect this issue in a meeting held on February 26, 2010. The mitigation strategies will be used in future land use planning. The strategies are listed in Table 6-20, and minutes from the brainstorming session are in Appendix A.

Table 6-20: Schererville Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Address localized flooding at Fountain Park	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Complete	The Town has successfully completed this project.
Bury new power lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Earthquake, Thunderstorm, Winter Storm	Complete	The Town requires all new lines to be buried.
Upgrade existing and install new warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Complete	Schererville has adequate outdoor warning sirens for the existing population
Complete a watershed study	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Flood	In Progress	Phase I completed in October 2009; Phase II of the study is in progress.
Purchase new snow removal equipment and pre-treatment equipment and supplies	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Ongoing	The Town has agreements in place with contractors.
Replace sewer truck	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood	High	DPW will oversee implementation of this project. Local, state, and federal funds will be sought. Implementation will begin within one year.
Institute a buy-out plan for properties along Turkey Creek, Kennedy Ave, Summer St, and Starlight Dr.	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP.	Flood	High	The Town Administration oversees the implementation of the project. Funding has not been secured as of 2010 but will be sought from funding sources such as IDHS. Implementation, if funding is available, is forecasted to begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Harden critical facilities, especially fire stations and schools; currently, only dispatch is hardened	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Town Administration will oversee the implementation of this project. Local resources will be used to identify the required structures to be hardened. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. Implementation, if funding is available, will begin within one year.
Procure generators for fire stations and lift stations	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Town Administration will work with first responders to oversee the implementation of this project. Funding has not been secured as of 2010, but local resources are possible funding sources. If funding is available, this project is forecasted to begin within one year.
Establish public outreach programs to educate residents on the hazards affecting the Town	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Town will work with schools and healthcare facilities to establish a program. Local resources and FEMA will be used for funding. If funding and resources are available, implementation will begin within one year.
Assess and upgrade drainage systems along Kennedy Ave and Eagle Ridge	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	DPW will work with the INDOT to implement this project. Funding as not been secured as of 2010, but INDOT and IDNR are potential sources. Implementation, if funding is available, will begin within three years.
Repair damaged dike located off Rohrman Rd.	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	DPW will oversee the implementation of this project. Funding has not been secured as of 2010, but IDNR is a possible funding source. Implementation, if funding is available, will begin within three years.
Retrofit bridge at railroad intersection (U.S. 41 and U.S. 30) to improve drainage issues	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Flood	Medium	DPW will oversee this project. Possible funding sources include DNR, IDHS, and FEMA. Implementation, if funding is available, will begin within three years.
Conduct a commodity flow study	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Medium	The Town Planning and Building Department and Town engineers will coordinate this study. Funding will be requested from community grants or IDHS. Implementation will begin within three years.
Develop an alternative communication center as backup	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Low	The Town first responders will coordinate this effort. Local resources will be used to set up the communication center. Additional funding may be sought from state and federal sources. Implementation will begin within five years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Update evacuation plan for hazardous materials spills	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Hazmat	Low	The Town Emergency Operations Committee will work with first responders to oversee the implementation of this project. Local resources will be used to develop the plans. Implementation will begin within five years.
Implement the Town AM Radio System for hazmat spill alerts	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Low	The Town Police and Fire Departments will oversee this project. Funding has not been secured as of 2010, but local resources and community grants are an option. Implementation will begin within five years.
Distribute weather radios to all critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm	Low	The Town Safety Committee will oversee implementation of this project. Local resources will be used to determine how many radios are needed and when/where to distribute them. Funding has not been secured as of 2010, but the PDM program and community grants are an option. Implementation, if funding is available, will begin within five years.
Develop a database of special needs populations	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Winter Storm	Low	The Town Planning and Building Department will work with utility companies and healthcare staff to identify the population. Local resources will be used to create the database. Implementation will begin within five years.

Town of Schneider

The Town of Schneider is located in southern Lake County. Schneider is protected by levees and floodwalls but would be significantly vulnerable if the water control structures were to fail. Mitigation strategies were recorded to reflect this issue in a meeting held on January 29, 2010. The mitigation strategies will be used in future land use planning. The strategies are listed in Table 6-21, and minutes from the brainstorming session are in Appendix A.

Table 6-21: Schneider Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Conduct a sewer upgrade to separate stormwater and sanitary sewer lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The Plan Commission will work with INDOT and IDNR to evaluate the current conditions of the community's sewer system and develop a plan. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Conduct a study to determine potential buy-out properties	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP for each jurisdiction in community.	Flood	High	The Plan Commission oversees the implementation of the project. Local resources will be used to determine potential buy-out areas. Additional funding will be sought from funding sources such as IDHS. Implementation, if funding is available, is forecasted to begin within one year.
Improve stormwater drainage to decrease localized damage caused by pooling in yards, basements, and streets	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	The Town will seek funding from IDHS to coordinate with the EPA and effectively implement this project. Funding has not been secured as of 2010, but state and federal sources are an option. Implementation will begin within one year.
Procure back-up generator for Community Center	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	DPW will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within one year.
Strengthen mutual aid response agreements	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Hazmat	High	DPW will work with local resources to strengthen the agreement. If resources are available, implementation will begin within one year.
Implement new plans for public education including distribution of first aid kits, weather radios, and pamphlets	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Town Board will work with area schools, healthcare facilities, and businesses to implement this project. Funding will be sought from local sources. Implementation, if funding is available, will begin within one year.
Harden fire station	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm, Hazmat, Fire	High	The Plan Commission and Town Board will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within one year.
Assess and upgrade drainage system along U.S. 41	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	The Town will work with the INDOT to implement this project. Funding as not been secured as of 2010, but INDOT and IDNR are potential sources. Implementation, if funding is available, will begin within three years.
Install an additional warning siren	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Medium	The Plan Commission oversees the implementation of the project. IDHS and FEMA are potential funding sources. Implementation, if funding is available, is forecasted to begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Purchase new snow removal equipment and pre-treatment equipment and supplies, as well as a storage facility	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Medium	DPW will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within three years.

Town of St. John

The Town of St. John is located in west central Lake County. St. John's most pressing concern is lack of back-up generators at lift stations, well sites, and the water treatment plant. A meeting was held on January 29, 2010 to discuss this and other potential issues facing the community. The mitigation strategies will be used in future land use planning. The strategies are listed in Table 6-22, and minutes from the brainstorming session are in Appendix A.

Table 6-22: St. John Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Conduct a sewer upgrade to separate stormwater and sanitary sewer lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Complete	The Town has completed this project.
Bury new power lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Earthquake, Thunderstorm, Winter Storm	Complete	The Town requires all new lines to be buried.
Establish a warming center	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Winter Storm	Complete	The Town has warming centers at Lake Central High School and the Public Safety building.
Develop an evacuation plan for hazardous materials spills	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Hazmat	In Progress	The Town is currently developing an emergency response plan.
Distribute literature advising that residents, schools, healthcare facilities, and other critical facilities bolt bookshelves to walls and secure water heaters	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Earthquake	High	The Town will work with schools, healthcare facilities, and public officials to create and distribute the literature. Local resources will be used for funding. If funding is available, implementation will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Clear trees and debris from rivers, creeks, and/or ditches, especially around St. John Ditch at Hart St.; Blaine St and 101st N; Bull Run at 109th St.	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	DPW will work with INDOT, IDNR, and IDHS to coordinate this effort. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within one year.
Purchase new snow removal equipment and pre-treatment equipment and supplies; at least two snow plows needed	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	High	DPW will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within one year.
Procure generators for lift stations, well sites, and water treatment plant	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Utility District will oversee the implementation of this project. Local resources will be used to determine which facilities should receive generators. Funding has not been secured as of 2010, but local resources are possible funding sources. If funding is available, this project is forecasted to begin within three years.
Assess and upgrade drainage systems in the following areas: Watts subdivision, lateral drain under U.S. 41; downstream to Schererville; 85th Ave at Parrish	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	DPW will work with the INDOT to implement this project. Funding as not been secured as of 2010, but INDOT and IDNR are potential sources. Implementation will begin within three years.
Elevate 109th at Bull Run and 85th at Parrish	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	The Town engineers will oversee this project, working with highway departments. INDOT, IDHS, and IDNR are potential funding sources. If funding is available, implementation will begin within three years.
Replace culverts at 9300 and Columbia; St. John Ditch @ Hart St; Blaine St. and 101st N; 85th and Parrish	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	DPW will oversee the implementation of this project. Funding has not been secured as of 2010, but INDOT is a possible funding source. Implementation, if funding is available, will begin within three years.
Create a database for identification of special needs population and institute a plan for rescue and recovery	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Medium	The Town will work with local health care facilities to coordinate this project. Local resources will be used. Implementation will begin within three years.
Install inertial valves at critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Earthquake	Low	The Plan Commission will oversee implementation of this project. Funding has not been secured as of 2010, but the PDM program and community grants are an option. If funding is available, implementation will begin within five years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Develop a program to distribute weather radios to all critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Thunderstorm, Winter Storm	Low	The Town Council will oversee implementation of this project. Local resources will be used to determine how many radios are needed and when/where to distribute them. The PDM program and community grants are an option for funding. Implementation, if funding is available, will begin within five years.
Implement NOAA's radio system for hazmat spill alerts	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Low	The fire department and first responders will oversee this project. Funding has not been secured as of 2010, but local resources and community grants are an option. Implementation will begin within five years.
Purchase equipment for containing spills, e.g. absorbent materials	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Hazmat	Low	The fire department will oversee the implementation of this project. Funding will be sought from the PDM program and community grants. If funding is available, implementation will begin within five years.

City of Whiting

The City of Whiting is a small community located in the northwest corner of Lake County. The community is unusual in that of its four square miles of land, two of them are occupied by the BP Oil Refinery. Whiting maintains a good relationship with BP and even has an agreement in place for hazardous materials response. A meeting was held on January 11, 2010 to discuss potential issues facing the community. The mitigation strategies will be used in future land use planning. The strategies are listed in Table 6-23, and minutes from the brainstorming session are in Appendix A.

Table 6-23: Whiting Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Procure generators for critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Complete	The City has generators at police and fire stations, as well as the community center, which serves as the primary shelter.
Establish a mutual aid response agreement	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Hazmat	Complete	The City has a good relationship with BP, which helps with hazmat issues.
Bury existing power lines alongside the radio tower	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Earthquake, Thunderstorm, Winter Storm	High	The City will work with the utility company to oversee implementation of this project. Local and corporate resources will be used to bury the lines. Implementation will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Establish public outreach programs to educate residents on the hazards affecting the town	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The City will work with schools and healthcare facilities to establish a program. Local resources and FEMA will be used for funding. If funding and resources are available, implementation will begin within one year.
Procure a back-up storm pump for retention basin	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	DPW will work with INDOT and IDNR to coordinate this project. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within three years.
Conduct a commodity flow study along 119th and Indianapolis Blvd	Goal: Create new or revise existing plans/maps for the community Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Medium	Community planners and local government leaders will coordinate this study. Funding will be requested from community grants or IDHS. Implementation will begin within three years.
Purchase generator for City Hall and Public Works facility	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Medium	City Planners will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within three years.
Install warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Medium	The City currently has no sirens. The Plan Commission will seek funding from IDHS and FEMA for adequate coverage. Implementation will begin within three years.
Purchase a sewer vacuum truck for preventative maintenance	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Low	DPW will coordinate this effort. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within five years.
Purchase new snow removal equipment including an emergency 4WD vehicle	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Low	DPW will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within five years.
Trim trees to minimize the amount/duration of power outages; need to purchase a bucket truck	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Winter Storm	Low	DPW will oversee implementation of this project. Funding has not been secured as of 2010, but the PDM program, INDOT, or IDHS are possibilities. If funding is available, implementation will begin within five years.

Town of Winfield

The Town of Winfield is located in east central Lake County. Winfield is the newest incorporated community in the county and is quickly growing. Because it is so new, the town currently has no established shelters. A meeting was held on January 29, 2010 to discuss this and other potential issues facing the community. The mitigation strategies will be used in future land

use planning. The strategies are listed in Table 6-24, and minutes from the brainstorming session are in Appendix A.

Table 6-24: Winfield Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Assess and upgrade drainage system along 117th/113th Ave	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	DPW will work with the INDOT to implement this project. Funding has not been secured as of 2010, but INDOT and IDNR are potential sources. Implementation, if funding is available, will begin within one year.
Elevate the following roads: 117th, Arizona, 109th	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	DPW will oversee this project, working with highway departments. INDOT, IDHS, and IDNR are potential funding sources. If funding is available, implementation will begin within one year.
Install/repair culverts at 117th, Co. Line Rd, and 109th	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	DPW will oversee the implementation of this project. Funding has not been secured as of 2010, but INDOT is a possible funding source. Implementation, if funding is available, will begin within one year.
Enlarge existing detention basin in Hidden Creek Subdivision; Install new diversion storm water pipe; and replace 103rd Avenue Culvert	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	DPW will oversee the implementation of this project. Funding has not been secured as of 2010, but local, state, and federal funding sources will be sought. Implementation, if funding is available, will begin within one year.
Procure back-up generators for Town Hall and Township Office	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Town Board will oversee the implementation of this project. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. If funding is available, this project is forecasted to begin within one year.
Develop an evacuation plan for hazardous materials spills	Goal: Create new or revise existing plans/maps for the community Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Hazmat	High	The Town's first responders will oversee the implementation of this project. Local resources will be used to develop the plans. Implementation will begin within one year.
Harden critical facilities, especially fire stations and municipal buildings	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Plan Commission will oversee the implementation of this project. Local resources will be used to identify the required structures to be hardened. Funding has not been secured as of 2010, but the pre-disaster mitigation program and community development grants are possible funding sources. Implementation, if funding is available, will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Implement a mass notification system such as Nixle	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Plan Commission and first responders oversee the implementation of the project. Funding may sought from the PDM program or community grants. Implementation, if funding is available, is forecasted to begin within one year.
Establish a new shelter	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	High	The Town has no shelters. Local resources will be used to establish shelter locations. Funding for supplies will be sought from IDHS and FEMA. Implementation will begin within one year.
Enlarge existing detention basin in Hidden Creek Subdivision; install new diversion storm water pipe; and replace 103rd Avenue culvert	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	High	DPW will oversee the implementation of this project. Funding has not been secured as of 2010, but INDOT, IDHS, and FEMA are a possible funding sources. Implementation, if funding is available, will begin within one year.
Distribute literature advising that residents, schools, healthcare facilities, and other critical facilities bolt bookshelves to walls and secure water heaters	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Earthquake	Medium	The Town will work with schools, healthcare facilities, and public officials to create and distribute the literature. Local resources will be used for funding. If funding is available, implementation will begin within three years.
Clear trees and debris from rivers, creeks, and/or ditches, especially around Deer Creek and Hidden Creek	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Medium	DPW will coordinate this effort. Funding has not been secured as of 2010, but county, state, and federal funding will be sought. Implementation will begin within three years.
Create a database for identification of special needs population and institute a plan for rescue and recovery	Goal: Develop long-term strategies to educate community residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Medium	The Town will work with local health care facilities to coordinate this project. Local resources will be used. Implementation will begin within three years.
Install additional warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Medium	The Plan Commission oversees the implementation of the project. Funding will be sought from IDHS and FEMA. Implementation, if funding is available, is forecasted to begin within three years.
Purchase two snow plows and improve storage facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Winter Storm	Medium	DPW will oversee this project. Funding has not been secured as of 2010, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Priority	Comments
Trim trees to minimize the amount/duration of power outages; specifically in the agricultural areas in the southern part of the community	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Winter Storm	Medium	The Town will oversee implementation of this project. Funding has not been secured as of 2010, but the Town will work with NIPSCO to establish an agreement. Additional state or federal funding may be needed. If funding is available, implementation will begin within three years.
Conduct a study to determine potential buy-out properties	Goal: Create new or revise existing plans/maps for the community Objective: Support compliance with the NFIP for each jurisdiction in community.	Flood	Low	The Plan Commission oversees the implementation of the project. Local resources will be used to determine potential buy-out areas. Additional funding will be sought from funding sources such as IDHS. Implementation, if funding is available, is forecasted to begin within five years.
Purchase equipment for containing spills, e.g. absorbent materials	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Hazmat	Low	The Town would like its first responders to be trained at the operational level. Funding will be sought from state and federal sources. Implementation will begin within five years.

The Lake County Emergency Management will be the local champions for the mitigation actions. The County Commissioners and the city and town councils will be an integral part of the implementation process. Federal and state assistance will be necessary for a number of the identified actions. The Northwestern Indiana Regional Planning Commission is qualified to provide technical grant writing services to assist the county in seeking resources to achieve the recommended mitigation action.

6.4 MULTI-JURISDICTIONAL MITIGATION STRATEGY

As a part of the multi-hazard mitigation planning requirements, each community listed identifiable mitigation action items for their respective hazards.

Each of the 20 incorporated communities within and including Lake County was invited to participate in brainstorming sessions in which goals, objectives, and strategies were discussed and prioritized. Each participant in these sessions was armed with possible mitigation goals and strategies provided by FEMA, as well as information about mitigation projects discussed in neighboring communities and counties. All potential strategies and goals that arose through this process are included in this plan. The county planning team used FEMA's evaluation criteria to gauge the priority of all items. A final draft of the disaster mitigation plan was presented to all members to allow for final edits and approval of the priorities.

7.0 PLAN MAINTENANCE

7.1 MONITORING, EVALUATING, AND UPDATING THE PLAN

Throughout the five-year planning cycle, the Lake County Emergency Management Agency will reconvene the MHMP planning committee to monitor, evaluate, and update the plan on an annual basis. Additionally, a meeting will be held during June 2015 to address the five-year update of this plan. Members of the planning committee are readily available to engage in email correspondence between annual meetings. If the need for a special meeting, due to new developments or a declared disaster occurs in the county, the team will meet to update mitigation strategies. Depending on grant opportunities and fiscal resources, mitigation projects may be implemented independently by individual communities or through local partnerships.

At the review sessions, the committee will evaluate the county and community goals and strategies to determine their relevance to changing situations in the county. In addition, state and federal policies will be reviewed to ensure they are addressing current and expected conditions. The committee will also review the risk assessment portion of the plan to determine if this information should be updated or modified. The parties responsible for the various implementation actions will report on the status of their projects, and will include which implementation processes worked well, any difficulties encountered, how coordination efforts are proceeding, and which strategies should be revised.

Updates or modifications to the MHMP during the five-year planning process will require a public notice and meeting prior to submitting revisions to the individual jurisdictions for approval. The plan will be updated via written changes, submissions as the committee deems appropriate and necessary, and as approved by the county commissioners.

The GIS data used to prepare the plan was obtained from existing county GIS data as well as data collected as part of the planning process. This updated HAZUS-MH GIS data has been returned to the county for use and maintenance in the county's system. As newer data becomes available, this updated data will be used for future risk assessments and vulnerability analyses.

7.2 IMPLEMENTATION THROUGH EXISTING PROGRAMS

The results of this plan will be incorporated into ongoing planning efforts since many of the mitigation projects identified as part of this planning process are ongoing. Lake County and its incorporated jurisdictions will update their respective zoning plans and ordinances listed in Table 6-2 as necessary and as part of regularly scheduled updates. Each community will be responsible for updating its own plans and ordinances.

7.3 CONTINUED PUBLIC INVOLVEMENT

Continued public involvement is critical to the successful implementation of the MHMP. Comments from the public on the MHMP will be received by the EMA director and forwarded to the MHMP planning committee for discussion. Education efforts for hazard mitigation will be ongoing through the EMA and the responsible entity within each jurisdiction. The public will be

notified of periodic planning meetings through notices in the local newspaper. Once adopted, a copy of this plan will be maintained in each jurisdiction and in the County EMA Office.

Glossary of Terms

A

AEGL – Acute Exposure Guideline Levels
ALOHA – Areal Locations of Hazardous Atmospheres

B

BFE – Base Flood Elevation

C

CAMEO – Computer-Aided Management of Emergency Operations
CEMA – County Emergency Management Agency
CEMP – Comprehensive Emergency Management Plan
CPRI – Calculated Priority Risk Index
CRS – Community Rating System

D

DEM – Digital Elevation Model
DFIRM – Digital Flood Insurance Rate Map
DMA – Disaster Mitigation Act

E

EAP – Emergency Action Plan
ERPG – Emergency Response Planning Guidelines
EMA – Emergency Management Agency
EPA – Environmental Protection Agency

F

FEMA – Federal Emergency Management Agency
FIRM – Flood Insurance Rate Maps
FIS – Flood Information Study

G

GIS – Geographic Information System

H

HAZUS-MH – **Ha**zards **US**A **M**ulti-**H**azard
HUC – Hydrologic Unit Code

I

IDHS – Indiana Department of Homeland Security
IDNR – Indiana Department of Natural Resources
IGS – Indiana Geological Survey

M

MHMP – Multi-Hazard Mitigation Plan

N

NCDC – National Climatic Data Center
NEHRP – National Earthquake Hazards Reduction Program
NFIP – National Flood Insurance Program
NOAA – National Oceanic and Atmospheric Administration

P

PPM – Parts Per Million

S

SPC – Storm Prediction Center

U

USGS – United States Geological Survey

Appendix A – Minutes of the Multi-Hazard Mitigation Planning Team Meetings

Lake County Pre-Disaster Mitigation Meeting
May 29, 2009 at 9:00 a.m. Central

Meeting #1 of the Lake County Pre-Disaster Mitigation (PDM) Committee was held May 29, 2009 at 9:00 a.m. at the Lake County Homeland Security/Emergency Management Agency conference room located at 2900 W. 93rd Ave., Crown Point. Those present are listed in the following table.

Jody Melton	NIRPC
Jodi Richmond	Lake Co. HS/EMA
Michael DeMory	Lake County Surveyor's Office
Dan Gardner	Lake County Surveyor's Office
Becky McKinley	Hammond Sanitary District
Wayne Cauley	North Township
Maureen Shuttleworth	NISOURCE
Jennifer Payne	IDHS
George Shropshirk	Hammond EMA
Bob Roach	NIPSCO
David Pelc	Town of Munster
James Knesek	Town of Munster
John Buechler	The Polis Center
Melissa Gona	The Polis Center

Jody Melton from Northwestern Indiana Regional Planning Commission welcomed attendees and introduced Jodi Richmond, Director of the Lake County Homeland Security/Emergency Management Agency who will chair the Committee. Jodi thanked all for coming and explained that this is an initial meeting to assemble the necessary parties and distribute information. Jodi introduced John Buechler of The Polis Center. John Buechler described the plan and what it is to accomplish and how it will be formed. He provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary.

He introduced the website http://pdmplanning.com and the user name "Indiana_PDM" and password "hoosiers". Much information can be gained from this site as the process continues. Participants in the plan will need to keep track of their time at meetings as well as time preparing information for the meetings. That time will contribute to the matching funds requirement.

Melissa Gona also from The Polis Center asked for documentation of memorable historical hazards that might be archived within the communities.

To close the meeting, Jodi Richmond said she would contact each of the communities to seek their participation in a second introductory meeting. Meeting adjourned 10:30 a.m.

Jody Melton/Coordinator/NIRPC

Lake County Pre-Disaster Mitigation Meeting
July 27, 2009 at 9:00 a.m. Central

Meeting #2 of the Lake County Pre-Disaster Mitigation (PDM) Committee was held July 27, 2009 at 9:00 a.m. at the Lake County Homeland Security/Emergency Management Agency conference room located at 2900 W. 93rd Ave., Crown Point. Those present are listed in the following table.

Jody Melton	NIRPC
Jodi Richmond	Lake Co. HS/EMA
Tony Kenning	Town of Winfield
Robert Patterson	Town of Schererville FD
Joe Kruzan	Town of Schererville FD
Dennis Simala	North Township
Herbie Cruz	East Chicago EMA
Matt Hay	NIRPC
Gerry Scheub	Lake Co. Commissioner
John Buechler	The Polis Center
Melissa Gona	The Polis Center
Manuela Johnson	IDHS

Jody Melton from Northwestern Indiana Regional Planning Commission welcomed attendees and introduced John Buechler of The Polis Center. John Buechler described the plan and what it is to accomplish and how it will be formed. He provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary.

He introduced the website http://pdmplanning.com and the user name "Indiana_PDM" and password "hoosiers". Much information can be gained from this site as the process continues. Participants in the plan will need to keep track of their time at meetings as well as time preparing information for the meetings. That time will contribute to the matching funds requirement.

There was general discussion among the participants about what is needed from the county as data and where critical structures may be. There are dams and levees in several places and flooding along I 80/94. Lake of the Four Seasons is preparing an Emergency Action Plan and needs to be involved in this process. Commissioner Scheub said that Lake County has 180 bridges and many refineries and pipelines that will need to be identified. Failure of utility service during emergencies was emphasized as a significant problem. While earthquakes are statistically not probable, an earthquake of significance in Lake County would probably be devastating to the infrastructure of the county and as a central hub from Chicago, perhaps of national significance. Flooding continues to be a major problem and Hobart, Lake Station, and St. John have asked the state for mitigation help. The completed plan from this process will provide that help.

Melissa Gona also from The Polis Center asked for documentation of memorable historical hazards that might be archived within the communities. These documents will aid in the preparation of the final plan and contribute to the knowledge of known events and their effects.

A preliminary view of the prepared initial map indicated paths of several historical tornados and the group asked that two tornado paths be modeled; one in the north and one in the south. A hazardous material incident also needs to be modeled and it was suggested that the area around East Chicago would contribute the most useful information. There should also be a hazardous chemical spill modeled from a transportation source along I 80/94 or Indianapolis Boulevard.

The committee members discussed outreach, how to bring other communities into the process, and how to get the GIS data from the county for damage assessment. Commissioner Scheub asked that a letter be sent to his office asking for the GIS information so that the planning process can proceed. Manuela Johnson from Homeland Security described the process of IDHS, the Polis Center, NIRPC, and Lake County work and data being used to create the plan with no cash cost share from the county. The model and plan can be created and written with 'sweat' equity of participants and the GIS data. When the document is completed and adopted, hazard mitigation grants will be available for municipalities and the county to work on mitigation projects.

The next meeting will be scheduled by Jodi Richmond in the Commissioners Meeting Room at the Lake County Government Center.

Jody Melton/Coordinator/NIRPC

Lake County Pre-Disaster Mitigation Meeting Minutes
August 12, 2009 at 1:00 p.m. Central

Meeting #3 of the Lake County Pre-Disaster Mitigation (PDM) Committee was held August 12, 2009 at 1:00 p.m. at the Lake County Commissioners Courtroom located at 2293 N. Main St, Crown Point. Those present are listed in the following table.

Jody Melton	NIRPC
Heidi Kendall	Town of Winfield
Stephanie Stiener	Town of Winfield
Matt Hay	NIRPC
Becky McKinley	City of Hammond
Jim Pokrajac	Little Calumet River Basin Dev. Comm.
Herbie Cruz	East Chicago EMA
Larry Blanchard	Lake Co. Council
Dave Coats	The Polis Center
Melissa Gona	The Polis Center

Dave Coats of The Polis Center welcomed attendees and introduced Jody Melton from Northwestern Indiana Regional Planning Commission. Dave described the plan and what it is to accomplish and how it will be formed. He provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary.

He introduced the website http://pdmplanning.com and the user name "Indiana_PDM" and password "hoosiers". Much information can be gained from this site as the process continues. Participants in the plan will need to keep track of their time at meetings as well as time preparing information for the meetings. That time will contribute to the matching funds requirement.

Melissa Gona also from The Polis Center asked for documentation of memorable historical hazards that might be archived within the communities. These documents will aid in the preparation of the final plan and contribute to the knowledge of known events and their effects. There was general discussion among the attendees about the lack of participation from other communities. The completed plan from this process must have input from the locals and we are going to have to re-think our process to get the required information from the local communities. The lack of GIS data is also hampering the beginning of the process and Councilman Blanchard was informed of the need for the necessary data that will contribute to the local share for the project.

There was some discussion about specific areas but since Winfield, Hammond, and East Chicago were at previous meetings, the meeting was concluded.

Jody Melton/Coordinator/NIRPC

August 13, 2009

Lake County Mitigation Planning Meeting

Attendees:

Calumet Twsp.
City of Gary
City of Hobart
Town of Munster
Town of St. John
There was also another gentleman representing another township – we will be able to get that info exactly at the next meeting – we can just ask.

Minutes:

We discussed the progress with everyone's critical infrastructure surveys – if there were any questions etc. Everyone was doing pretty well if not completed all ready. They are continuing to work on them if they did not turn them into me.

We discussed that they needed to really try and have those completed yesterday. They will bring them to the next meeting or email me those as soon as they are finished.

We discussed the next meeting. I said that I would have to get with POLIS to see when we can schedule the next meeting. They were all pretty understanding on the communication mix with this meeting.

Jodi E. Richmond, Director
Lake County Homeland Security/Emergency Management Agency

Lake Station, IN Pre-Disaster Mitigation Meeting
January 11, 2010 at 9:00 a.m. Central

Those present are listed in the following table.

Jody Melton	NIRPC
John Buechler	The Polis Center
Laura Danielson	The Polis Center
Jim Meyer	Attorney, City of Lake Station
Mike Stills	Police Chief, Lake Station
R. Janes	Fire Chief, Lake Station
Chuck Farekas	Deputy Fire Chief, Lake Station
Mayor Keith Soderquist	Lake Station

John Buechler described the plan and what it is to accomplish and how it will be formed. He provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary.

Laura Danielson presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards facing Lake Station.

Strategies

- Riverside trailer park (70 structures) buyout in progress.
- Flood areas (roads to elevate) Wyoming Street, 23rd and 24th at Colorado, 28th Avenue, east of clay north of central, 4000 block off of Hwy 51, State Road 51, Clay Street, Old Hobart Road North
- Backflow valves required
- Maintenance of culverts needed.
- 80-94 Burns Ditch new culvert construction in progress; need more funding
- LS has sewer camera and truck
- Need lightning protection on new building
- Update evacuation plan flyers doo9r to door
- Bulk email notification
- County system reverse 911
- All schools have weather radios
- County wide Hazmat team
- Generators exist at fire stations
- No generators or transfer switches at school
- Need bucket truck for tree trimming
- Need new snow truck
- Sirens needed and education about siren warnings
- New City Hall building in progress for Mayor, police, and fire and ambulance station
- Boys and girls club is used as a shelter and needs enhanced

Flooding is concerned the chief hazard in lake Station. There are several areas where buyouts are possible and waiting to happen. There is flooding along 23rd and 24th Courts, 29th Avenue, Howard, Wyoming, and Arizona Streets. 270 properties area affected as well as roadways. Clay Street needs major roadwork and flood protection. The city also needs better siren warning coverage with new sirens, snow equipment needs to by added and purchased, and public education for alerting citizens to dangers, to shelters, and to aid need to be implemented.

Meeting adjourned 10:30 a.m.

Jody Melton/Coordinator/NIRPC

New Chicago, IN Pre-Disaster Mitigation Meeting
January 11, 2010 at 10:40 a.m. Central
Meeting Minutes
Those present are listed in the following table.

Jody Melton	NIRPC
John Buechler	The Polis Center
Laura Danielson	The Polis Center
Dan Sebbens,	Police Chief, New Chicago

John Buechler described the plan and what it is to accomplish and how it will be formed. He provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary.

Strategies

- Community has water tower (Cleveland and Michigan) which supplies water to neighboring jurisdiction
- Communication via police radios
- Siren on fire department needed
- Basement warming shelter in town hall basement; building not handicap accessible, need new building
- Updated fire station
- Need evacuation plan for hazmat
- Sewer is combined; requires separation
- Need new fire hydrants
- Require new snow removal equipment

Laura Danielson presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards facing New Chicago.

New Chicago is a town of one square mile. The greatest hazard is the lack of funds to maintain municipal equipment. The water tower needs securing, warning siren coverage needs to be created, handicap accessibility and shelters are lacking. The town complex is very out of date and a new public safety building and town complex should be established. The sewer system is outdated, the town needs new fire hydrants, and snow removal equipment is minimal and old.

Meeting adjourned 12:10 p.m.

Jody Melton/Coordinator/NIRPC

Hobart, IN Pre-Disaster Mitigation Meeting
January 11, 2010 at 2:00 p.m. Central

Those present are listed in the following table.

Jody Melton	NIRPC
John Buechler	The Polis Center
Laura Danielson	The Polis Center
Mike Frank	City of Hobart EMA Director

John Buechler described the plan and what it is to accomplish and how it will be formed. He provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary.

Laura Danielson presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards facing Hobart.

Strategies

- Would like FM early warning system (high priority)
- Have funding for culvert repairs
- Have funding for stream maintenance
- In progress: rebuilding community center
- Transportation hazards important Railroads and intersection of three major highways; glide path to OHare
- Drainage projects in progress
- Project in progress to reduce infiltration into sanitary sewers particularly sewers being pumped (lift stations); need additional funding
- EAP needed for Lake George
- Dam repairs and spillway project 1973 overtopping dam flooding
- City hall needs generator
- New government center is being planned and will serve as a warming center (generator will be required)
- New subdivisions electric is buried
- Public education on pipeline hazards and issues
- Good snow equipment
- Are you ready Packets?
- Need sirens

Hobart is very large geographically and. warning sirens are lacking and emergency notification is sparse. Flooding around Lake George is also an issue. There is a need for more community shelters and also public education on preparing for disasters. As in other towns, Hobart is in need of new emergency equipment for police, fire, and snow removal. Hazmat is a concern because of the highways running through Hobart and they rely on the Lake County Hazmat Team.

Meeting adjourned at 3:30 p.m.

Jody Melton/Coordinator/NIRPC

Whiting, IN Pre-Disaster Mitigation Meeting
January 11, 2010 at 4:00 p.m. Central

Those present are listed in the following table.

John Buechler	The Polis Center
Laura Danielson	The Polis Center
Joe Stahura	Mayor, Whiting
Mark Harbin	Whiting
Bruce Stolman	Acting Fire Chief, Whiting
Steve Miller	Police Chief, Whiting

Laura Danielson described the plan and what it is to accomplish and how it will be formed. She provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary. Laura Danielson presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards facing Whiting.

The team described Whiting's strategies as follows.

- Due to location adjacent to Lake no tornados or properties in flood plain
- Need back-up storm pump for retention basin
- Generators exist at Police and fire and community center
- Whiting has no sirens; city works with Hammond to insure siren coverage
- Bury power lines alongside radio tower
- Snow equipment required including 4wd emergency vehicle
- Need additional tree trimming
- 3 railroads cross city
- 119th & Indianapolis Blvd flow allocation study
- City has good relationship with BP and agreement for HAZMAT response
- Generator needed at city hall
- New public works facility needs generator
- Emergency preparedness kits
- Sewer vacuum truck needed for preventive maintenance

Meeting adjourned 4:30 p.m.

Laura Danielson/Polis

Lowell, IN Pre-Disaster Mitigation Meeting
January 12, 2010 at 9:00 a.m. Central

Those present are listed in the following table.

Jody Melton	NIRPC	
Laura Danielson	The Polis Center	
Alice F. Dahl	Cedar Creek Township Trustee	
Charles Scott	Chief, Lowell Fire Dept.	
Mark R. Gruessing	Lowell Fire Dept.	

Laura Danielson described the plan and what it is to accomplish and how it will be formed. She provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary.

Laura Danielson presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards facing Lowell.

Strategies

- Completed: distribute public education literature at Red Cross and in first response buildings
- Have 3 sirens; need 3 more (trailer park, public areas like parks, truck stop)
- Need sandbagging equipment or strong mutual aid agreement
- NOAA radios for public
- Need portable pumps for flooding
- Harden bridges
- Conduct study to determine shelter capacity
- Elevate 205th and Monon
- Stream maintenance near American Legion
- Buy-out plan
- Flow allocation study
- Bury new power lines
- Generators/transfer switches in CFs and public buildings
- Watershed study
- Emergency vehicle fleet (4WD, snowmobile, water craft)
- Map pipeline locations
- Upgrade EMS equipment and provide more training
- Need underground water stores

Lowell is in great need of warning sirens to cover more area. They need at least 3 more in addition to the 3 existing. The I-65/SR2 interchange though outside town limits, is the responsibility of the LFD and the development at that interchange continues. Shelters for safety are needed. Generators and more shelter space is a critical need.

There are several areas of flooding which need to be addressed. Some roads could be raised, particularly the intersection of Monon Road and 205th Avenue. During the last flood there were no pumps available to help people pump water away. There is a need for better public education so that citizens know where to go in case of emergencies.

There is also worry about the cost of maintaining Emergency Medical Services for Emergency Response.

Meeting adjourned at 10:00 p.m.

Jody Melton/Coordinator/NIRPC

East Chicago, IN Pre-Disaster Mitigation Meeting
January 12, 2010 at 10:00 a.m. Central

Those present are listed in the following table.

John Buechler	The Polis Center
Herbie Cruz	East Chicago EMA
Jezreel Rodriguez	East Chicago Engineer
Adolfo Velez	East Chicago Utilities Director
Monsie Corsbie	East Chicago Sanitary Dept

John Buechler described the plan and what it is to accomplish and how it will be formed. He provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary. John presented a prepared list of disasters and mitigation activities for those disasters. He asked for prioritization of disasters and hazards facing East Chicago.

The team described East Chicago's strategies as follows.

- The most important project is the Clive Avenue North Pumping Station. The pumping station relieves combined sewer system (see the map). The sewer system is in good condition and was televised recently. The pumping station rehabilitation will relieve flooding for several hundred homes.
- The 2nd most important project is to install backup generators at the WWTP
- The 3rd most important project is to install backflow valves in the Roxanna neighborhood
- The city has 6 early warning sirens and requires 2 more
- The city uses the county's rapid notify system (reverse 911)
- The city performs tree trimming
- The city may need backup generators in the schools

Meeting adjourned 11:00 a.m.

Laura Danielson/Polis

Crown Point, IN Pre-Disaster Mitigation Meeting
January 12, 2010 at 10:30 a.m. Central

Those present are listed in the following table.

Jody Melton	NIRPC
Laura Danielson	The Polis Center
Dan Niksch	City of Crown Point Engineer
Gerard Abraham	City of Crown Point Engineer
Matt Lake	City of Crown Point Consultant
M. Scott Rediger	City of Crown Point, Inspector

Laura Danielson described the plan and what it is to accomplish and how it will be formed. She provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary.
Laura Danielson presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards facing Crown Point.

FLOOD
- Assess and upgrade drainage system along major roadways
- Stream maintenance
- Need funding for CSO; plan is in place
- Additional funding for culvert repairs
- Buyouts in Fashion Terrace
- Improve conveyance system for ditches to improve water quality

TORNADO/THUNDERSTORMS
- The High School and the Civic Center serve as shelters. Generators are ok but the fire department could use more. Siren coverage is adequate now. Buildings need to be hardened for storms.
- Distribute weather radios to CFs
- Need to establish safe rooms

EARTHQUAKES
- The public needs to be educated about earthquakes and the actions they should take for both personal safety and for building hardening
- Inertial valves need to be considered/installed in older buildings in all communities

HAZMAT AND FIRE
- Crown Point works with the Lake County Hazmat Team.
- Fire Department is in need of replacement and additional equipment and training

WINTER STORMS
- Need bucket truck for tree trimming
- Need de-icing agents
- Schools may not be connected to NOAA radios.
- Special needs database

COMPLETED/ONGOING
- Generators in most CFs; need in fire departments
- Have TV station for announcements
- 7 sirens – completed strategic study
- Blackboard study for mass communication
- Weekly radio show
- MABUS? MAVIS?
- EPA grant for stormwater control in progress
- Evacuation plan for hazmat…ongoing

Other hazards discussed in Crown Point were the loss of trees and replacing of green infrastructure. There were also concerns about trained Emergency Management personnel and mutual aid with other units of government.

Meeting adjourned at 11:35 am.

Jody Melton/Coordinator/NIRPC

Highland, IN Pre-Disaster Mitigation Meeting
January 12, 2010 at 12:00 p.m. Central

Those present are listed in the following table.

Jody Melton	NIRPC
Laura Danielson	The Polis Center
Bill Timmer	Chief, Highland Fire Department
Mike Piptia	Highland Public Works

Laura Danielson described the plan and what it is to accomplish and how it will be formed. She provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary.

Laura Danielson presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards facing Highland.

FLOOD
- Need storm water retention systems upgrades
- Repair storm sewers
- Sewers need to be upgraded and separated (in progress but need add'l funding)
- The Kennedy overpass and Cline Avenue need to be raised
- Buy-outs of two homes in Wicker Park Estates
- Replace culverts near Spring Creek
- Stream maintenance on Little Cal River
- Watershed study
- Need backflow valves

TORNADO/THUNDERSTORMS
- Need generators in Lincoln Center and Town Hall
- Need 6 additional sirens
- Funding for public education for Nixel or Codespear
- Establish safe rooms in public buildings
- Develop program to distribute receiver radios to public
- Combine FD, PD, and Town Hall into new EOC

EARTHQUAKES
- Public education
- Bridge infrastructure study on Kennedy Ave and Cline Ave
- Harden CFs

HAZMAT AND FIRE
- Need equipment for LEPC
- Implement NOAA radio system for hazmat spill alerts
- Conduct flow allocation study

WINTER STORMS
- Need more equipment
- Need stronger mutual aid agreements
- Debris clearing plan

COMPLETED
- LEPC
- Highland has mutual aid agreements with Lake County Fire Association and County HAZMAT team
- Have 12 sirens
- Dike project almost complete
- Stormwater retention ordinance for new developments
- Flood gauges in place
- Flood stations along levee are flood-proof and have generators

Meeting adjourned at 1:35 pm.

Jody Melton/Coordinator/NIRPC

Munster, IN Pre-Disaster Mitigation Meeting
January 12, 2010 at 2:00 p.m. Central

Those present are listed in the following table.

Jody Melton	NIRPC
Laura Danielson	The Polis Center
John Buechler	The Polis Center
Tom DeGiulio	Town Manager, Munster
Charles Remmers	GIS Specialist, Munster
Steve Kovecik	Munster Police Dept.
Lance Reinsma	MIS manager, Munster
James Knesek	Fire Chief, Munster
Stephen Scheckel	Police Chief, Munster
David Pelc	EMA, Munster
Ashley Porter	Ass't to Town Manager, Munster

Laura Danielson described the plan and what it is to accomplish and how it will be formed. She provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary. She presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards.

FLOOD
- Munster was devastated by flooding from Little Calumet River in Sept. 2008.
- Buyouts for 35 homes behind levee; turn to green space
- Several roads need elevating, and the bridge at Northcote Avenue is particularly troublesome. Study is complete, need funding for implementation
- Need backflow valves in Harts Ditch area
- Complete watershed study
- Sewer separation design in progress for northeast part of town. CSO separation north of Ridge Road; need funding to implement

TORNADO/THUNDERSTORMS
- Lightning predicators are needed for parks and more warning sirens could be used.
- Trees and tree trimming should be kept up.
- Need more generators/transfer switches for CFs
- Program to distribute weather radios and emergency kits to CFs, especially nursing homes and schools

DROUGHT
- Develop a plan for domestic animal protection and subsistence; include agreements with local shelters

EARTHQUAKES
- Public education is necessary.

HAZMAT AND FIRE
- Munster has agreements with Lake County Fire Association and County HAZMAT team.
- HAZMAT training and spill kits
- Radio system for hazmat spill alerts in businesses and public areas
- Formalize a wide area evacuation plan, e.g. hospital evacuation

WINTER STORMS
- Public education for Nixel
- FM station for information to the public
- Establish warming centers with supplies (one in north; one in south)
- More equipment is needed.
- Warming stations are needed.

COMPLETED OR ONGOING
- CERT program used for public education
- Newsletter sent out for public education
- Have generators on for all lift stations
- 4 home buyouts in progress
- Completed study to evaluate bridge infrastructure
- New power lines are buried; need funding for old
- Stream maintenance ongoing; need more for Harts Ditch
- Uses mobile command center MAVIS

Meeting adjourned at 3:15 pm. *Jody Melton/Coordinator/NIRPC*

Merrillville, IN Pre-Disaster Mitigation Meeting
January 12, 2010 at 3:45 p.m. Central

Those present are listed in the following table.

Jody Melton	NIRPC
Laura Danielson	The Polis Center
Howard Fink	Merrillville Town Administrator
Joe Petruch	Police Chief, Merrillville
John Minchuk	Merrillville EMA Director

Laura Danielson described the plan and what it is to accomplish and how it will be formed. She provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary.

Laura Danielson presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards facing Merrillville.

FLOOD
- Flooding is prevalent around town. Some of it is storm water but particularly in the north end of Merrillville, the flooding is sewer backup from the Gary Sanitary District; add capacity to sewer system to reduce flooding
- There are several areas of Merrillville where roads should be raised, particularly in the southeast quadrant.
- Replace existing or install new culverts: Broadway, Beaver Dam Ditch, Turkey Creek
- Need new retention pond in northern part of town
- Install permanent flood signage
- Stream maintenance
- Assess and upgrade drainage along major roadways

TORNADO/THUNDERSTORMS
- Have 4 sirens, but need more
- Town hall used for shelter

EARTHQUAKES
- Public education is necessary.

HAZMAT AND FIRE
- Merrillville has agreements with Lake County Fire Association and County HAZMAT team.
- Need equipment for volunteer FDs

WINTER STORMS
- Merrillville needs a mass notification system (Reverse 911, Nixel, or other)
- Equipment for tree trimming, snow removal, and de-icing
- More mutual aid is required.
- Have radio station for weather announcements

Meeting adjourned at 4:35 pm.

Jody Melton/Coordinator/NIRPC

Cedar Lake, IN Pre-Disaster Mitigation Meeting
January 13, 2010 at 9:00 a.m. Central
Meeting Minutes
Those present are listed in the following table.

Jody Melton	NIRPC
John Buechler	The Polis Center
Ian Nicolini	Cedar Lake Town Administrator
Roger Patz	Police Chief, Cedar Lake
Douglas Wynkoop	Public Works, Cedar Lake

John Buechler described the plan and what it is to accomplish and how it will be formed. He provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary.

John Buechler presented a prepared list of disasters and mitigation activities for those disasters. He asked for prioritization of disasters and hazards facing Cedar Lake.

FLOOD
- Replace culverts and broken field tiles
- Update subdivision ordinances
- 2008 flood resulted in bridge overtopping; need to regulate discharge from lake by working with DNR and adjusting height of dam
- Remove abandoned railroad viaduct to relieve flooding issues
- Look into Brownfields redevelopment of fuel soils along Morris Street (work with EPA)

TORNADO/THUNDERSTORMS
- Need warning sirens on southwest side
- Harden CFs

EARTHQUAKES
- Public education

HAZMAT AND FIRE
- Nixel in place; need to publicize

WINTER STORMS
- Need equipment
- Strengthen mutual aid agreements
- Need generator in City Hall

COMPLETED
- Cedar Lake Dam has EAP
- Enforcing floodplain ordinances
- Hazmat mutual aid agreements with Lake County Fire Association and County HAZMAT team
- New power lines are buried
- City Hall is a warming center and shelter
- implement wetland retention to the south to mitigate flooding
- drainage improvements to Sleepy Hollow ditch
- currently updating zoning ordinance and incorporating into GIS
- comprehensive plan addresses flood best management practices (BMP)
- in process of installing curbs and gutters to improve drainage (16% complete)
- weather radios installed in schools
- communications systems installed on buses

Meeting adjourned at 10:00 am.

Jody Melton/Coordinator/NIRPC

Dyer, IN Pre-Disaster Mitigation Meeting
January 13, 2010 at 11:00 a.m. Central

Those present are listed in the following table.

John Buechler	The Polis Center
Laura Danielson	The Polis Center
Rick Eberly	Town of Dyer
Brian Lane	Dyer GIS

Laura Danielson described the plan and what it is to accomplish and how it will be formed. She provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary. Because Dyer completed an MHMP in 2007, they had a list of strategies prepared. The team went through the strategies and made necessary updates.

The team described Dyer's strategies as follows.

- Complete a detailed flood study of Hart Ditch from the bridge crossing at Hart Street to the bridge crossing at U.S. Route 30
- Minimize flooding by diverting or retaining stormwater
- Enforce development restrictions within the 100-year floodplain
- Enforce existing snow routes to allow for snow removal activities
- Improve stormwater drainage to decrease localized damage caused by pooling in yards, basements, and streets
- Enhance coordination and collaboration between the Town of Dyer and Red Cross of Northwest Indiana
- Increase number of personnel who are certified to OSHA III Technician Level
- Upgrade existing and install new warning sirens
- Participate in the Community Rating System
- Procure educational trailers and literature to distribute to schools and town residents at public events
- Develop and implement a voluntary immunization program for first responders
- Distribute weather radios to residents in mobile homes, nursing homes, and major businesses
- Trim trees to minimize the amount/duration of power outages
- Procure back-up generators for critical facilities
- Establish a volunteer emergency response team
- Purchase a mobile messaging board system to notify residents of traffic conditions, road closures, and other events
- Establish safe rooms in all community buildings
- Apply to become an NWS Storm Ready Community
- Improve railroad warnings at key intersections
- Add GPS units to snow plows and emergency vehicles

Meeting adjourned 11:30 am

Laura Danielson/Polis

Lake County Pre-Disaster Mitigation Township Meeting Minutes
January 29, 2010 at 9:00 a.m. Central

The Lake County Pre Disaster Mitigation Team held a meeting at the office of the Lake County Emergency Management Office with representatives of the unincorporated portions of Lake County and additional attendees.

Jody Melton	NIRPC
John Buechler	Polis Center
Laura Danielson	Polis Center
Melissa Gona	Polis Center
Heidi Kendall	Town of Winfield
Stephanie Stiener	Town of Winfield
Alan McCoy	Calumet Township EMS
Lamar Taylor	Calumet Township EMS
Joe Kruzan	Schererville Fire Dept.
Greg White	Lake Co. Surveyor's Office
Richard M. Wright	Town of Schneider Council
Michael J. Weber	Schneider Police Dept.
Kathe Benith	Lake Co. Commissioners" Office
Alice F. Dahl	Cedar Creek Twp. Trustee
Charles Scott	Lowell Fire Dept. Chief
Rick Niemeyer	West Creek Twp. Trustee
Harold Mussman	West Creek Twp.
Jason Oravet	St. John
Mark Gruessing	Lowell F.D.
Jodi Richmond	Lake County EMA Director
George Van Til	Lake County Surveyor

John Buechler of The Polis Center welcomed attendees and provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary.

Laura Danielson led the attendees in a discussion of hazards within their own jurisdictions.

Flooding was mentioned by most as the greatest concern. Buyouts would be a valuable tool. In Cedar Creek Township in the Kankakee River area, there are approximately 20 homes in the Shelby, Wildwood, and Pons Riverside Area that should be moved out. In Dyer, the Baldwin Subdivision has over 30 homes with flooding problems over the last 25 years. The Schererville Heights area, Ranburn Woods in Calumet Township, the area in Gary south and east of Indiana University Northwest has severe flooding problems, both from storm water and inadequate sanitary sewers. IUN lost a building due to flooding in the September 2008 event. The Small Farms Area of Gary near Chase Street and most of the area within the Little Calumet floodplain have been problems for years.

Stream maintenance is a definite issue, especially Turkey Creek and tributaries which affect Schererville, Merrillville, Hobart, and unincorporated area.

Other areas of concern are the repetitive floods in Lake Station, Schneider has drainage issues due to the lack of maintenance of ditches along US 41 and poor storm water structures. In Winfield along 117th Avenue there have been flooding problems for many years. The Dike Ditch and Levee west of US 41 in West Creek Township protects almost 3000 acres and several homes and the Levee is deteriorating and in danger of failing. Much of south Lake County water flows into the Singleton Ditch before it gets to the Kankakee River and the Singleton is in constant need of maintenance to keep storm water moving.

Lack of funding for these problems is the main concern, particularly in the Baldwin Subdivision (Dyer) and Ranburn Woods (Calumet Township).

St. John needs wellhead protection for its water treatment plant.

Dyer is working to protect the hospital from flooding

Schererville works with the County Drainage Board but needs maintenance on Turkey Creek.

Every community needs sanitary and storm water sewer work and Gary is in desperate need to address its CSO.

Road elevations should be priorities at Taft St. in Merrillville, Kennedy Avenue from 77th to Main in Schererville, Eagleridge and 213th St. in Schererville, Chase St. from 25th to 35th in Calumet Township, 117th Avenue in Winfield, at Arizona and 109th in Winfield, and 93rd Ave. in St. John

SR 2 at the viaduct east of US 41 in West Creek Township also needs to be raised as well as Main Street west of Lowell.

Winter storms are an issue for all jurisdictions. Buried utility lines would help Snow removal equipment is needed and facilities and equipment should be checked. Lake County highway takes care of most of the unincorporated areas and it is undermanned and underequipped. St. John needs 3 new plows and a new truck. Schneider needs a new truck, plow, and barn. Winfield needs trucks and a barn.

Transfer switches and generators are in short supply and most jurisdictions would like them. In particular, the Lions Club in Shelby, the Community Center in Schneider, the 3 Schererville Fire Departments and Town Hall, the Multi Purpose Facility in Calumet Township need to be renovated and provided generators. Lake Dalecarlia needs a shelter. The county should identify specific sites for more hub shelter sites.

Hazmat is addressed through the Lake County Hazmat team although Gary, East Chicago, and Hammond have their own teams. There is a mutual aid agreement but all teams need training and equipment and most local fire departments need more training in first responder practices. Availability of equipment is an issue, equipment is expensive, housing should be better and shelters hardened.

Due to Lake County's location and industrial base, they participate in mutual aid pacts with Wisconsin and Illinois.

Emergency Management Teams need more hazmat training.

Communications is a problem. Rapid Notify or some other system needs to be more used. Better Community Alert Network upgrades could help. Sirens seem to have lost their effectiveness because no one pays attention. Maybe dual toned sirens would help. Nevertheless South Lake County needs more sirens, 3 in Lowell, 2 in Schererville, 1 in Schneider and several more in Winfield. Sirens to summon volunteer fire fighters should stop being used and everyone should go to a paging system to save sirens for hazard alerts only.

Tornados and severe storms are monitored with NOAA radios. Most schools and hospitals have them and Lake County EMA is making an effort to make them more available, especially in other critical facilities.

The Schneider Fire Department Station is in need of upgrading.

Dry hydrants would be helpful especially in the unincorporated areas since water wagons are a big problem

GIS information needs to be used for greater coordination with all jurisdictions.

Earthquake information needs to be publicized and a planning and training exercise would be helpful.

Meeting adjourned at 10:45.

Jody Melton/Coordinator/NIRPC

Gary, IN Pre-Disaster Mitigation Meeting
January 29, 2010 at 1:00 p.m. Central

Those present are listed in the following table.

John Buechler	The Polis Center
Laura Danielson	The Polis Center
Melissa Gona	The Polis Center
Alan McCoy	Cal Twp EMS
Jeff Ward	Gary Fire Dept
Luci Horton	Gary Sanitary District
Nathaniel Brannon	Gary Public Schools
Geraldine B. Tousant	Deputy Mayor, Gary
James D. Craig	City of Gary Zoning
Ben Robinson	Gary Building Dept
Gary Carter	Gary PD/EMA

Laura Danielson described the plan and what it is to accomplish and how it will be formed. She provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary. Laura Danielson presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards facing Gary.

The team described Gary's strategies as follows.

- Flooding 25th & Clay to State street, Black Oak, East Glen Park
- Flooding west 25th
- Flooding destroyed IU dormitory at IUN
- Flooding 80-94 Grant and BroadWay exit
- 15th & cline and 5th & Marshall flooding
- Combined sewer problems
- Finish Levee system
- Hazmat training & equipment
- Hardening of fire stations
- No warning sirens in Gary
- Bury power lines
- Transfer switches
- Upgrade Genesis Center for shelter
- Flow allocation study
- Sanitary district Generators
- Revise mutual aid agreements

Meeting adjourned 2:00 p.m.

Laura Danielson/Polis

St. John, IN Pre-Disaster Mitigation Meeting
January 29, 2010 at 4:20 p.m. Central

Those present are listed in the following table.

John Buechler	The Polis Center
Laura Danielson	The Polis Center
Stephen Z. Kil	Town Manager, St. John

Laura Danielson described the plan and what it is to accomplish and how it will be formed. She provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary. Laura Danielson presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards facing St. John.

Stephen Kil described St. John's strategies as follows.

Hazards Addressed	Mitigation Item	Comments
Flood	Assess and upgrade drainage system along major roadways	Watts subdivision; lateral drain located under U.S. 41; downstream to Schererville; 85th Ave @ Parrish
Flood	Clear trees and debris from rivers, creeks, and/or ditches	St. John Ditch @ Hart St.; Blaine St. & 101st North; Bull Run @ 109th st.
Flood	Conduct a sewer upgrade to separate stormwater and sanitary sewer lines	DONE
Flood	Elevate roads that frequently flood	109th @ Bull Run; 85th Ave @ Parrish
Flood	Replace existing or install new culverts	9300 & Columbia; St. John Ditch @ Hart St; Blaine St. & 101st North; 85th Ave @ Parrish
Winter Storm	Bury new power lines	DONE – ordinance requires new subdivisions to do
Winter Storm	Purchase new snow removal equipment and pre-treatment supplies	Need 2 snow plows
Hazmat	Develop an evacuation plan for hazardous materials spills	* working on an emergency response plan
Hazmat	Implement Reverse 911	DONE
Hazmat	Implement NOAA's radio system for hazmat spill alerts	Need NOAA radios
Hazmat	Purchase equipment for containing spills, e.g. absorbent materials	Yes
Earthquake	Conduct a study to evaluate bridge structures	
Earthquake	Public education: trailers, brochures at public events; etc.	Need
Earthquake	Install inertial valves at critical facilities	Need
Multiple Hazards	Procure back-up generators or transfer switches for critical facilities	Need at lift stations, well sites, and water treatment plant (H)
Multiple Hazards	Develop a program to distribute weather radios to all critical facilities	Need
Multiple Hazards	Create a database for identification of special needs population	Need
Multiple Hazards	Identify a warming center	Need
Multiple Hazards	Upgrade existing and install new warning sirens	Need one hazmat siren

Meeting adjourned 5:00 p.m.

Laura Danielson/Polis

Griffith, IN Pre-Disaster Mitigation Meeting
February 16, 2010 at 4:00 p.m. Central

Those present are listed in the following table.

Dave Coats	The Polis Center
Melissa Gona	The Polis Center
George Jerome	Town of Griffith

Dave Coats described the plan and what it is to accomplish and how it will be formed. He provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary. Melissa Gona presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards facing Griffith.

George Jerome described Griffith's strategies as follows.

- Assess and upgrade drainage system along major roadways specifically along N. Broad St from 45th to Ridge Rd. and along W Main St. from Elgin to Kennedy (this range extends past Griffith's boundaries).
- Ongoing program to clear trees and debris from rivers, creeks, and/or ditches; federal project in progress for Cady Marsh Ditch
- Conduct a sewer upgrade to separate stormwater and sanitary sewer lines; many home sump pumps are connected to sanitary sewer lines
- Need ordinance to bury new power lines
- Griffith has an existing tree trimming plan for parks. The power company handles all other areas.
- A commodity flow study would be needed if it was not already completed as part of the recent agreement with CN railroad.
- Development of a hazmat evacuation plan is currently in progress.
- Install inertial valves at critical facilities
- Griffith is in the process of installing natural gas generators at all fire stations.
- In the process of creating a new emergency handout that will be mailed to all addresses.
- Weather radios have been distributed to all schools and the police dispatch center.
- Create a database for identification of special needs population and institute a plan for rescue and recovery
- Need to harden all 3 fire stations and police stations
- Warning siren upgrades are in progress, including battery backup systems
- Griffith schools have been identified as shelters with staff plans that include Red Cross, church groups, school administrators and local volunteers.
- Griffith added a Call1 system (reverse 911) after the recent tornado.

Meeting adjourned 5:00 p.m.

Laura Danielson/Polis

Schererville, IN Pre-Disaster Mitigation Meeting
February 26, 2010 at 9:00 a.m. Central

Those present are listed in the following table.

John Buechler	The Polis Center
Melissa Gona	The Polis Center
Joe Kruzan	Schererville FD
Jeff Huet	Schererville PW
Jim Gorman	Schererville WWTP
Daniel Smith	Schererville Police
Larry Mysliwiec	Schererville Police
Bob Volkmann	Schererville Town Manager

John Buechler described the plan and what it is to accomplish and how it will be formed. He provided an overview of the Disaster Mitigation Act of 2000, explained the process of at least 6 meetings and the work that will be necessary. Melissa Gona presented a prepared list of disasters and mitigation activities for those disasters. She asked for prioritization of disasters and hazards facing Griffith.

The team described Schererville's strategies as follows.

- Address localized flooding at Fountain Park
- Bury new power lines
- Upgrade existing and install new warning sirens
- Complete a watershed study
- Purchase new snow removal equipment and pre-treatment equipment and supplies
- Replace sewer truck
- Institute a buy-out plan for properties along Turkey Creek, Kennedy Ave, Summer St, and Starlight Dr.
- Harden critical facilities, especially fire stations and schools; currently, only dispatch is hardened
- Procure generators for fire stations and lift stations
- Establish public outreach programs to educate residents on the hazards affecting the Town
- Assess and upgrade drainage systems along Kennedy Ave and Eagle Ridge
- Repair damaged dike located off Rohrman Rd.
- Retrofit bridge at railroad intersection (U.S. 41 and U.S. 30) to improve drainage issues
- Conduct a commodity flow study
- Develop an alternative communication center as backup
- Update evacuation plan for hazardous materials spills
- Implement NOAA's radio system for hazmat spill alerts
- Distribute weather radios to all critical facilities
- Develop a database of special needs populations

Meeting adjourned 10:00 a.m.

Laura Danielson/Polis

Lake County Pre-Disaster Mitigation Meeting
PUBLIC MEETING #1
March 16, 2010 – 2:00PM Calumet Township Multi-Purpose Center
Meeting Minutes

The public meeting for the Lake County Pre-Disaster Mitigation (PDM) Committee was held on March 16, 2010, at the Calumet Township Multi-Purpose Center, 1900 W. 41st Avenue, Gary, IN. Those present are listed in the following table.

Name	Organization/Jurisdiction
Dave Coats	The Polis Center
Laura Danielson	The Polis Center
Jody Melton	NIRPC
Joe Stahura	City of Whiting
Mike Frank	Hobart EMA
Rick Eberly	Town of Dyer
Jodi Richmond	LCHS/EMA
Herbie Cruz	East Chicago EMA
Dave Diehl	East Chicago FD
Peter Baranyai	E.C.S.D. WWTP
Joe Kruzan	Schererville FD
Joe Leavy	Gary EMA
James Brannon	Gary EMA
James B. Meyer	Lake Station
Cele Morris	Indiana University NW
Dave Pell	Munster EMA
James Knesek	Munster FD
Bill Timmer	Highland FD
Bill Cook	Hammond FD
Shirley Stanford	City of Gary
Christopher Shannon	Cal Township Trustee
Gary Carter	Gary EMA
Alan McCoy	Cal Township EMS
Dan Gardner	Lake Co. Surveyors Office
Jeffrey Ward	Gary Fire Department

Dave Coats opened the meeting with a discussion of the draft plan for those in attendance explaining the process to date and the information gathering process for the draft document. Copies of the draft plan were presented to those in attendance for review.

Dave Coats and Laura Danielson then presented a PowerPoint overview of the critical information contained in the draft including a number of scenarios depicted in the plan utilizing the data collected from the planning committee in the second planning meeting.

Upon the conclusion of the presentation, The Polis Center opened the floor for further discussion and questions.

The group concluded that each jurisdiction would review the draft and submit revisions to Jodi Richmond by April 20, 2010. Jodi would be responsible for forwarding all changes to Polis. Once Polis makes the necessary edits, it will submit the Lake County plan to IDHS and FEMA for review.

The meeting adjourned at 3:30PM.

Laura Danielson, The Polis Center

Lake County Pre-Disaster Mitigation Meeting
PUBLIC MEETING #2
March 16, 2010 – 6:00PM Calumet Township Multi-Purpose Center
Meeting Minutes

The second public meeting for the Lake County Pre-Disaster Mitigation (PDM) Committee was held on March 16, 2010, at the Lake County Government Center Auditorium, 2293 N. Main Street, Crown Point, IN. Those present are listed in the following table.

Name	Organization/Jurisdiction
Dave Coats	The Polis Center
Laura Danielson	The Polis Center
Jody Melton	NIRPC
Gregory White	L.C. Surveyors Office
Dan Gossman	L.C. Surveyors Office
George Van Til	L.C. Surveyors Office
Matt Lake	CBBEL
Dan Niksch	City of Crown Point
Jason Dravet	Town of St. John
Roger Patz	Town of Cedar Lake
Elijah Cole	2900 W. 93rd Ave
Jennifer Payne	IDHS
Stephanie Stiener	Town of Winfield
Heidi Kendall	Town of Winfield
Ron Svetic	L.C. Fire Chief
John Pisowicz	Crown Point EMA
Christina Lazerus	Post-Tribune

Dave Coats opened the meeting with a discussion of the draft plan for those in attendance explaining the process to date and the information gathering process for the draft document. Copies of the draft plan were presented to those in attendance for review.

Dave Coats and Laura Danielson then presented a PowerPoint overview of the critical information contained in the draft including a number of scenarios depicted in the plan utilizing the data collected from the planning committee in the second planning meeting.

Upon the conclusion of the presentation, The Polis Center opened the floor for further discussion and questions.

The group concluded that each jurisdiction would review the draft and submit revisions to Jodi Richmond by April 20, 2010. Jodi would be responsible for forwarding all changes to Polis. Once Polis makes the necessary edits, it will submit the Lake County plan to IDHS and FEMA for review.

The meeting adjourned at 7:00PM.

Laura Danielson, The Polis Center

Appendix B – Articles published by Local Newspaper

Public Notice or Legal Notice #: 1609615

LEGAL NOTICE Hazard Mitigation Committee Seeks

LEGAL NOTICE Hazard Mitigation Committee Seeks Public Input Lake County officials have partnered with The Polis Center of Indiana University Purdue University-Indianapolis (IUPUI) to develop a Multi-Hazard Mitigation Plan (MHMP). The completed plan will ensure that Lake County is eligible for federal funding to implement mitigation measures that will minimize the effects of a disaster. Over the last several months, Lake County's mitigation planning committee and The Polis Center have met to discuss and prioritize Lake County's potential hazards including flooding, dam and levee failure, tornadoes, severe thunderstorms, earthquakes, hazardous materials spills, and winter storms. The Polis Center then used FEMA's unique modeling software to provide casualty and damage estimates relating to each hazard. The planning committee is interested in receiving public input on the MHMP. At the public meeting, The Polis Center will present the results of the plan and distribute draft copies to the public, who will have the opportunity to make suggestions during a Q&A session at the end of the meeting. Public meetings will be held on **March 16, 2010** at the following locations and times. Calumet Township Multi-Purpose Center @ 2:00 p.m. 1900 W. 41st Avenue, Gary Lake County Government Center Auditorium @ 6:00 p.m. 2293 N. Main Street, Crown Point For more information, contact Jodi Richmond at the Lake County EMA, 219-755-3549, or Jody Melton at NIRPC, 219-763-6060. 3/4,10 -

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Posting Date: 03/05/2010 State: Indiana
Category: Meeting County:
City:

Roads thaw, while motorists are left to remember the morning commute

WILLIAM DOLAN AND CHRIS KELLER
The Times | Posted: Thursday, February 19, 2009 12:00 am | No Comments Posted

Buy this photo CHRISTOPHER SMITH

Roads are quieter now Thursday evening after police and emergency personnel from around the region dealt with traffic accidents, slideoffs and long delays from icy roads this morning.

Illinois State Police dealt with five crashes before 3:30 p.m., but there were no active lane blockages at the time. An Indiana State Police dispatcher said the number of accident calls have thinned out at 3:30 p.m. since the amount of accidents this morning.

Griffith police Lt. Don McCarter said there were a couple of accidents in the town this morning, but there were no active incidents early Thursday afternoon. Cmdr. George Georgeff of the Highland Police Department said between the morning and 3:45 p.m., police dealt with eight accidents, which was "abnormally high because of weather" but none were "very serious." Some of the roads in the town were restricted because of ice, but those restrictions were removed in the afternoon. In LaPorte County, although roads were still snow covered in the afternoon, according to a police dispatcher, there weren't any major crashes resulting from the weather.

This afternoon, a spotter measured that 3.5 inches of snow fell overnight in Chesterton. About 10:30 a.m., 2 inches of snow fell in Cedar Lake Thursday morning.

The ice that left the region's streets glazed over Thursday morning, and left scores of motorists stranded on major highways, was the aftermath of a weather system that flash froze morning rains and dumped seven hours of snow.

Northbound Interstate 65 traffic remained slow from 61st Avenue to Interstate 80/94 due to heavy traffic and lingering ice, but much of the Region roadways had thawed out by late morning.

The thaw came after an early morning period when state police had suggested that motorists traveling into Northwest Indiana wait until road conditions improve, and icy conditions led authorities to close portions of I-65 and Interstate 94 near the Indiana Toll Road.

State police warned motorists that delays and lane restrictions remained along I-80/94 and the toll road.

Lake County Highway Department Superintendent Marcus Malczewski said county roads were open throughout the morning commute, but called conditions "treacherous."

"It (was) packed ice. We have had all 38 trucks out 6 p.m. Wednesday night. We have our materials down on the road," he said. "This is when you really need the salt and we've had it, but salt stops working below 16 degrees so you have to pump calcium chloride with it to make it work. Now that the sun is out, it could start breaking."

Lake County police responded to about 26 weather-related incidents, including disabled vehicles, traffic hazards, spin-out crashes and accidents, spokesman Michael Higgins said.

Porter County police said there were no significant traffic accidents Thursday morning, but there were a number of cars that had slid off area roads.

Icy conditions on Wednesday evening contributed to one traffic fatality, Indiana State Police said.

Twenty-six-year-old Jihan M. Abuokab lost control of her vehicle about 11:30 p.m. Wednesday while driving on I-65 near the DeMotte exit, according to a state police news release. Abuokab, a Palos Park resident, was taken to Jasper County Hospital in Rensselaer where she was pronounced dead of massive head injuries, the news release said.

Three passengers were also taken to Jasper County Hospital with minor injuries, and no one in the vehicle wore seat belts, according to the news release.

Road conditions also contributed to an accident that knocked out electricity to about 950 NIPSCO customers and the Gary-Chicago International Airport at 5:30 a.m. Thursday after a vehicle hit a utility pole on Industrial Highway.

Electric generators kicked on for the control tower and airport administrative building and aircraft could still land, according to Airport Director Chris Curry.

A Channel 7 News helicopter wanted to refuel at a private facility at the airport but had to be turned away, Curry said.

NIPSCO restored power to the airport at about 7:30 a.m., he said.

All but a handful of residential customers had power restored by 7:30 a.m. a NIPSCO spokesman said.

The Gary Jet Center, the airport's fixed-base operator for corporate and other aircraft, was without electricity for the duration of the outage, according to owner Wil Davis. However, refueling operations were able to continue because they are not dependent on electricity, he said.

The weather meant no school for Crown Point, Lake Central, Hanover Central and Tri-Creek students, and two hour delays for East Porter County School Corporation students. Westbound South Shore trains also were delayed Thursday morning after mechanical problems developed near the Beverly Shores station.

The Northern Indiana Commuter Transportation District added additional cars on later trains to provide extra capacity.

More snow is expected to move into the Region beginning Friday evening and could leave up to 6 inches of snow by the time it's over on Saturday.

And a flood warning continues for several spots along the Kankakee River, including near Shelby, Kouts and Dunn's Bridge in Porter County.

The National Weather Service expects river levels to remain high before slowly falling over the next several days.

As of 6:45 p.m. Thursday, the river was at 11.4 feet, up from 10.9 feet early this morning. Flood stage is 9 feet. The river level is expected to dip back toward 9 feet over the next seven days.

Times Staff Writers Keith Benman and Bowdeya Tweh contributed to this report.

Posted in Local on *Thursday, February 19, 2009 12:00 am Updated: 2:12 am.* | Tags: Weather

Storm causes wind damage, flooding in northern Indiana

The Associated Press

Strong winds damaged buildings and downed trees in northern Indiana overnight, and downpours from the storm left scattered flooding.

An unconfirmed tornado was reported late Wednesday near Argos, about 30 miles south of South Bend, according to the National Weather Service. In Schererville, trees were uprooted and fences broken. State police reported trees fell on both the Indiana Toll Road and Interstate 94 in Gary, blocking lanes on both interstates.

Part of the roof of an apartment building in East Chicago was torn off. A factory had roof damage and a Marshall County Sheriff's Department car was hit by debris from a gas station.

"I just saw the roof from the BP fly off," Officer Corey Morris said. "The BP sign came over and struck my car and my car started moving."

One woman was injured near Culver when her leg was pinned under a tree that fell on her porch. Police and paramedics were able to free her and she was taken to a hospital. Her condition was not known.

The storm front first swept through northwestern Indiana, with large hail reported in Lake and Porter counties. Wind knocked down trees and power lines as the storm moved southeast.

About 60,000 customers remained without power in northern Indiana by late morning Thursday, most in Lake County, according to the Northern Indiana Public Service Co. About 100,000 customers total had service interrupted for a time. He said crews expected to work through the weekend to restore power.

The weather service issued tornado warnings for much of the area between Logansport and Fort Wayne. Wind gusts of 50 mph to 60 mph were reported, with flash flooding in Valparaiso and Merrillville.

As the northern part of the state was dealing with severe weather, southern Indiana is sweltering under record high temperatures.

It hit 104 degrees in Evansville Wednesday, a record high for the date, which was set in 1896 at 100 degrees, according to the weather service. It was the hottest day since 1966.

Wednesday also marked the 13th consecutive day of temperatures 95 degrees or higher in the city and was the fourth day in August above 100 degrees.

"This is just a significant heat wave," said Wayne Hart, chief meteorologist for WEHT-News25. "I think we're going to break it, but it's not a guarantee."

Storms Cause Damage, Power Outages In Parts Of Indiana

Front Will Bring Cooler Air

A storm wave that moved across the state Friday evening caused power outages and prompted some damage reports in parts of western and northern Indiana.

Storms entered the state early Friday evening, and downed trees and power lines were reported in parts of Parke and Vermillion counties, according to the National Weather Service.

Many damage reports were made in northern Indiana, parts of which were still dealing with high water and destruction from storms a day earlier. In the Huntington area, more than a dozen houses were damaged by fallen trees during a storm Friday, according to the weather service.

Widespread power outages were reported in the Terre Haute, Marion and Fort Wayne areas from Friday's storms. The storms accompanied a frontal system that promises an end to the blazing heat that enveloped much of the state for the past couple of days.

High temperatures were expected in the mid-90s on Friday after reaching the upper 90s on Thursday. Indianapolis implemented its extreme heat plan as heat indices climbed above 100 degrees for a second straight day.
The same storm system was responsible for strong winds that caused damage and hundreds of thousands of power outages in the Chicago area on Thursday evening.

Northern Indiana Still Dealing With Flooding From Thursday Storms

Authorities moved patients from a northwestern Indiana hospital on Friday as water from a flooded creek began seeping into the building after storms hit the area the night before.

About 70 patients were being moved by ambulance from St. Margaret Mercy Hospital in Dyer to other hospitals in the Chicago area, hospital spokeswoman Maria Ramos said.

"The hospital is surrounded by water from the flooding," Ramos said. "It is up to our entry doors."

The Thursday night thunderstorm also caused widespread power outages and flooding that closed a 3-mile stretch of eastbound Interstate 80/94 in the Hammond area on Friday. Two westbound lanes of the highway also were closed as crews worked to pump out the water.

Police officers and firefighters were going door-to-door in Dyer, telling those in a neighborhood near the hospital to leave.

Ramos said Plum Creek, which runs behind the hospital in the town along the Indiana-Illinois state line, had overflowed and filled retention ponds on the hospital grounds.

Crews were setting up sandbags to keep floodwater at bay and working to pump the water away, Ramos said. Some areas of the hospital were operating on emergency power.

State police said it could be Saturday before all lanes of I-80/94 would be reopened. Some cities and towns also redirected traffic because of flooded streets.

State police reported two people died early Friday when the van in which they were riding hit a patch of high water on U.S. 30 in Porter County, went out of control and collided with a semitrailer. Those killed were Jirong Liu and Xiangyang Xu of Shanghai, China, both visiting scholars at Valparaiso University.

The storm that moved through Thursday night also knocked out power to more than 81,000 homes and businesses in a stretch concentrated from Hammond to Michigan City. Northern Indiana Public Service Co. reported some 16,000 outages remained Friday night.

The strong winds on Thursday knocked down the 38,800-square-foot hangar under construction at the Gary/Chicago International Airport. The hangar was left "a pile of metal," Gary Jet Center President Will Davis said.

"The wind pushed it down, a tremendous amount of wind," he said.

It was the second time in 10 days that the area was hit hard by storms.

On Aug. 15, hundreds of homes and businesses in Lake and Porter counties were damaged when the storm with hail and winds topping 70 mph hit the area.

May 15, 2007 11:19 pm US/Central

1 Dead After Severe Storm In Northwest Indiana

Powerful Rain And Winds Knock Down Trees And Light Poles

CBS 2 Northwest Indiana Bureau Chief Pamela Jones and the Associated Press contributed to this report.

MERRILLVILLE, Ind. (CBS) —

A powerful storm ripped this tree out of the ground on Tuesday, nearly knocking it into Dawn Krajci's home in Crown Point, Ind.

Some intense storms moved through the Chicago area Tuesday afternoon, including possible tornado sightings in the southwest suburbs and northwest Indiana.

As CBS 2 Northwest Indiana Bureau Chief Pamela Jones reports, the danger was over by Tuesday night, but the damage from the powerful winds is done. It was confirmed Tuesday evening that a tornado touched down in LaPorte, Ind.

You could see it in the leaning trees and hear it in the air. At around 2:30 Tuesday afternoon a storm packing high winds tore through northwest Indiana.

Witnesses say the storm ripped part of the roof off a preschool in Cedar Lake.

"Something hit the top of the building and it lifted the back of the roof up, and a lot of water came down in there and we went in there and checked it out," said head preschool teacher Jennifer Moes. And there's quite a bit of water damage."

She was supposed to be inside Grand Tots Day Care at the time, but she was at another school location, blocks away, where the storm seemed to tug at everything.

"The ceiling tiles were all blowing everywhere," Moes said. "And we were rushed down to the boiler room and we were stuck there all afternoon."

Just down the road the wind snapped utility poles and slung power lines onto the street.

"We had a massive storm come through," said Cedar Lake Fire Chief Todd Wilkening. "That's all we know of as of right now."

The grounds at St Elijah Serbian Church are normally pristine, but a snapped tree and a fallen light post were evidence that a powerful thunderstorm swept over the property.

The worst part of the storm pushed through northwest Indiana in just a few minutes. A CBS 2 news crew was there when the Krajci family from Crown Point found the storm had ripped a huge tree right out of the ground.

They'd just bought this house a few days ago, ironically as a fixer-upper to sell. The tree fell within inches of the home.

Homeowner Dawn Krajci said, "I can't believe it didn't hit the house the way it fell. It's incredible, it's just, I mean, we were lucky."

But in Portage, the driver of a pickup wasn't so lucky. He died when a falling tree crushed him – a sign of the danger storms like this carry.

That driver had license plates from outside the CBS 2 viewing area. Emergency officials say residents of northwest Indiana are lucky the destruction wasn't worse, and that's partly because people obeyed the tornado sirens warning them to take cover.

Damages from Indiana tornado hit $1 million

HOBART, Ind. (AP) — A day after a tornado touched down in northwestern Indiana, toppling trees and fences and stripping homes of gutters and roofing, residents began cleaning up Sunday from the surprise storm.

By Tasos Katopodis, AP
Workers clean up a damaged section of Kohl's Department Store at the Southlake Mall Saturday in Hobart, Ind., after a tornado whipped off part of a wall.

Two people were slightly injured in Saturday evening's storm, which caught most residents off guard and caused an estimated $1 million in damages during its seven minutes on the ground.

The twister touched down in eastern Lake County at a shopping district and dissipated several miles later north of U.S. 30 after charging through a portion of the city's Green Acres subdivision.

The worst damage was at Hobart's Kohl's Department Store, where the tornado whipped away one side of the building and collapsed an inside wall.

"Everything exploded out," said Dan Cieslak, who does janitorial work at Kohl's. "It was so fast. There was no warning."

In Hobart's Green Acres subdivision, Jason Janiszewski was celebrating his 25th birthday under rented tents with his parents and several friends when rain and darkening skies sent the partygoers into his garage.

Only moments later, the storm hit, Janiszewski said Sunday.

"We looked out and the wind was blowing this, then that way and then it got quiet and still," he said. "Then it hit and we were watching things flying up, trees flying around and everyone headed for the basement."

The storm stripped away some of his home's gutters and roofing, shattered windows and damaged his truck when it collapsed a party tent, sending the metal poles into the side of the vehicle.

Janiszewski, like many of his neighbors, spent much of Sunday waiting for his insurance assessor to arrive. He said the storm severely damaged the roof of his parents' nearby home.

Dorothy Hines, 82, said she had never seen a storm as fierce and dangerous as the tornado, which destroyed her garage.

"I was watching the news and, as I came through the dining room, I heard this terrible noise," said Hines, who has lived in her house for 59 years. "I said, 'Oh my God,' I don't have a garage anymore."

About 90 Northern Indiana Public Service Co. customers remained without power Sunday afternoon due to scattered storm-related causes such as fallen branches, said NIPSCO spokesman Chris Taelman.

The outages peaked at about 10 p.m. Saturday, when 2,400 customers throughout northern Indiana were without electricity. The outages remaining Sunday were isolated cases, mainly centered in the LaPorte County area, he said.

National Weather Service Meteorologist Christine Krause said the storm arose so quickly the National Weather Service had only two minutes to warn the public.

The tornado's intensity won't be known until the Weather Service completes its investigation today or Monday, she said.

The combination of a warm front and an upper level disturbance made conditions "just right" for a tornado, Krause said.

Northern Indiana Left Devastated By Floods

At Least 3 Dead In North Central, Northwest Part Of State

MERRILLVILLE, Ind. (CBS/Post-Tribune) —

Residents of Monticello, Indiana, are evacuated due to flooding.

Indiana Floods Turn Deadly As Rain Continues

(1/9/2008)

The May temperatures that came to the area this week had devastating and even deadly consequences, particularly in parts of Indiana.

As CBS 2's Kristyn Hartman reports, residents of north central and northwest Indiana are watching waters recede and cleaning up the damage. But earlier, at least three people, two of them children, drowned in the flooding.

Heavy rain has made for a very serious situation in Merrillville, Gary and other northwest Indiana municipalities, where some basements and even homes were left under feet of water.

The problems were even worse in the north central Indiana town of Monticello, where widespread evacuations have been necessary.

"The first person we got out was a guy in a wheelchair," said Monticello Fire Chief Shane Swaim, "and by the time we got to him, he was actually floating in the water."
Floodwaters proved deadly for a family 20 miles outside of Monticello. A mother was driving in a sport-utility vehicle with five children inside when the floodwaters made her car stall and then float away. She was able to get three of the children out of the car, but the 2- and 5-year-old children died. It's a situation that has officials urging a lot of people near here to move to higher ground.

Firefighters say six inches of water turned into at six least feet of it in just a couple of hours. But Northern Indiana Public Service Company (NIPSCO), the power company here, says it's operating properly and the gates are open, allowing more of the Tippecanoe River through, despite false rumors earlier. The problems instead have been caused by too much rain falling very quickly.

The road to their Monticello home and some 25 other streets closed due to high water after Monday night's storm.

Rescue teams took people by boat across the Tippecanoe River, which could not hold its banks. Dam gates opened to allow rushing water through following the storms.

Chopper 2's aerial shots of the area showed just what residents have been dealing with. White County, Ind., Emergency Management estimates that 150 families could not return to their homes Tuesday night.

"We saw the boats going by upside down, picnic tables, life rafts," said flood victim Joy Chaney. "We lost everything in our yard."

Some Monticello residents were reluctant to evacuate.

"We've seen a lot of distraught citizens watching their houses," said Monticello Mayor Jason Thompson. "They don't want to leave their houses."

White County Emergency Management officials say dams have been holding at the same volume since about midnight Tuesday night, so the water is no longer rising.

--Kristyn Hartman, CBS 2 News

Subdivision Floods Again in Merrillville

Farther northwest in Merrillville, water covered the streets, but homes were dry early Wednesday morning. But a day earlier, the Broadfield apartment subdivision flooded for the second time in less than six months.

Ann Cazangiu was trapped in her Broadfield home due to flooding in August, and in January, it happened all over again

Floodwater from Monday night's rain engulfed the cul de sac, sending papers floating out of recycling bins.

The town closed 93rd Avenue from Broadway to Mississippi all day so that workers could pump the water from Broadfield to a retention pond on the south side of 93rd.

But by midafternoon the water had risen over the sidewalks, Cazangiu said.

There were no reports of flooded homes, though.

"The last time it was worse,"she said, referring to August flooding. "We had to leave."

Lake County Surveyor George Van Til said the county loaned Merrillville pumps to remove the water.

The county is currently assisting the town in investigating the source of the flooding, Van Til said.

In Gary, Vicki Halstead woke up to water seeping into her basement on Tuesday morning and thought, "Oh, no, not again."

Heavy rains had wrecked the basement of the house at 3332 Connecticut St. in August, requiring the replacement of several appliances, and Halstead feared the situation would repeat itself.

Halstead called the Gary Sanitary District to clear the overflowing sewers, but to no avail.

"The only thing they keep saying is they'll send someone out here," Halstead said.

By Tuesday afternoon, 3 feet of water had built up in the basement. The house has two sump pumps, but they were no match for a devastating mix of melting snow and severe thunderstorms.

Halstead fears that she'll have to replace the washer, dryer, furnace and water heater.

--Diane Krieger Spival and Christin Nance Lazerus, Post-Tribune

Flooding Casket Sinks Spirits In Hobart

The family of Harold Upshaw Jr. witnessed a beautiful funeral service Monday morning for the loved one they called "Slim."

The preacher preached, the mourners mourned, and Bible scripture served as the perfect balm for the family's loss.

That is, until Upshaw's casket was finally lowered into the ground at Evergreen Memorial Cemetery in Hobart.

And it floated. Yes, floated.

Lingering rain, melted snow, and slow drainage issues caused that part of the cemetery to flood, and workers had to install pumps to help drain all the water. But it wasn't enough.

"I was forced to see my son's casket float in that water instead of being properly laid to rest," sighed his mother, Monwella Upshaw of Gary.

"That will now be our lasting image of his funeral," said his brother-in-law, Wallace Bryant.

Harold Upshaw Jr., a 1979 Gary West Side High School graduate and U.S. Army veteran, died on New Year's Day, the victim of a hit-and-run accident in Dallas, where he lived.

His family had his body flown home, and a local funeral home picked a cemetery plot as close as possible to his mother's preplanned plot. But no one planned on Upshaw's casket floating in his grave site.

"That just isn't right," Bryant said, breaking down to cry.

The cemetery's manager said she was "humbly sorry" for what happened, and there's no way for her to "bring back yesterday" for the Upshaw family.

--Jerry Davich, Post-Tribune

Little Calumet River Basin Development References

The Little Calumet River Basin Development Commission was created in 1980 by the Indiana General Assembly to serve as the required local sponsor for the Little Calumet River, Indiana Flood Control and Recreation Project. The federal project, which was authorized for construction in the 1986 Water Resources Development Act, is designed to provide structural flood protection up to the 200-year level along the main channel of the Little Calumet River from the Illinois State line to Martin Luther King Drive in Gary.

To accomplish this protection, the federal project is being constructed in eight geographic stages, totaling 29 construction contracts. To maximize participation of local contractors and minority/disadvantaged businesses, a 40 percent goal for contracting and labor participation was proposed by the development commission and adopted by the Corps of Engineers.

Project features include:

- Construction of over 9.7 miles of set-back levees in Gary and Griffith.
- Construction of 12.2 miles of levees and floodwalls in Hammond, Highland and Munster
- Installation of a flow diversion structure at the Hart Ditch confluence in Hammond/Munster
- Modification of four major highway bridges along the river corridor to permit better flow
- Creation of 16.8 miles of hiking/biking trails connecting recreational developments

Direct project benefits:

- Protect 3,500 acres of existing residential. commercial, industrial and transportation, uses from flooding
- Protect over 9,500 structures from flooding, of which 8,755 are residences
- Create a 2,000 acre river/recreation

Commission History

Preceding the development commission in the early planning and engineering studies of the river were a Governor's Study Committee in 1970 and the Little Calumet River Basin Commission – a planning group made up of representatives of the communities/counties within the river drainage basin and the Indiana Department of Natural Resources (1971-1983).

Development Commission Board

- *Chairman - Dan Dernulc, Governor's Appt.*
- *Vice-chairman - William Baker - Governor's Appt.*
- *Treasurer - R. Kent Gurley - Lake County*

Commissioners' Appt.

- *Secretary - Mark Gordish - Mayor of Hammond Appt*
- *Arlene Colvin - Mayor of Gary Appt.*
- *Ron McAhron - IDNR Appt.*
- *William Biller - Governor's Appt*
- *Vacancy - Governor's Appt.*
- *John Mroczkowski - Governor's Appt.*
- *Vacancy - Governor's Appt.*
- *Vacancy - Governor's Appt.*

Development Commission Staff

- *Vacancy, Executive Director*
- *Louis Casale, Commission Attorney*
- *Sandy Mordus, Business Operations Coordinator*
- *James Pokrajac, Agent, Land Management/ Engineering*
- *Judith Vamos, Land Acquisition Agent*
- *Lorraine Kray – Crediting Technician*
- *Northwestern Indiana Regional Planning Commission – Administrative Services Contract*

corridor system
- Project major public/state investments such as Indiana University Northwest Campus and I-80/94 (Borman Expressway) from costly flooding damages
- Bring over $65 million in federal construction/ improvement contracts to northwest Indiana
- Allow over 1,500 acres of presently marginal land to be reclaimed for economic development/ redevelopment uses along the urbanized Borman corridor

Last updated 20 January 2009

NON-FEDERAL PROJECT CONTRIBUTIONS STATE, COUNTY, TOWNSHIP, MUNICIPAL, LOCAL SANITARY DISTRICTS, PRIVATE DONATIONS

BACKGROUND AND PROJECT COST SHARING AGREEMENT

The Little Calumet River project is a Federally-authorized local flood control and recreation project. Extensive Federal studies were done leading to the inclusion of the project in the 1986 Water Resources Development Act. The actual plan for the improvements was developed by the U. S. Army Corps of Engineers in conjunction with the state of Indiana Department of Natural Resources and the local communities, at that time presented by the Little Calumet River Basin Commission. The 1986 Water Resources Development Act specified, to effect the Federal funding and construction, there must be in place a Local Cooperation Agreement between the Federal government and a responsible and local non-federal single entity. In 1980, the LCRBDC was created to act for the state of Indiana and the local communities in this manner. The Local Cooperation Agreement spedfied that the Federal government will participate at 75% of the total project cost with the remaining 25% being the responsibility of the non-federal interest. The Federal 75% funding is spent on: (1) project design; (2) project engineering; (3) plans and specifications; (4) Federal bidding procedures; (5) construction of the flood control improvements; and (6) management and oversight of the contractors. The non-federal 25% funding is spent on: (1) acquiring the necessary public easements to allow construction and for the purpose of continued operation and maintenance after construction; (2) relocation as specified in the engineering plan of any highway bridges; (3) the relocation of project identified utilities at no cost to the Federal government; and (4) a cost share of each contract equal to 5-7% of the total contract cost. The total cost calculations are finalized in an audit at the end of project with the non-federal interest being required to meet the 25% obligation.

Following are the funding and donation contributions of the non-federal entities that the LCRBDC has coordinated toward meeting the Federal schedule and the required 25% cost share.

STATE AGENCY CONTRIBUTIONS

- Indiana General Assembly - The principal financial contribution of the state of Indiana has been the funding of the majority of the non-federal project share (25%) by the Indiana General Assembly for claim draw-down to the LCRBDC. The appropriations and allocations to the LCRBDC began in the 1981/83 biennium and General Assembly funding has been provided every biennium, including the most-recently completed one. The amount funded to the LCRBDC currently is $29,500,000.

- Indiana Department of Natural Resources - In addition to the Indiana General Assembly funding to the LCRBDC, the Indiana General Assembly began funding the project as early as 1975/77 biennium at the request of then area State Senator and

Budget Committee member Adam Benjamin. These appropriations between 1975 and 1981 went to the Indiana Department of Natural Resources (IDNR) for an initial state site master plan and funding for the initial real estate acquisition identified as needed for the project. Total dollars appropriated to the IDNR between 1975 and 1981 was $5,300,000. Once the LCRBDC was created in 1981, the IDNR donated the 962 acres acquired for the project to the LCRBDC for use as non federal contribution.

• Indiana Department of Transportation (INDOT) – One of the major items of non-Federal cooperation in the Local Cooperation Agreement with the U. S. Army Corps of Engineers is the necessary re-construction consistent with the Army Corps plans and specifications of state highway bridges and crossings over the Little Calumet River. A total of five major INDOT river crossings and bridges were required and were constructed by INDOT on an accelerated schedule compatible with the Army Corps schedule. The five state projects are: Georgia Street/I-80/94; Broadway interchange/ bridge; Grant Street interchange/bridge; Cline Avenue interchange/ roadway extension and bridge; and Indianapolis Blvd. bridge re-construction and raising. An inter-agency team comprised of Corps of Engineers staff, LCRBDC staff, and INDOT staff is currently beginning the detailed "crediting of the value of these required improvements". INDOT has cooperated, not only with the accomplishment of these projects on schedule, but also has committed the use of Indiana bond proceeds from Crossroads 2000 as the primary funding source to maximize the State's eligible contribution for the non-Federal credit. This is extremely important because INDOT can and has used interstate highway funds (Federal) along the I-80/94 corridor which are not eligible for match with Corps of Engineers Federal dollars. (Current early estimates of the value of the INDOT improvements eligible for credit is put at $7-9 million).

• Indiana Economic Development Corporation (IEDC) – The IEDC, as part of negotiations for the Cabela's development commitment to the old Woodmar site in Hammond, provided significant "off-budget funding" in April 2006 for needed infrastructure for non-Federal project commitments to the segment (Stage V-2) required to get half of Hammond and all of Highland into Cabela's development site out of the floodplain at an earlier date. The commitments by the IEDC were in the amount of not-to-exceed $6 million and are shown on Chart 1 included after this summary. This $6 million commitment has enabled the LCRBDC to continue to meet the aggressive project completion schedule required by Congressman Visclosky.

LAKE COUNTRY NON-FEDERAL PROJECT COMMITMENTS

• Lake County Council/Drainage Board – In the early 1980's, over $250,000 of river improvement funds were allocated by the Lake County Council to make river flow improvements to the river compatible to the Federal project. The largest single project was the addition of twin 6' diameter culverts to the twin culverts already in place at the Conrail RR crossing of the river just east of Martin Luther King Drive in Gary. This construction doubled the capacity of the river flow at critical flood periods by 50%, yet restricted the down stream impacts to under the allowable limits and maintained wetland conditions in low flow periods. Total cost of that project was in the range of $165,000.

- Lake County Parks & Recreation Department (LCPD) – The LCPD has been an active partner with the LCRBDC in addressing the non-Federal responsibilities on this project. The LCPD has contributed in three separate ways:

(1) The LCPD provided the excavation site for several of the first levee segments from their Deep River Park. Big Maple Lake was created from approximately 1.3 million cubic yards of clay that was donated at no cost to the project. The benefits to the county park system was a graded-to-specification recreation lake and to the LCRBDC project the 1.3 million cubic yards of clay valued at a savings to the project of over $1,625,000 ($1.25 per cubic yard).

(2) LCPD also donated small lots and larger parcels of land they had acquired over the years along the Little Calumet River. Approximately 85 acres in total was donated to the LCRBDC as needed project lands, and the estimated value of that land is approximately $200,000. The easement rental value of the Deep River borrow site was credited by the Army Corps at $104,000.

(3) The LCPD contributed over $100,000 of county funding for recreation improvements at the Lake Etta County Park, which is owned by the state of Indiana/ LCRBDC and operated by the LPPD. In addition, the LCPD permitted use of their land and water grant eligibility for three separate Lake Etta grants at a 50/50 matching ratio to obtain Federal funds. Significant public recreation facilities, lake improvements, and public picnic and community use buildings were built as part of these improvements. The LCRBDC was not eligible to apply directly for land and water conservation funds.

The LCPD also financed an early recreation feasibility study for the Hammond Carlson/ Oxbow Park site which subsequently resulted in the development of the site by the LCRBDC and the city of Hammond.

- Lake County Highway Department (LCHD) – The LCHD has cooperated on the county bridge crossings over the Little Calumet River in regards to bridge raisings, river flow improvements, and traffic flow and safety improvements compatible with the flood control project. County bridge improvements were made at: Calhoun Street, Burr Street, Colfax Street, Kennedy Avenue, and Hohman Avenue. Value of these improvements eligible for project crediting is in the preliminary estimation stage and will be completed following the model developed by the inter-agency team for the State Highway bridge improvements. It is hoped eligible credits of over $1 million can be documented for project match.

- Lake County Commissioners (LCC) – The LCC donated lands identified as needed for project use that they controlled to the LCRBDC in the amount of approximately 168 acres at a total estimated value of $353,000.

- Lake County Convention and Visitors Bureau donated the necessary easement along the river on the southern portion of their property for the project levee construction and trail system valued at $3,750.

NORTH TOWNSHIP TRUSTEE'S OFFICE

• The North Township Trustee's Office donated permanent levee and temporary work area easements valued and credited at $423,000, necessary for the project construction in Wicker Park.
The North Township Trustee's Office has offered additional free clay material available at the Wicker Park site that could provide levee construction material and aide the golf course upgrade.

MUNICIPAL GOVERNMENTS

• City of Gary – The city of Gary has contributed $1.4 million of city funds to fund the "betterment portion" of the Burr Street levee in the east reach.
The city of Gary has also demolished three structures on Commission-owned property in the east reach. The value of these demolitions, if they had been contracted for by the LCRBDC, would have total approximately $18,000.
The city of Gary has also donated $50,000 as a contribution to one of the land and water conservation grants in the Lake Etta park site.
The Gary Sanitary District has contributed a total of $326,139 toward the construction of the Burr Street Gary betterment levee which is in the critical path to providing flood protection to the east reach.

• Town of Griffith - The town of Griffith is cooperating with the LCRBDC, the Army Corps of Engineers and the IN Dept. of Natural Resources in pursuing incrementally the re-construction of what is known as the Griffith "betterment" levee located from the EJ&E RR on the east to Cline Avenue on the west – approximately 2500' of levee that will provide the connection between the Highland portion of the levee and the Burr Street "betterment" levee east of the EJ&E. To date, the town of Griffith has built an elevated access way to their north pump station along the levee area in 1996 approximately 1200' at a cost of approximately $400,000. This segment will form the core of the levee to be built up to Federal standards.
Additionally, the town of Griffith extended that levee approximately 700' in 1978 at a cost of about $300,000.
Additionally, a private developer Richard Kortenhoven spent $100,000 to build to Federal standards a levee to tie into the EJ&E RR, a length of approximately the remaining 600' in 2001. These commitments will form the basis for certifying any additional improvements to bring this total 2500' segment up to Federal standards.
Donation of easement for drainage ditch in V-1 for .11acres at a total estimated savings of $300.

• City of Hammond – The city of Hammond and its Redevelopment Commission, Park & Recreation Department, and Sanitary District has fully cooperated by donating all municipally owned properties for needed easements. The civil city donations to the project total 15 acres valued at $30,938 in Stages V and VI.
Additional needed easements in Stage VII are currently being submitted before the various Boards in Hammond for donation totaling 10 acres valued at $19,310.

The city of Hammond also contributed $300,000 to complete the recreation features at the Carlson/Oxbow Park in conjunction with the Federal Little Calumet River project.
The Hammond Parks & Recreation Department has donated easements for the flood control project construction valued at $32,500 in Stage V and VI.
The Hammond Sanitary District has made significant contributions to the project in the form of real estate easements valued at $365,319; five pump station easements at a total value of $45,000; and the Sanitary District has constructed up front of the Federal construction west of Hohman Avenue, a Federally-approved levee and a major pump station at a total value (and credited by the Army Corps) of $1,667,200.

- Town of Highland – The town of Highland cooperated fully with the LCRBDC by donating 53 acres of publicly owned easements valued at $134,024 in Stages V Phases 1 and 2 and Stage VI.
The Highland Parks Department also donated 41 acres of easements valued at $104,000.
The town of Highland donated an easement for the Wicker Park Manor levee construction valued at approximately $12,000.
The town of Highland also donated easements for two pump station re-habilitations for a total cost savings of approximately $18,000.

- Town of Munster - For the upcoming segment known as Stage VII (Northcote to Columbia, south of the river), the town of Munster has committed to several items: (1) they are committed to donating needed levee easements at a value of $19,500; (2) they have authorized sewer infrastructure funds within the town budget to finance the cost of the acquisition of easements needed from private landowners along the river in Munster up to $302,000 (about 33 parcels); and (3) they have committed to hire a landscaping architectural firm to plan appropriate additional plantings for the public and private landowners to be specifically identified after the Army Corps plan is reviewed. Munster has committed to funding additional landscaping.

PRIVATE CONTRIBUTIONS AND DONATIONS

- NIPSCO – NIPSCO has donated easements at I-65 & 80/94, approximately 57 acres, valued at $103,000 as well as various easements along the corridor.

- WHITECO – WHITECO Development Corporation donated needed easements for levee construction and trail connection south of their three hotel complex on the old Optimist park site valued at $45,400.

- Cardinal Services (Tri State Bus terminal) – Cardinal Services donated the easement necessary for the construction of the sheet piling in Stage V-1 (when Wicker Park Manor flooded) instead of levee construction ($25,000)

- 25 local residents donated easements for the construction of the Wicker Park Manor levee construction in Highland after the Wicker Park Manor flood in the early 90's at a total value of approximately $25,000.

- Krosan Corporation – As part of an agreed-to engineering construction change by the Army Corps, Krosan Industries negotiated and settled on a lesser easement value of $25,000 which provided a potential savings of $357,000 to the LCRBDC.

- Cabela's – As part of the Cabela's/Hammond/State of Indiana/LCRBDC construction agreement, the Cabela's Corporation donated the easements needed for the Federal flood control project construction, maintenance, and flowage at a currently-valued amount of $3,319,000.

- Izaak Walton League – The local chapter of the Izaak Walton League donated properties, totaling about two acres, along the Little Calumet River they owned and were need for the flood protection project in the amount of $4,200.

August 15, 2007

Appendix C – Historical Hazards from NCDC

The following records were obtained from NCDC. The data was not verified, and the county and jurisdictions may have more updated information.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Lake	6/16/1960	Tornado	F1	0	0	3K	0	Not Available
Lake	4/23/1961	Hail	1.75 in.	0	0	0	0	Not Available
Lake	4/23/1961	Tornado	F3	0	0	25K	0	Not Available
Lake	6/22/1961	Tornado	F1	0	1	3K	0	Not Available
Lake	7/20/1962	Tornado	F2	0	0	25K	0	Not Available
Lake	7/20/1962	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/19/1964	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	11/12/1965	Tornado	F3	0	14	250K	0	Not Available
Lake	7/13/1966	Tornado	F2	0	0	25K	0	Not Available
Lake	6/4/1969	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	7/2/1970	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/16/1973	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/16/1973	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/16/1973	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/20/1974	Tornado	F3	0	5	250K	0	Not Available
Lake	6/20/1974	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/20/1974	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/14/1975	Tstm Wind	52 kts.	0	0	0	0	Not Available
Lake	6/14/1975	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/14/1975	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	3/4/1976	Tornado	F1	0	0	25K	0	Not Available
Lake	3/12/1976	Tornado	F2	0	0	3K	0	Not Available
Lake	3/12/1976	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/29/1976	Hail	1.75 in.	0	0	0	0	Not Available
Lake	6/29/1976	Hail	1.75 in.	0	0	0	0	Not Available
Lake	6/29/1976	Tornado	F0	0	0	3K	0	Not Available
Lake	7/15/1976	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	7/28/1976	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/8/1977	Tstm Wind	0 kts.	0	0	0	0	Not Available

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Lake	6/30/1977	Tornado	F2	0	1	2.5M	0	Not Available
Lake	6/30/1977	Tornado	F1	0	0	3K	0	Not Available
Lake	7/26/1978	Hail	1.00 in.	0	0	0	0	Not Available
Lake	7/9/1980	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	8/13/1980	Hail	1.75 in.	0	0	0	0	Not Available
Lake	8/13/1980	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	4/4/1981	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/8/1981	Tornado	F1	0	0	250K	0	Not Available
Lake	10/17/1981	Tornado	F1	0	0	25K	0	Not Available
Lake	4/3/1982	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	7/1/1983	Hail	2.00 in.	0	0	0	0	Not Available
Lake	7/1/1983	Hail	1.00 in.	0	0	0	0	Not Available
Lake	7/2/1983	Hail	0.75 in.	0	0	0	0	Not Available
Lake	7/17/1983	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	7/19/1983	Tstm Wind	55 kts.	0	0	0	0	Not Available
Lake	9/18/1983	Hail	0.75 in.	0	0	0	0	Not Available
Lake	8/5/1989	Tstm Wind	0 kts.	1	0	0	0	Not Available
Lake	3/27/1991	Hail	1.00 in.	0	0	0	0	Not Available
Lake	3/27/1991	Hail	0.75 in.	0	0	0	0	Not Available
Lake	3/27/1991	Hail	2.00 in.	0	0	0	0	Not Available
Lake	3/27/1991	Tstm Wind	56 kts.	0	0	0	0	Not Available
Lake	6/15/1991	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	7/7/1991	Hail	1.00 in.	0	0	0	0	Not Available
Lake	10/4/1991	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	3/6/1992	Hail	1.75 in.	0	0	0	0	Not Available
Lake	6/17/1992	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/17/1992	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	6/17/1992	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	7/2/1992	Tstm Wind	67 kts.	0	0	0	0	Not Available
Lake	7/2/1992	Tstm Wind	0 kts.	0	0	0	0	Not Available
Lake	7/2/1992	Tstm Wind	0 kts.	0	2	0	0	Not Available
Lake	7/8/1992	Hail	0.88 in.	0	0	0	0	Not Available

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Lake	1/1/1993	Flood	N/A	0	0	5.0M	0	Northern and,07 West Central IN Near major flooding developed during early January in northern Indiana. Extensive flooding occurred along the Kankakee, Elkhart, Tippecanoe, Yellow, both St. Joseph Rivers, and numerous lakes in northeast Indiana. At least 1000 residential units were affected by the flooding and over 20 evacuations resulted. The antecedent conditions for this flood were reminiscent of the late December 1990 and early January 1991 major flood. Cold weather arrived Christmas Eve and froze the ground. Snow cover of three to seven inches in northern Indiana melted quickly at the end of December, with rain of two to three inches occurring on the 30th and 31st. Significant flooding developed along northern Indiana rivers by January 1. Just as the rivers were beginning to fall, an additional 1.5 to 2.5 inches of rain fell across the entire state on the 3rd and 4th. This produced near major flooding in northern Indiana, and significant widespread flooding across central and western Indiana. The hardest hit counties were LaGrange, Steuben and Noble. Three to four hundred lake side homes were flooded in these counties because of rises in lake levels. Rome City in northern Noble County was especially hard hit. Damage caused by the flooded lakes was estimated at 2 million dollars. Nearly 150 homes at Sumava Resorts in northern Newton County were threatened by a weakened dike. Local officials sandbagged business districts in Plymouth and South Bend to prevent flood damage. Nine families were evacuated in Pulaski County because of flooding. The Tippecanoe River flooded nearly 200 homes in Carroll County. The Wabash River isolated about 60 families near Lodi in northern Parke County. The flooding affected numerous local and several state roads. Flooding along portions of the Kankakee and both St. Joseph Rivers was the highest since 1985. Flooding along other streams in northern Indiana and the Wabash River in western Indiana was the highest since the flood of December 1990-January 1991.
Lake	10/17/1993	Flood	N/A	0	0	500K	500K	Significant agricultural flooding occurred along the Kankakee River in northwest Indiana. The Iroquois River flooded several homes and city streets in Rensselaer and State Road 55 near Foresman.
Lake	6/13/1994	Urban Flood	N/A	0	0	0	0	Heavy rain in southern Lake County caused flooding of roads and farmland. At Hebron, 5.18 inches of rain was recorded.
Northern	5/9/1996	Flash Flood	N/A	0	0	0	0	None Reported
Lake	7/17/1996	Flash Flood	N/A	0	0	0	0	None Reported
Gary	8/13/2001	Rip Currents	N/A	1	0	0	0	A 19 year old man drowned after he was caught in a rip current while swimming along the Indiana Dunes National Lakeshore.
Lake	7/17/2003	Flash Flood	N/A	0	0	0	0	Thunderstorms formed over far northeast Illinois during the afternoon hours of July 17th and moved southeast into northwest Indiana during the evening hours. Trees, large tree limbs and power lines were blown down across many parts of Lake county, including St. John, Munster and Cedar Lake. Large tree limbs and power lines were blown down in St. John. A tree fell onto a house in Griffith causing significant damage to the building. A large tree also fell onto a house in Hobart causing massive damage to the second floor. An old lumber storage building was blown down near Dyer. Many other areas received large hail. Very heavy rain fell across Lake and Porter counties which caused flooding of some streets and low lying areas. A few roads were impassable because of high water. Rainfall amounts ranged between 1 and 2 inches but the rain fell in a very short period of time. 2.1 inches of rain was reported in just 15 minutes in Munster.
Lake	7/21/2003	Flash Flood	N/A	0	0	0	0	Thunderstorms moved across northwest Indiana producing hail and very heavy rain during the early morning hours of July 21st. Flooding was reported across all of Lake county. Houses were

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								flooded in Dyer, St. John, and Schererville. Route 41 and Route 30 was closed with 3 to 4 feet of standing water. A few businesses suffered roof damage from the heavy rains in Lake county. Flooding was also reported in Hebron in Porter county and in Wheatfield in Jasper county. Many roads were closed due to flooding. The ground across parts of northwest Indiana was already saturated from heavy rains on July 17th. Some storm total rainfall reports include 5.50 inches in Wheatfield, 3.64 inches in Lowell, 3.27 inches in Crown Point and 2.16 inches in Rensselaer. For the entire month of July, Wheatfield reported 17.15 inches, Lowell reported 13.16 inches, Crown Point reported 10.35 inches and Rensselaer reported 16.93 inches.
Lake	7/27/2003	Flash Flood	N/A	0	0	0	0	A line of thunderstorms moved across northwest Indiana during the afternoon hours of July 27th. Trees were blown down blocking roads near Demotte and a three foot diameter tree was blown down near the intersection of Indiana Highway 14 and county road 475E, about 6 miles east of Lewiston. Flooding also occurred across the northern portion of Lake county were 2 to 3 inches of rain fell. Four feet of water was reported on Merrillville, Sibley and Wilson Roads in Calumet City. Flooding was also reported along US Route 6 in Gary.
Merrillville	5/14/2004	Flash Flood	N/A	0	0	0	0	Street flooding occurred. A total of 1.64 inches of rain fell in less than one hour.
East Chicago	5/22/2004	Flash Flood	N/A	0	0	0	0	Several inches of water was on Indianapolis Road, north of I-80 in Hammond.
Highland	7/21/2004	Flash Flood	N/A	0	0	0	0	Street flooding up to the curbs with portions of 45th St. impassible. During the morning hours of July 21, a cold front extended from north central Wisconsin southwestward through northwestern Iowa. Ahead of the cold front, over the upper midwest, a very humid, unstable airmass had set up. By late morning, a small cluster of thunderstorms had developed over northwestern Illinois. These storms tracked into north cental Illinois, reaching their peak intensity over Ogle County, producing wind gusts up to 58 mph and causing isolated incidents of damage to trees. This storm cluster then weakened as it moved eastward. By early afternoon, more thunderstorms began to develop over northeastern Illinois. A small area of strong thunderstorms initially developed over the western Chicago suburbs and rapidly developed into a line of severe storms extending over the rest of the metro area. The line of storms rapidly moved eastward into northwestern Indiana. These storms left a path of wind damage over southern and southeastern portions of the Chicago metro area and into rural sections of northwestern Indiana. Strong wind gusts were also measured by coastal observing stations of Lake Michigan. Numerous incidents of wind damage were observed, with a considerable number of trees knocked down or large limbs torn from trees. Power poles were knocked down over many locations. While the primary threat was strong winds, there were also isolated reports of up to 1 inch diameter hail as well.
Lake	1/13/2005	Flood	N/A	0	0	0	0	During the late afternoon of January 12, a strong cold front crossed the Mississippi River into Illinois. The airmass ahead of the cold front in Illinois was unseasonably warm and humid. By early evening, a squall line formed ahead of the front and moved rapidly eastward through northern Illinois, producing strong wind gusts, small hail and heavy rains. As the system moved through eastern Illinois and into western Indiana, between 2 and 3 inches of rainfall was reported over east-central portions of Illinois and west-central portions of Indiana. This heavy rain combined with snow melt caused flooding. Numerous rural roads were reported to be covered with water across the northern half of Newton County, including US Highway 41. Sandbagging operations were required at Wildwood near Shelby. Indiana State Road 55 was inundated by flood waters at Shelby.
Lake	2/16/2005	Flood	N/A	0	0	0	0	Kankakee River Flooding Precipitation over Northern Illinois and Northwest Indiana was above normal during the month of February. Many stages on rivers were high at the beginning of

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								February from flooding in January. A combination of rain and snowmelt resulted in rises above flood stage at several locations. A storm system February 12 produced between « to 1 inch of rainfall over portions of the Kankakee River Basin. This rainfall combined with snowmelt resulted in flooding. The flooding was limited primarily to forest preserve lands, park areas, and agricultural lands immediately adjacent to the river. Location Flood Stage From To Crest Level Date Time Dunns Bridge 10 2/17 2/25 11.04 2/20 23:00 Kouts 11 2/16 2/25 12.06 2/20 23:00 Shelby 9 2/08 into March 11.19 2/22 19:00
Lake	6/4/2005	Flash Flood	N/A	0	0	0	0	Thunderstorms developed along an outflow boundary in eastern Illinois during the afternoon of June 4th. These thunderstorms moved east into northwest Indiana producing damaging winds, hail and very heavy rainfall. Flooding was reported in northern Lake County. Crown Point measured 2.24 inches of rain and Schererville measured 2.03 inches.
Schererville	7/27/2006	Flood	N/A	0	0	0	0	Four inches of water reported on Route 41, three quarters of a mile south of Route 30.
Lake	9/13/2006	Flash Flood	N/A	0	0	8.0M	0	Heavy rain fell across parts of northwest Lake County during the middle and late morning hours of September 13th, which caused major and significant flooding. Highland suffered some of the worse flooding with over 1,400 reports of flood damage and 14 homes condemned due to severe damage. At the height of the flooding, 90 percent of the streets in Highland were flooded. School buses were unable to take students home from school and one elementary school had to be evacuated by boat. Over 70 percent of the homes in Highland sustained some damage. Countless streets across northwest Indiana were flooded and impassible. Over 600 homes were damaged by flooding in East Chicago. Flood water was seen shooting out of storm drains and in a few cases, blew the manhole covers into the air. Numerous cars were stranded and floating in flood waters. Rainfall totals included 7.94 inches, 7.50 inches and 6.58 inches, all three in Highland; 6.56 inches in Schererville; 5.31 inches in Hammond; 4.06 inches in Munster and 3.53 inches in Crown Point.
East Chicago	9/13/2006	Flood	N/A	0	0	0	0	After flash flooding across northwest Lake County during the morning and afternoon hours of September 13th, flood waters slowly receded with some areas still flooded two days later on September 15th.
Lowell	4/25/2007	Flood	N/A	0	0	0K	0K	Several roads and intersections were closed due to flooding, including 159th Street between Cline Avenue and Parrish due to one foot of standing water, 169th between the Illinois state line and Whiteoak due to one foot of standing water and 169th between Whiteoak and Sheffield. Heavy rains fell across far northwest Indiana during the morning hours of April 25th. Lowell and Crown Point measured 2.15 inches of rainfall.
Munster	4/25/2007	Flood	N/A	0	0	0K	0K	Many low lying streets closed with up to 18 inches of standing water. Heavy rains fell across far northwest Indiana during the morning hours of April 25th. Lowell and Crown Point measured 2.15 inches of rainfall.
Hammond	7/26/2007	Flash Flood	N/A	0	0	500K	0K	Heavy rain caused flooding along Interstate 80/94. Two passing lanes were closed with several vehicles stalled in high water. Over 500 basements were flooded in Hammond. The Indiana Dunes measured 2.79 inches of rain.
Merrillville	8/15/2007	Flood	N/A	0	0	0K	0K	Five inches of water at 161st and Route 65.Powerful storms developed over southern Lake Michigan and moved south across northwest Indiana during the evening hours of August 15th.
St John	8/23/2007	Flash Flood	N/A	0	0	0K	0K	Streets closed due to flooding. Powerful, severe storms moved across northwest Indiana during the afternoon and evening hours of August 23rd.

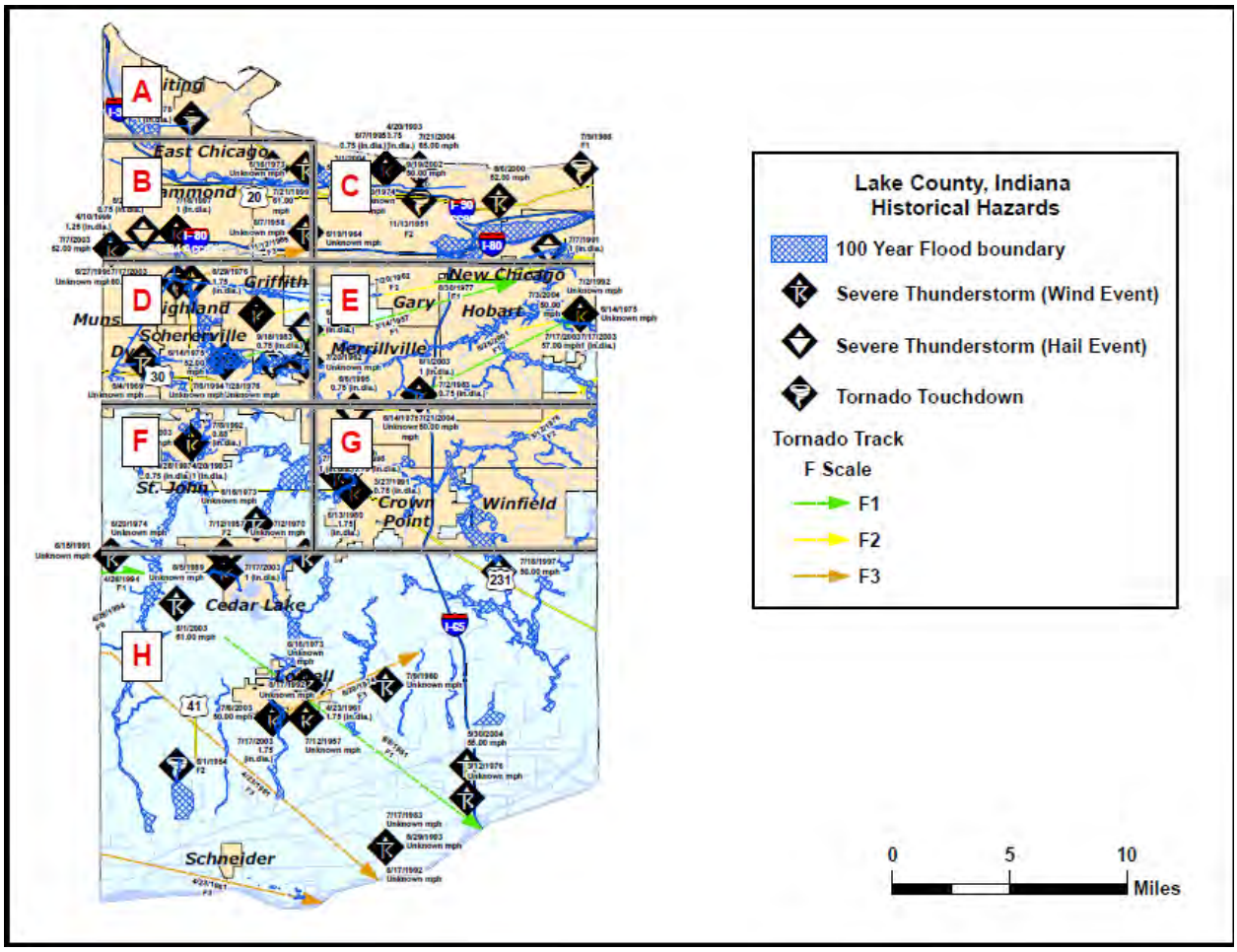
Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Hammond	8/24/2007	Flood	N/A	0	0	1.0M	0K	Significant flooding occurred across parts of northwest Indiana due to heavy rains that fell during the evening of August 23rd, on top of already saturated soil. Interstate 80/94 at Kennedy Avenue was flooded with all eastbound lanes closed and two westbound lanes closed. In Merrillville, the Broadfield subdivision was flooded, several feet deep after retention ponds overflowed. Across northern Lake County, hundreds of basements were flooded and numerous roads were closed due to flooding. Many locations received 3 to 5 inches of rain. Powerful, severe storms moved across northwest Indiana during the afternoon and evening hours of August 23rd.
Dyer	8/24/2007	Flood	N/A	0	0	4.0M	0K	St. Margaret Mercy Hospital in Dyer Indiana suffered significant flooding around noon on Friday, August 24th, about 20 hours after the heavy rains fell, when Hart Ditch overflowed it's banks. Sixty seven patients were evacuated from the healthcare center when it was apparent that floodwaters entering the building would submerge the Hospital???s emergency generators and cutoff the buildings power supply. The first floor suffered significant water damage. More than 150 homes near the creek also sustained some type of flood damage. US 30 at Plum Creek was closed due to flooding. Numerous cars were also damaged by flood waters. Powerful, severe storms moved across northwest Indiana during the afternoon and evening hours of August 23rd.
Schneider	1/8/2008	Flood	N/A	0	0	1.0M	0K	Many roads were closed due to flooding. Numerous basements were also flooded. Creeks and streams overflowed their banks. The Broadfield subdivision in Merrillville suffered significant flooding. Lowell measured 2.81 inches of rainfall. Heavy rain fell across northwest Indiana which caused significant flooding.
Lowell	6/5/2008	Heavy Rain	N/A	0	0	0K	0K	Four inches of storm total rainfall was measured in Lowell. Severe thunderstorms developed across parts of central Illinois and west central Indiana during the evening hours of June 4th and then moved northeast across northwest Indiana through the early morning hours of June 5th. Heavy rain and flash flooding was also reported.
Munster	9/13/2008	Flash Flood	N/A	0	0	500K	0K	Basement flooding was reported in Highland. Street flooding with 2 to 8 inches of water was reported on Glenwood, Laporte, Grand and Duluth Roads. A warm front moved across northwest Indiana during the morning hours of September 13th as the remnants of tropical storm Lowell moved across the region. These two features combined to produce heavy rain and flash flooding across many areas of northwest Indiana.
Artesian Wells	9/13/2008	Flash Flood	N/A	0	0	0K	0K	Fields were reported flooded from 109th to 132nd Street and creeks had overflowed their banks. A warm front moved across northwest Indiana during the morning hours of September 13th as the remnants of tropical storm Lowell moved across the region. These two features combined to produce heavy rain and flash flooding across many areas of northwest Indiana.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Illinoi	9/14/2008	Flash Flood	N/A	0	0	10.0M	0K	Flash flooding or significant flooding was reported across most of Lake County, including street closures due to flooding, basement flooding and creek, stream and river flooding. Interstate 80/94 was closed due to flooding between Cline and Calumet Avenues. Parts of Interstate 65 were closed due to flooding. In Lake Station, 300 to 400 homes were evacuated. In Merrillville, part of 73rd Avenue was washed away, where three cars were damaged. In Dyer, Hart Ditch overtopped its banks which flooded the Briar Ridge Subdivision. Flood waters were several feet deep in parts of Hobart after flood waters overflowed Lake George. Numerous vehicles were submerged or abandoned. The remnants of hurricane Ike moved across northwest Indiana during the morning hours of September 14th. This system produced a second round of very heavy rain after a period of heavy rain just 24 hours earlier across many of the same areas. Flash flooding was common as many creeks, streams and rivers swelled over their banks, some reaching all-time high record crests. Flooding was extensive and widespread with some of the worst flooding located near streams and rivers. Storm total rainfall amounts for September 13th and September 14th (combined) included, 11.02 inches near Valparaiso, 10.69 inches in Porter, 10.59 inches in Chesterton, 10.41 inches in Lakes of the Four Seasons, 9.37 inches in Merrillville, 9.04 inches in Crown Point, 8.95 inches near Hammond, 8.31 inches in Hebron, 7.61 inches in Whiting, 7.43 inches in De Motte, 6.86 inches in Munster, 6.16 inches near Wheatfield, 5.85 inches in Rensselaer and 5.85 inches in Kentland.
Munster	9/14/2008	Flood	N/A	0	0	15.0M	0K	Record flooding occurred along the Little Calumet River and its tributaries in northwest Indiana. A record crest of 17.32 feet was set at Munster on the 14th. Record flooding also occurred along Hart Ditch. Nearly 190 patients were evacuated from the Munster Med-Inn. Major flooding was reported in Munster with over a thousand homes evacuated as a levee along the Little Calumet River failed. Interstate 80/94 was closed in northwest Indiana when levees were topped by flood waters. Record flooding occurred along the Little Calumet River and its tributaries in northeast Illinois and northwest Indiana.
Illinoi	9/14/2008	Flood	N/A	0	0	0K	0K	Widespread flooding across parts of Lake County slowly receded through September 17th.The remnants of hurricane Ike moved across northwest Indiana during the morning hours of September 14th. This system produced a second round of very heavy rain after a period of heavy rain just 24 hours earlier across many of the same areas. Flash flooding was common as many creeks, streams and rivers swelled over their banks, some reaching all-time high record crests. Flooding was extensive and widespread with some of the worst flooding located near streams and rivers. Storm total rainfall amounts for September 13th and September 14th (combined) included, 11.02 inches near Valparaiso, 10.69 inches in Porter, 10.59 inches in Chesterton, 10.41 inches in Lakes of the Four Seasons, 9.37 inches in Merrillville, 9.04 inches in Crown Point, 8.95 inches near Hammond, 8.31 inches in Hebron, 7.61 inches in Whiting, 7.43 inches in De Motte, 6.86 inches in Munster, 6.16 inches near Wheatfield, 5.85 inches in Rensselaer and 5.85 inches in Kentland.
Shelby	9/15/2008	Flood	N/A	0	0	1.0M	0K	Extensive flooding closed roads and inundated large areas near the river. A levee break caused extensive flooding of homes in Sumava Resorts. Major flooding occurred along the Kankakee River over northwest Indiana and northeast Illinois. The most severe flooding occurred near Shelby, IN, where the second highest crest on record, 12.86 feet, occurred on the 18th.
Lake	10/26/2008	High Wind	53 kts.	0	0	0K	0K	A strong cold front moved across northwest Indiana during the afternoon hours of October 26th. A wind gust to 61 mph was measured at Gary Airport.
Lake	11/18/2008	Lake-effect Snow	N/A	0	0	0K	0K	Lake effect snow developed during the early morning hours of November 18th across northwest Indiana. The snow shifted east from Lake County into Porter County. Snowfall totals ranged

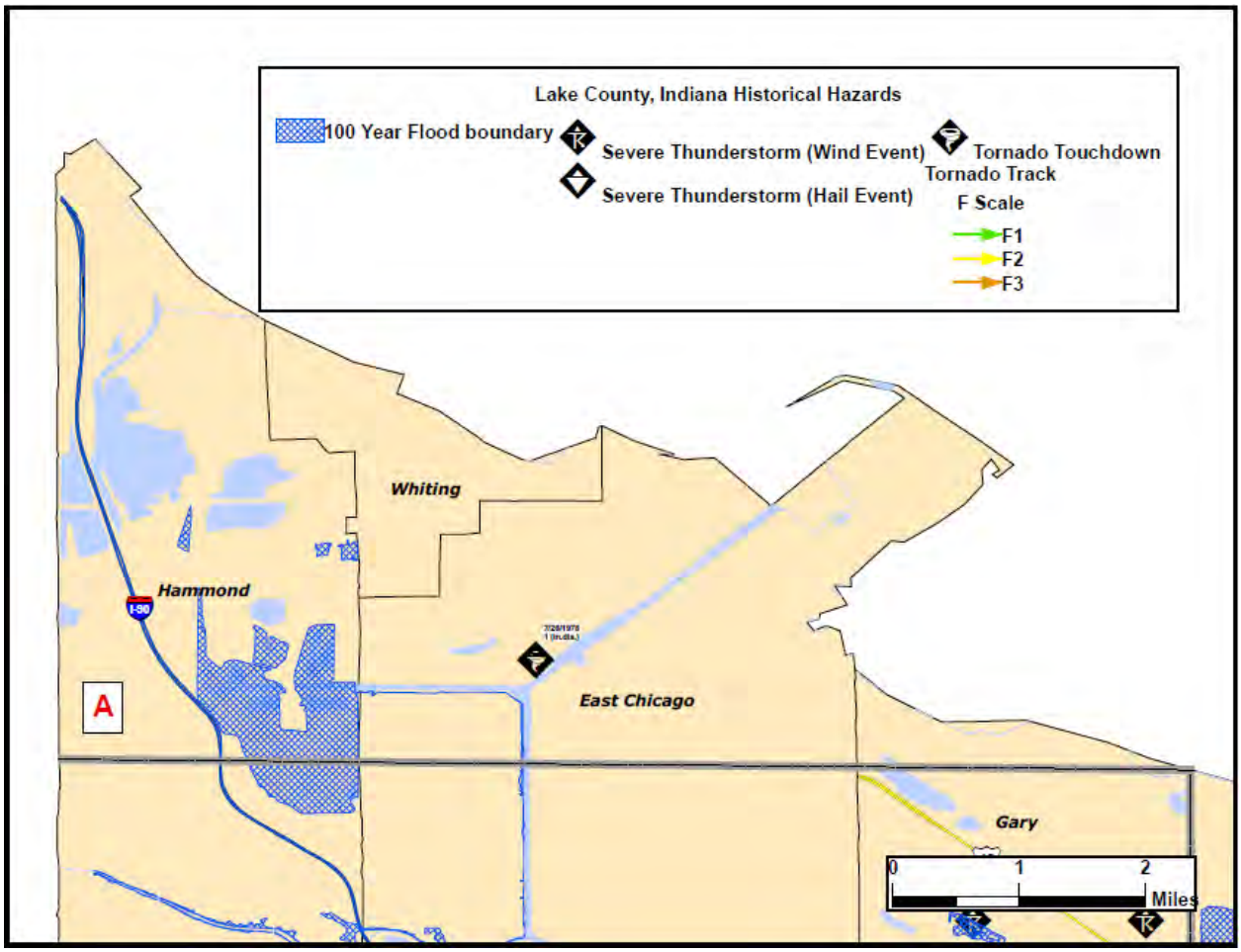
Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								from only a few inches across western Lake County to 6 to 8 inches along the Lake Porter County Line. Numerous locations in central Porter County received 8 to 10 inches of snow. The highest total reported was 10.0 inches 5 miles west southwest of Valparaiso. The snow was so heavy at times that visibilities were reported to be near zero.
Lake	12/18/2008	Winter Storm	N/A	0	0	0K	0K	A strong winter storm moved across northwest Indiana during the late evening hours of December 18th into the morning of December 19th. Ice accumulations of one quarter to one half inch were reported across much of Benton, Newton and Jasper Counties. This ice accumulation caused numerous tree limbs and power lines to break. Power outages were widespread and power wasn't restored for over one week in some locations. A combination of snow, sleet and freezing rain fell across Lake and Porter Counties where ice accumulations were around one quarter of an inch and sleet/snow accumulations ranged between one half and one inch. The snow, ice and sleet caused numerous vehicle accidents and spinouts.
Lake	12/21/2008	Extreme Cold/wind Chill	N/A	0	0	0K	0K	A combination of temperatures falling to 5 below zero and winds of 20 to 30 mph caused wind chill readings to drop to 35 below zero across parts of northwest Indiana during the morning hours of December 21st.
Lake	1/14/2009	Winter Storm	N/A	0	0	0K	0K	A small but potent winter storm moved from the plains across northwest Indiana on January 14th. Air temperatures were only 5 to 15 degrees above zero and snow/water ratios were very high, in some cases 40 to 1. Snow began falling during the morning of January 14th and continued into the evening of January 14th. Lake effect snow then continued into the night across Porter County. Stormtotal snowfall amounts included 7.4 inches near Merrillville, 7.0 inches in Highland, 7.0 inches in Valparaiso and 6.1 inches in Lake of the Four Seasons.
Lake	1/15/2009	Extreme Cold/wind Chill	N/A	0	0	0K	0K	Very cold temperatures combined with strong winds to create dangerously low wind chill values on January 15th which continued into the morning hours of January 16th. Low temperatures on the morning of January 15th dropped to 10 below to 15 below zero. Wind chill readings for most of January 15th ranged from 30 below to 40 below zero.
Lake	1/20/2009	Lake-effect Snow	N/A	0	0	0K	0K	Lake effect snow developed late in the evening on January 18th over Porter County and then shifted west across Lake County during the early morning hours of January 20th. The lake effect snow ended during the evening hours of January 20th. Storm total snowfall amounts included 15.0 inches in Burdick, 14.0 inches 2 miles east of Chesterton, 10.8 inches near Valparaiso, 8.0 inches in Whiting, 6.4 inches in Highland and 6.2 inches in Schererville.
Hammond	3/8/2009	Flood	N/A	0	0	0K	0K	High standing water was reported on both sides of Interstate 80/94 near Kennedy Avenue. Strong to severe thunderstorms moved across northwest Indiana during the morning and afternoon hours of March 8th. Heavy rain and flooding were also reported.

Appendix D – Historical Hazard Maps

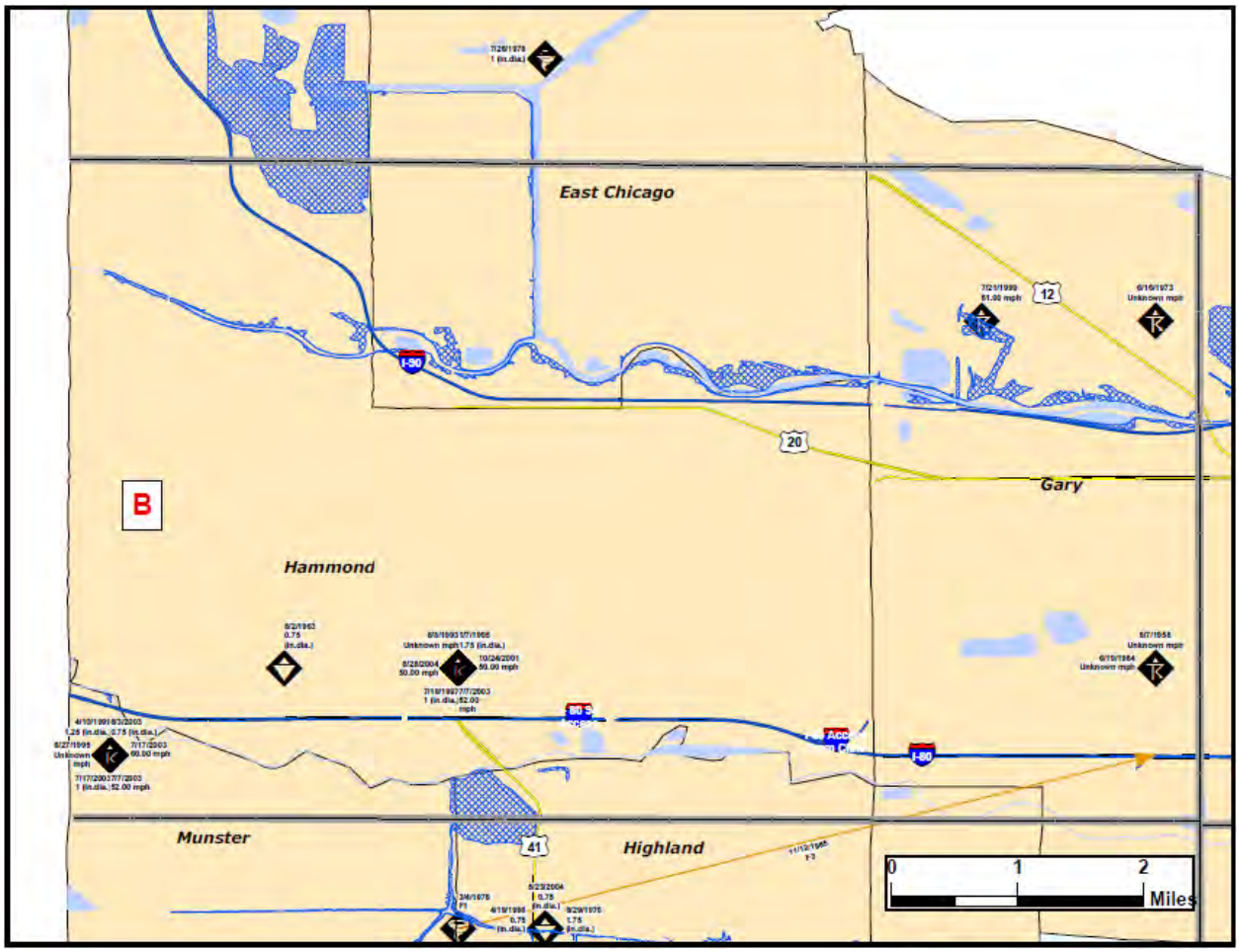
The following map shows historical natural hazard events for Lake County. Figures A through H on the following pages depict magnified views of the demarcated regions shown below.



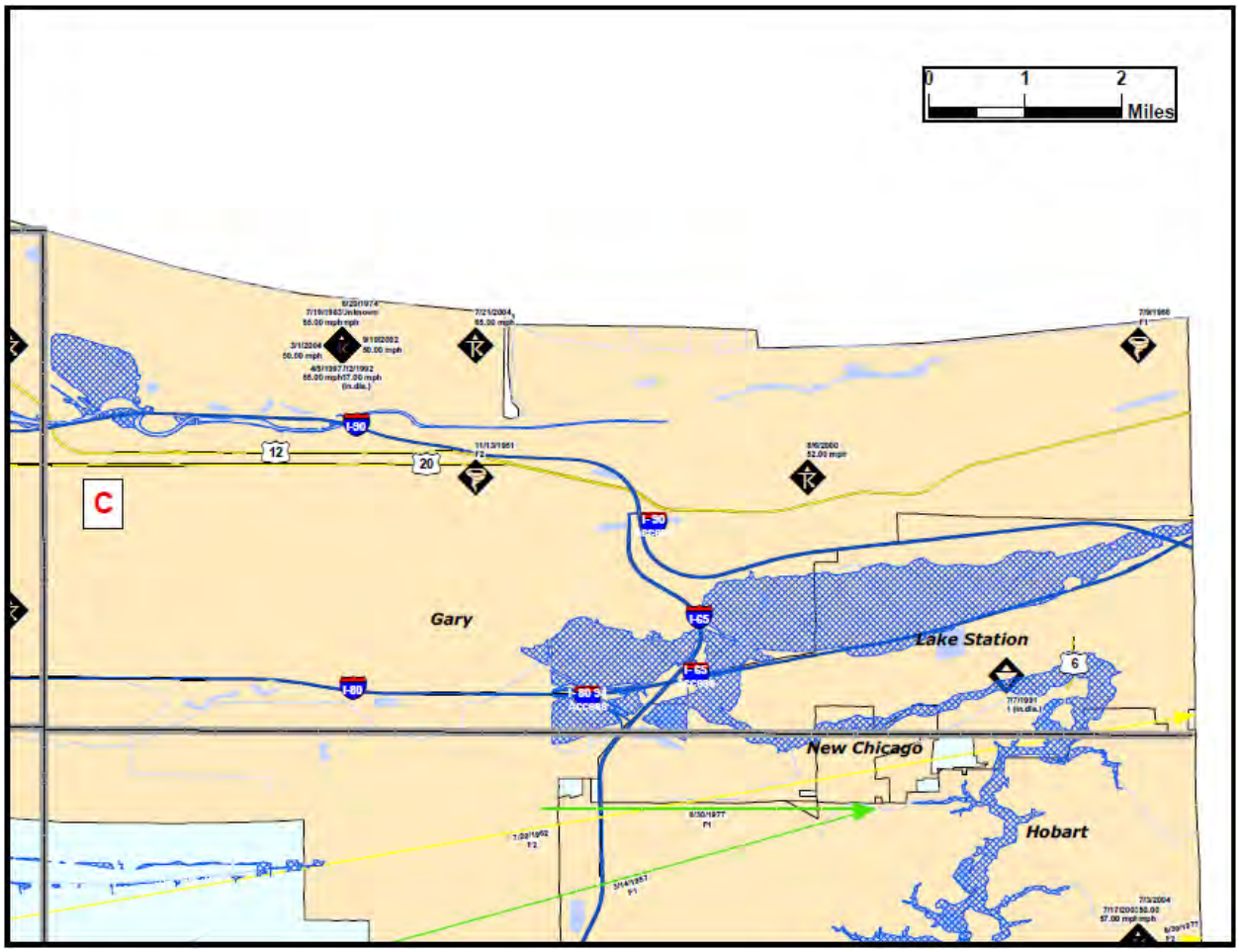
Region A


Lake County, Indiana Historical Hazards
100 Year Flood boundary
Severe Thunderstorm (Wind Event)
Tornado Touchdown
Tornado Track
Severe Thunderstorm (Hail Event)
F Scale
F1
F2
F3
Whiting
Hammond
I-90
East Chicago
A
Gary
0
1
2
Miles

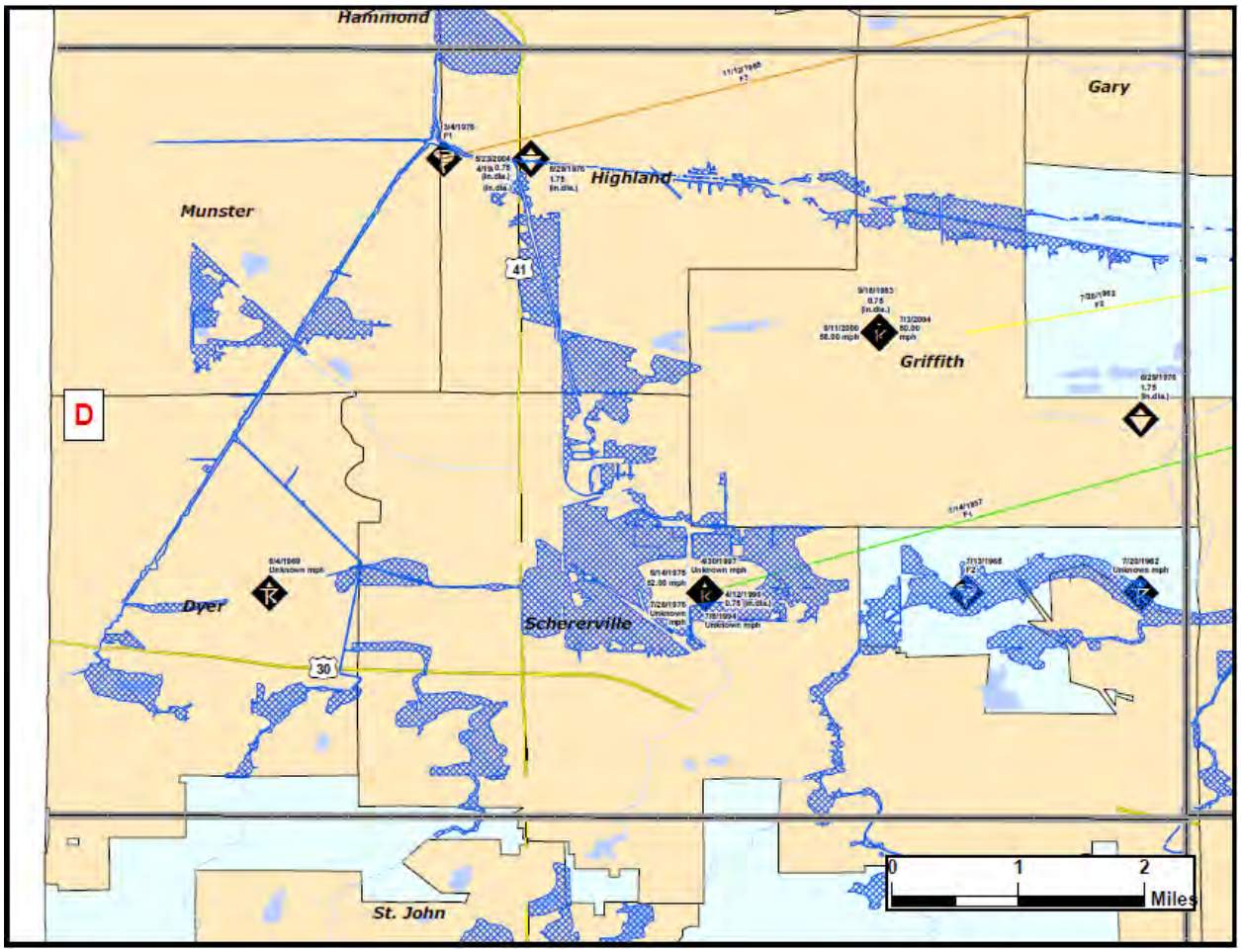
Region B


East Chicago
Gary
Hammond
Munster
Highland
B
12
20
41
I-90
I-80
I-65
0
1
2
Miles

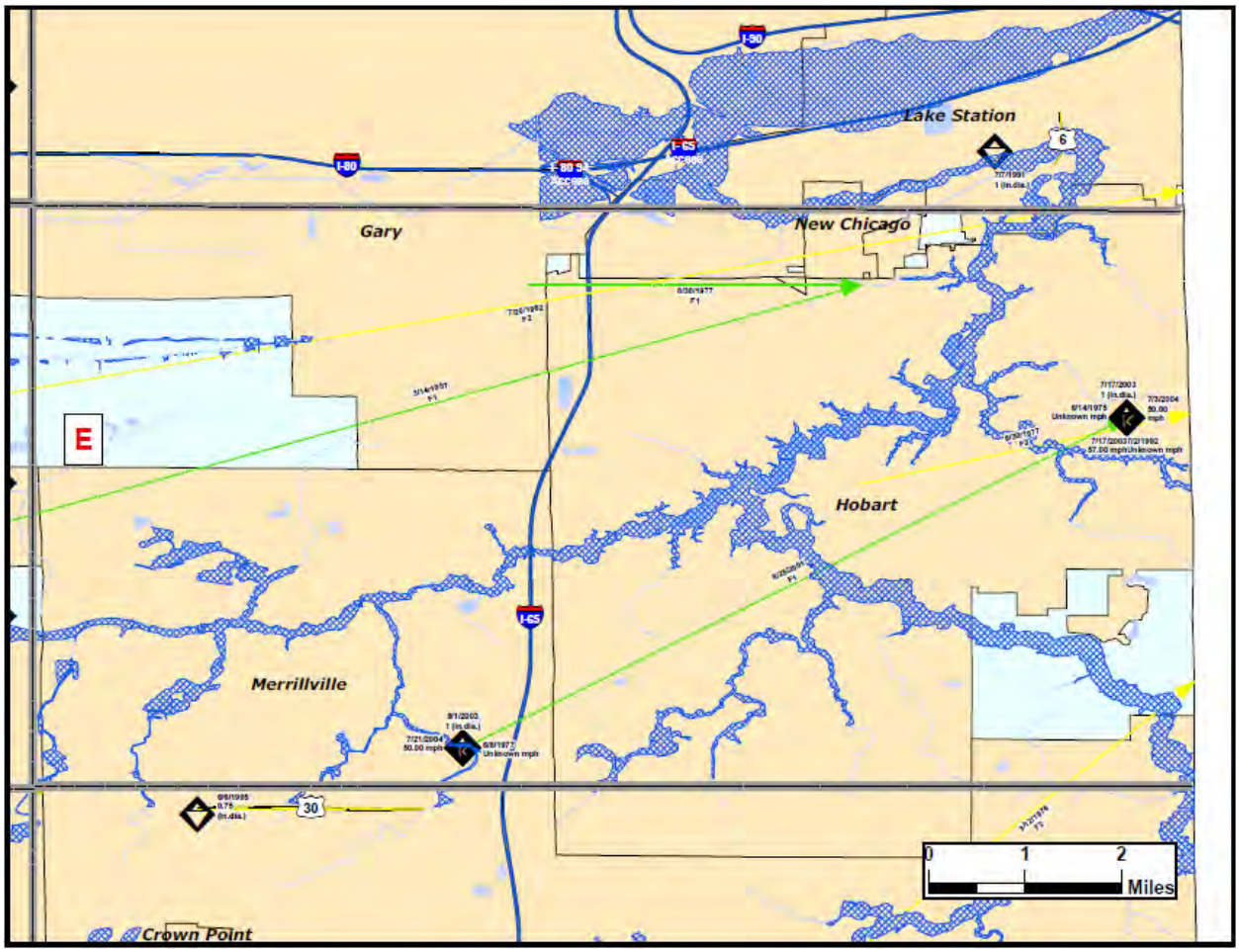
Region C


0
1
2
Miles
C
Gary
Lake Station
New Chicago
Hobart
I-90
I-65
I-80
12
20
6

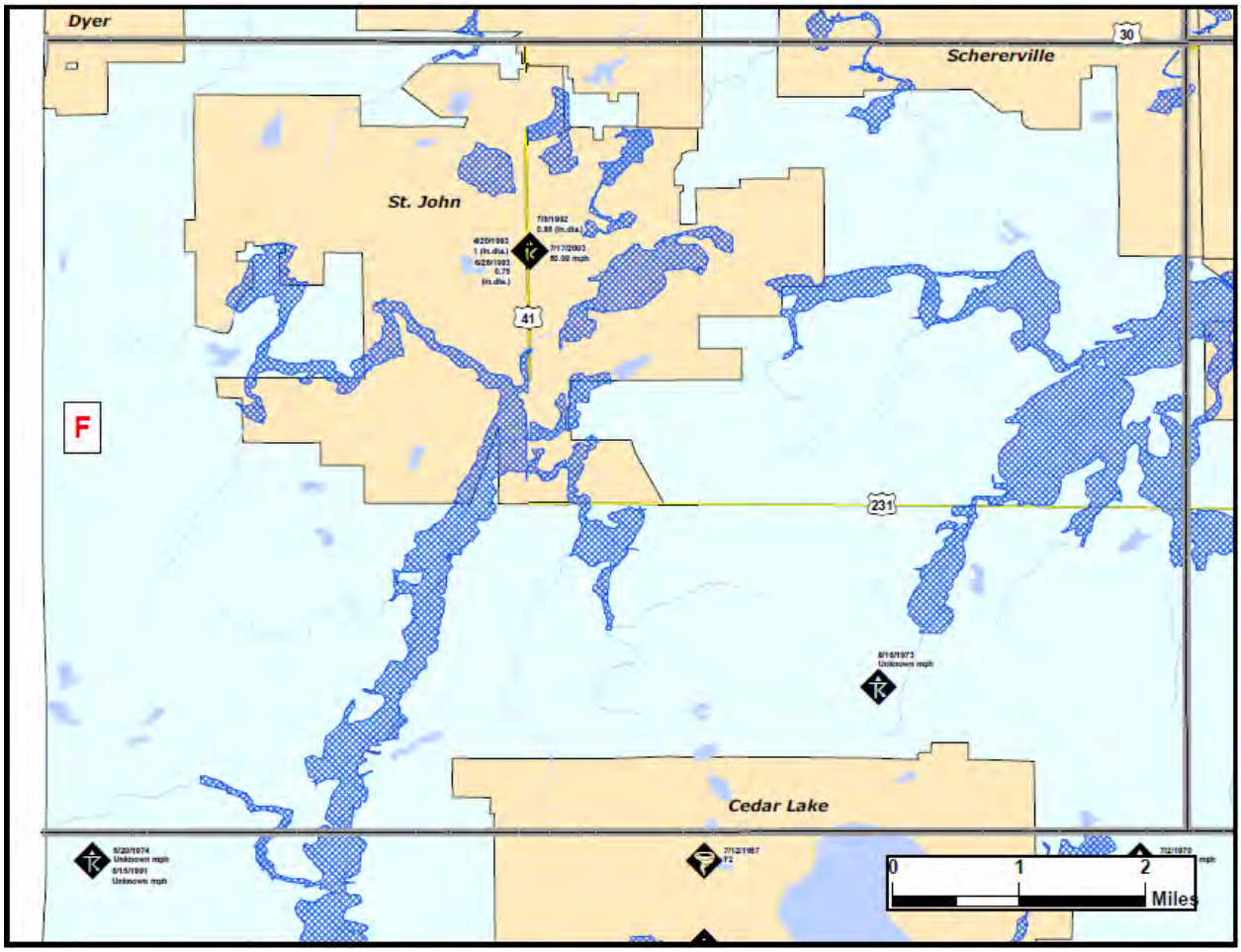
Region D


Hammond
Gary
Highland
Munster
41
Griffith
D
Dyer
Schererville
30
St. John
0
1
2
Miles

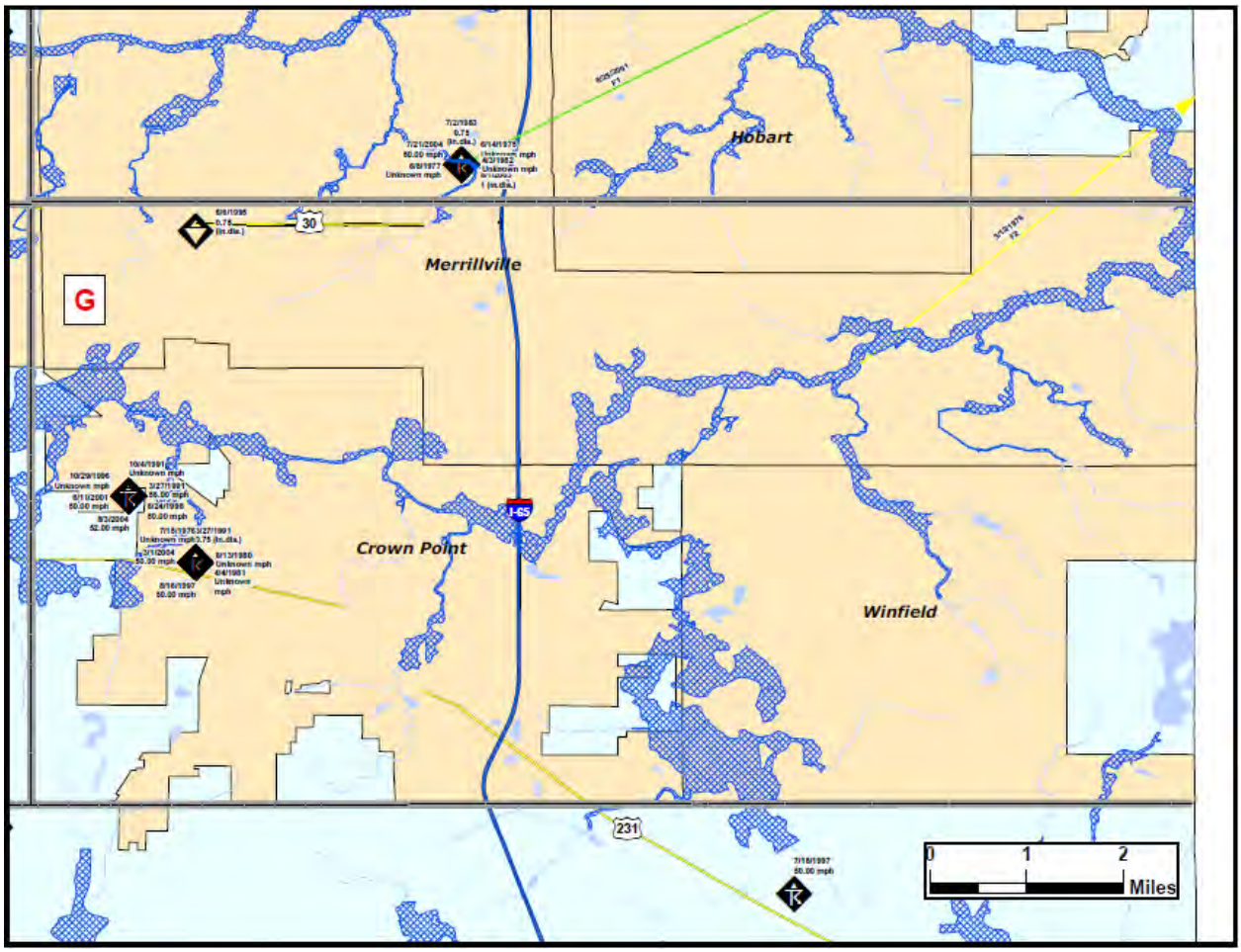
Region E


I-90
I-80
I-65
Lake Station
Gary
New Chicago
E
Hobart
Merrillville
30
6
0 1 2
Miles
Crown Point

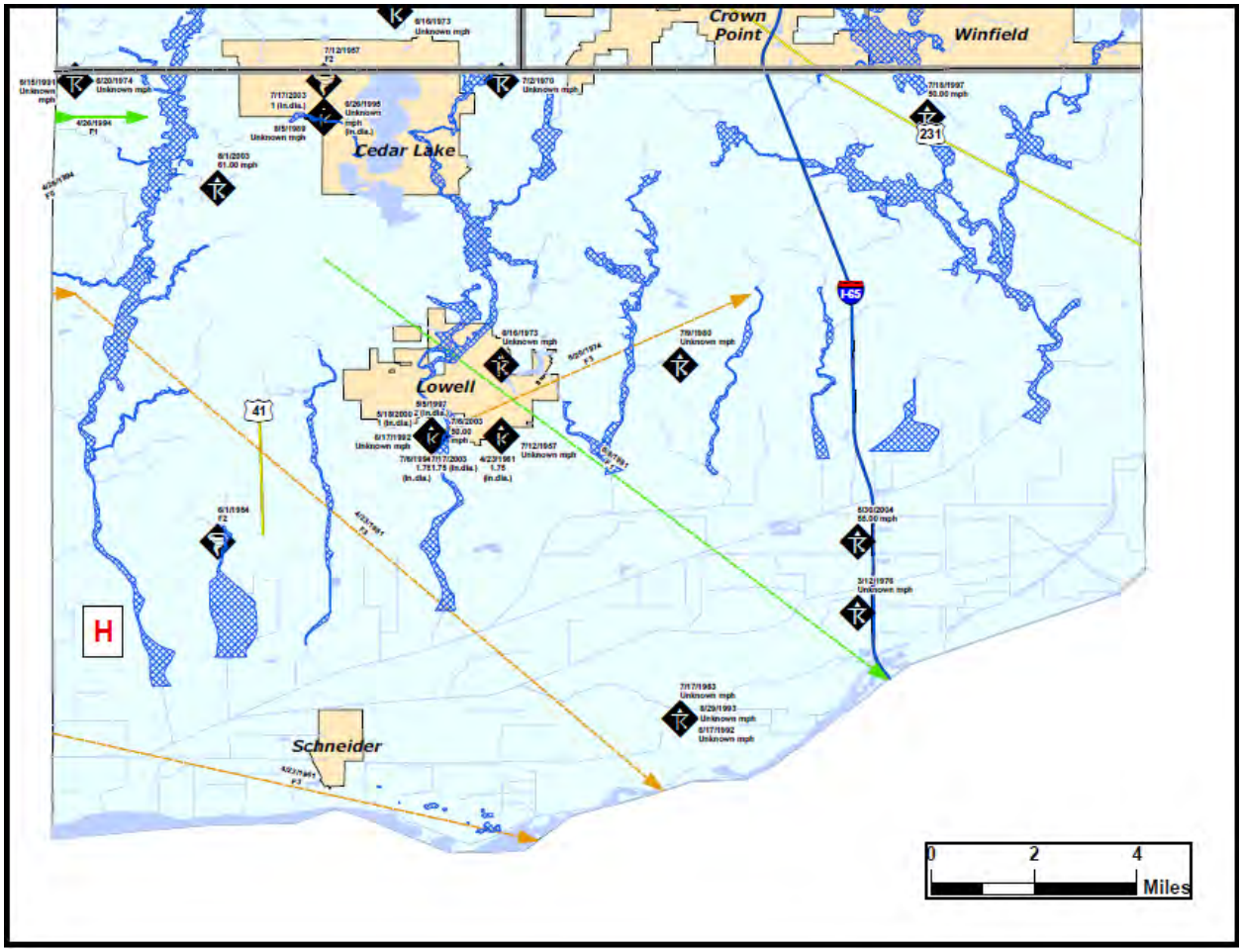
Region F



Region G

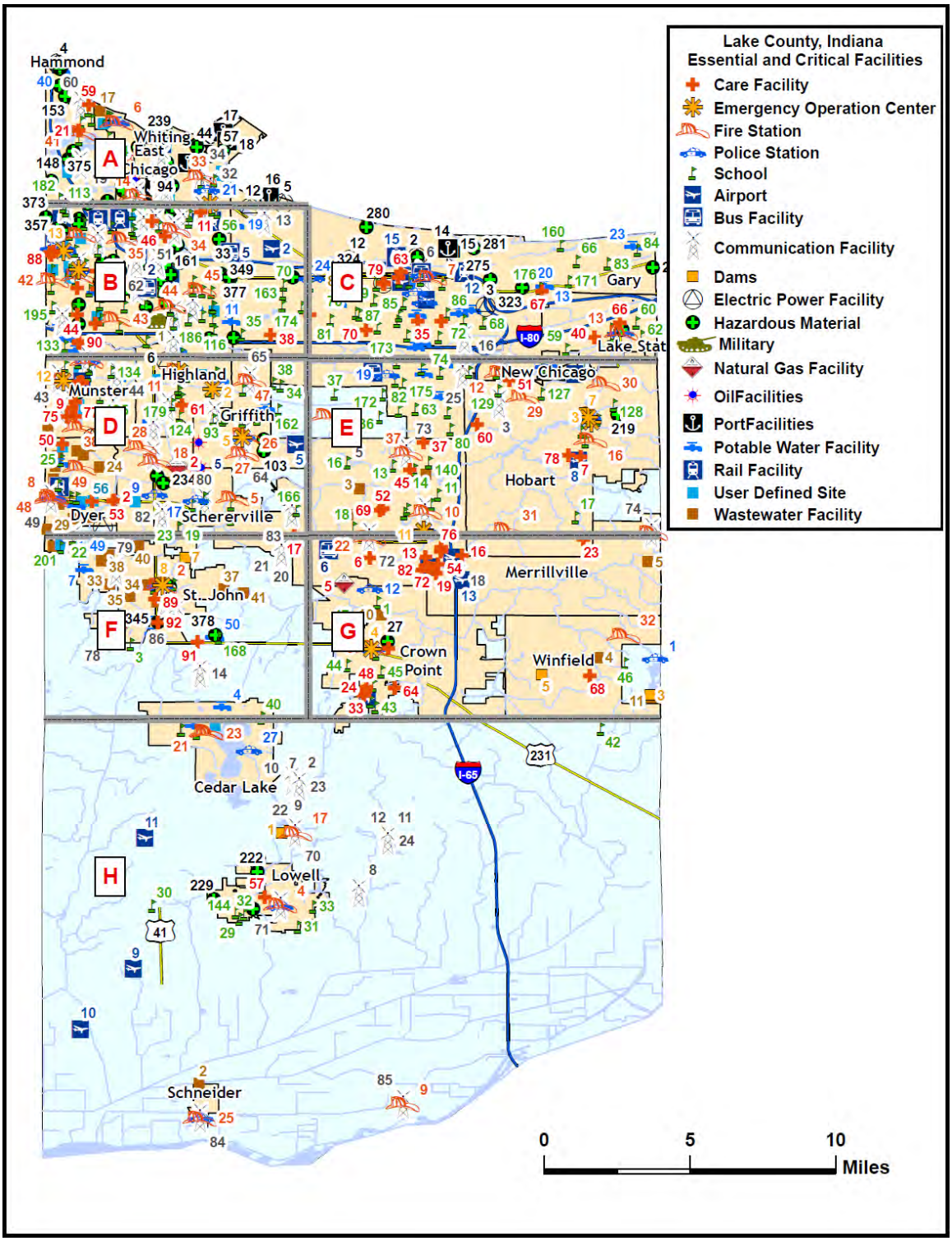

Hobart
Merrillville
G
30
Crown Point
I-65
Winfield
231
0
1
2
Miles

Region H

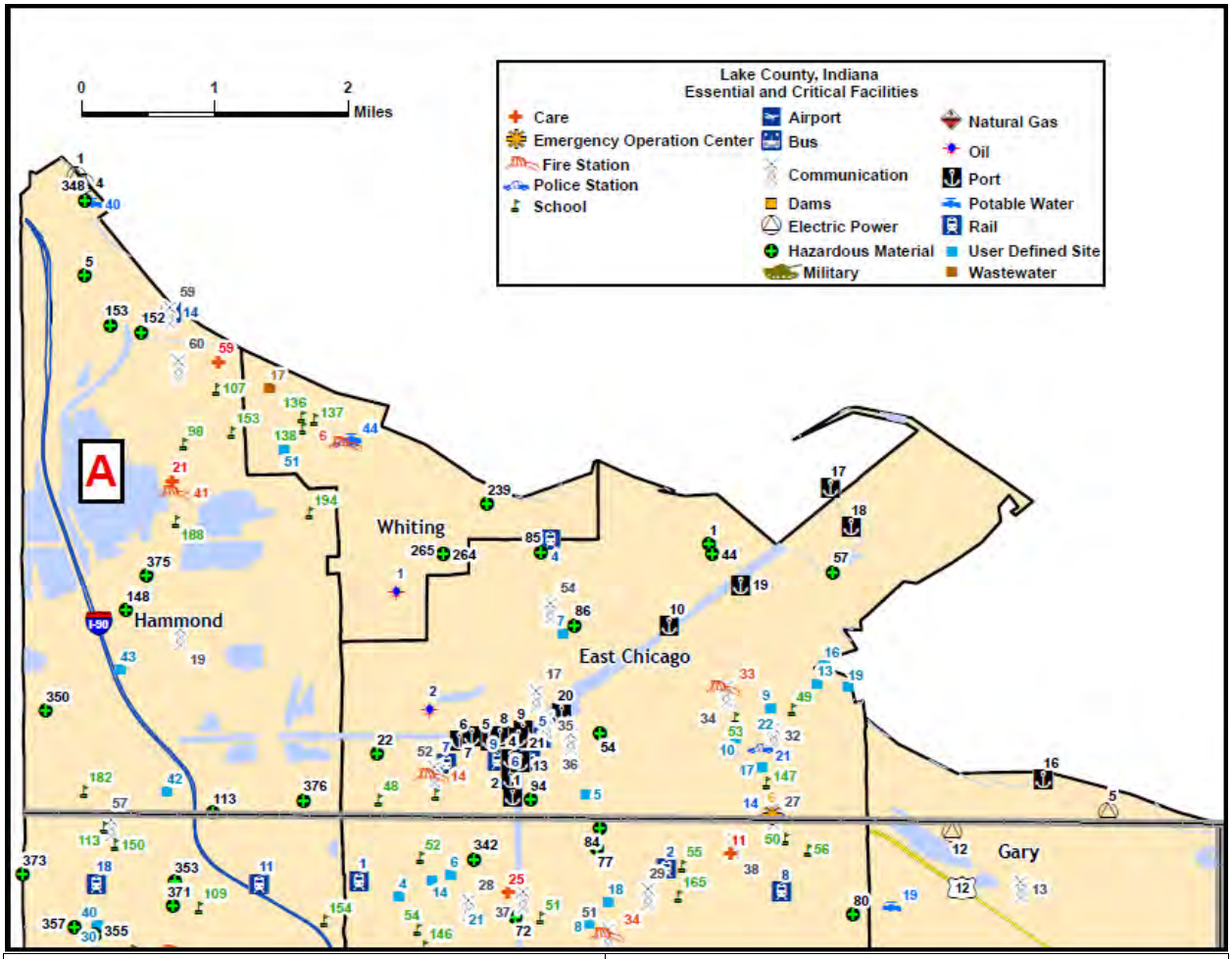

Crown Point
Winfield
Cedar Lake
Lowell
Schneider
H
41
231
I-65
0
2
4
Miles

Appendix E – Critical Facilities Maps

The following map shows the locations of Lake County's critical facilities. Figures A through H on the following pages depict magnified views of the demarcated regions on the county map. Each magnified view includes a table with the facility identification number, name, and type of critical facility. The facility identification number can be matched to the numbers listed above the facilities in the map. The numbers were automatically assigned through HAZUS-MH and may repeat; the legend clarifies types of facilities.



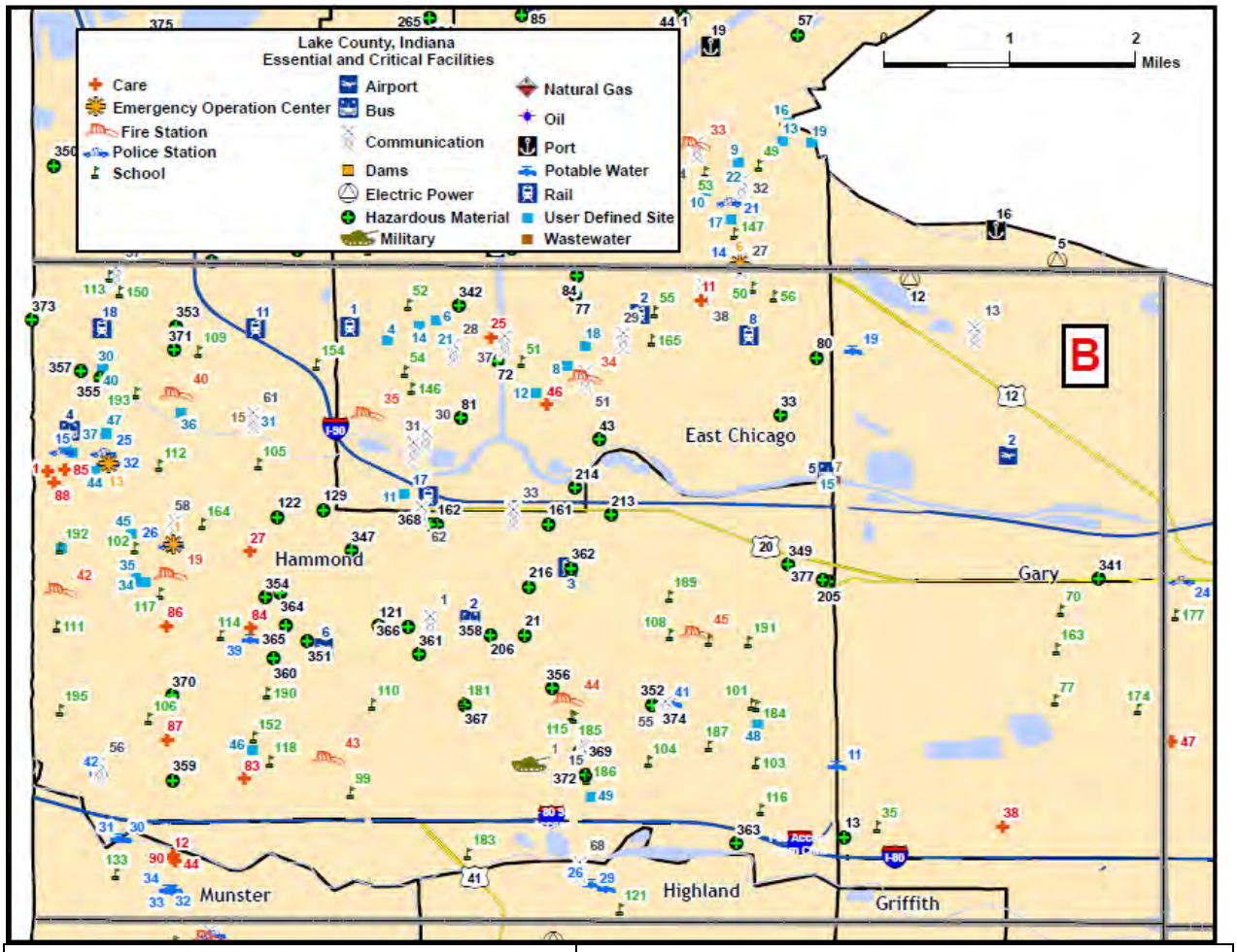
Region A



ID#	Name	Facility Type	ID#	Name	Facility Type
21	Lakeview Ambulatory Center	Care	6	Mobil Oil Corp., East Chicago Terminal D	Port
59	Hammond-Whiting Care Center	Care	7	Safety-Kleen Oil Recovery Company, East	Port
17	NEW	Communication	8	Amoco Oil Co. Indiana Harbor Dock.	Port
19	NEW	Communication	9	United States Gypsum Co., Indiana Harbor	Port
32	T_Mobile	Communication	10	LTV Steel Co., Indiana Harbor Works Coke	Port
34	Cell Tower	Communication	13	Northern Indiana Dock Co. Wharf.	Port
35	Cell Tower	Communication	16	Lehigh Portland Cement Co., Buffington H	Port
36	Cell Tower	Communication	17	Inland Steel Co., No. 6 Dock.	Port
52	Central	Communication	18	Inland Steel Co., No. 4 Dock.	Port
54	Mark Town	Communication	19	Inland Steel Co., Plant No. 2 Dock.	Port
59	Lever Bros Unilever	Communication	20	American Terminals, Inc., North Dock.	Port
60	Robertsdale SubStation	Communication	21	American Terminals, Inc., South Dock.	Port
1	Commonwealth Edison Test	Electric Power	40	Water Filtration Facility	Potable Water
4	State Line Energy LLC	Electric Power	44	Whiting Filtration Plant	Potable Water
5	Nipsco Power Plant	Electric Power	4	Matlack Bulk Intermodal: Whiting	Rail
6	Whiting Fire Dept	Fire Dept	5	American Terminals Inc: E Chicago	Rail

ID#	Name	Facility Type	ID#	Name	Facility Type
14	East Chicago Fire Dept Station 1	Fire Dept	6	Northern Ind Dock Co: East Chicago	Rail
33	East Chicago Fire Dept Station 2	Fire Dept	7	Mobil Oil Corp: East Chicago	Rail
41	Fire and Police Station #2	Fire Dept	9	Atlas Iron Processors: East Chicago	Rail
1	Harsco Co, Heckett Multiserv Plant 7	Hazmat Site	14	HAMMOND-WHITING	Rail
2	State Line Generating LLC	Hazmat Site	48	East Chicago Central High Sch	School
22	Mobil Oil Hammond Terminal	Hazmat Site	49	Eugene Field Elementary School	School
44	LTV Steel Co.	Hazmat Site	53	Abraham Lincoln Elementary Sch	School
54	American Steel Foundries	Hazmat Site	57	West Side Junior High School	School
57	Ispat Inland Inc	Hazmat Site	98	George Rogers Clark Md/HS	School
85	Praxair Inc	Hazmat Site	107	Benjamin Franklin Elem Sch	School
93	Safety Kleen Oil Recovery Co	Hazmat Site	136	Whiting High School	School
94	Phillips Petroleum Co.	Hazmat Site	137	Whiting Middle School	School
113	Premcor Inc	Hazmat Site	138	Nathan Hale Elementary School	School
148	Ferro Corp Hammond Site	Hazmat Site	147	Indiana Harbor Catholic School	School
149	Unilever HPC USA - Hammond	Hazmat Site	153	Saint John The Baptist School	School
153	Cerestar USA Inc	Hazmat Site	182	St Josephs Home for Boys	School
239	BP Amoco Chemical Co	Hazmat Site	188	Hammond Environmental Education Center	School
264	BP Amoco Oil Refy	Hazmat Site	194	Calumet College	School
265	BP Amoco Oil Co. Whiting Terminal	Hazmat Site	3	Main Library	User Defined Site
348	Hammond Water Plant	Hazmat Site	5	Bessie Owens Community Recreation Center	User Defined Site
350	Calumet Container	Hazmat Site	7	Mark Town Community Center	User Defined Site
375	Verizon North Hammond	Hazmat Site	9	Penn Center	User Defined Site
376	Wolverine Pipeline Company	Hazmat Site	10	Roberto Clemente Center	User Defined Site
1	BP Amoco Oil Co. Whiting Refinery	Oil	13	Filtration Plant	User Defined Site
2	Energy Coop Inc	Oil	16	Marina	User Defined Site
10	Whiting Police Dept	Police Dept	17	Post Office	User Defined Site
21	Lake County Sheriff	Police Dept	19	Ameristar Casino	User Defined Site
1	Mobil Oil Corp., Calumet River Branch So	Port	22	Hunter Senior Citizen Building	User Defined Site
2	CITGO Petroleum Corp. East Chicago Dock.	Port	42	Transportation Dept	User Defined Site
4	Atlas Iron Processors Calumet River Bran	Port	43	US General Svc Adm	User Defined Site
5	Service Waste, Inc. East Chicago Dock.	Port	51	Whiting Community Center	User Defined Site
			17	Detention Basin (pump to Hammond)	Wastewater Treatment

Region B

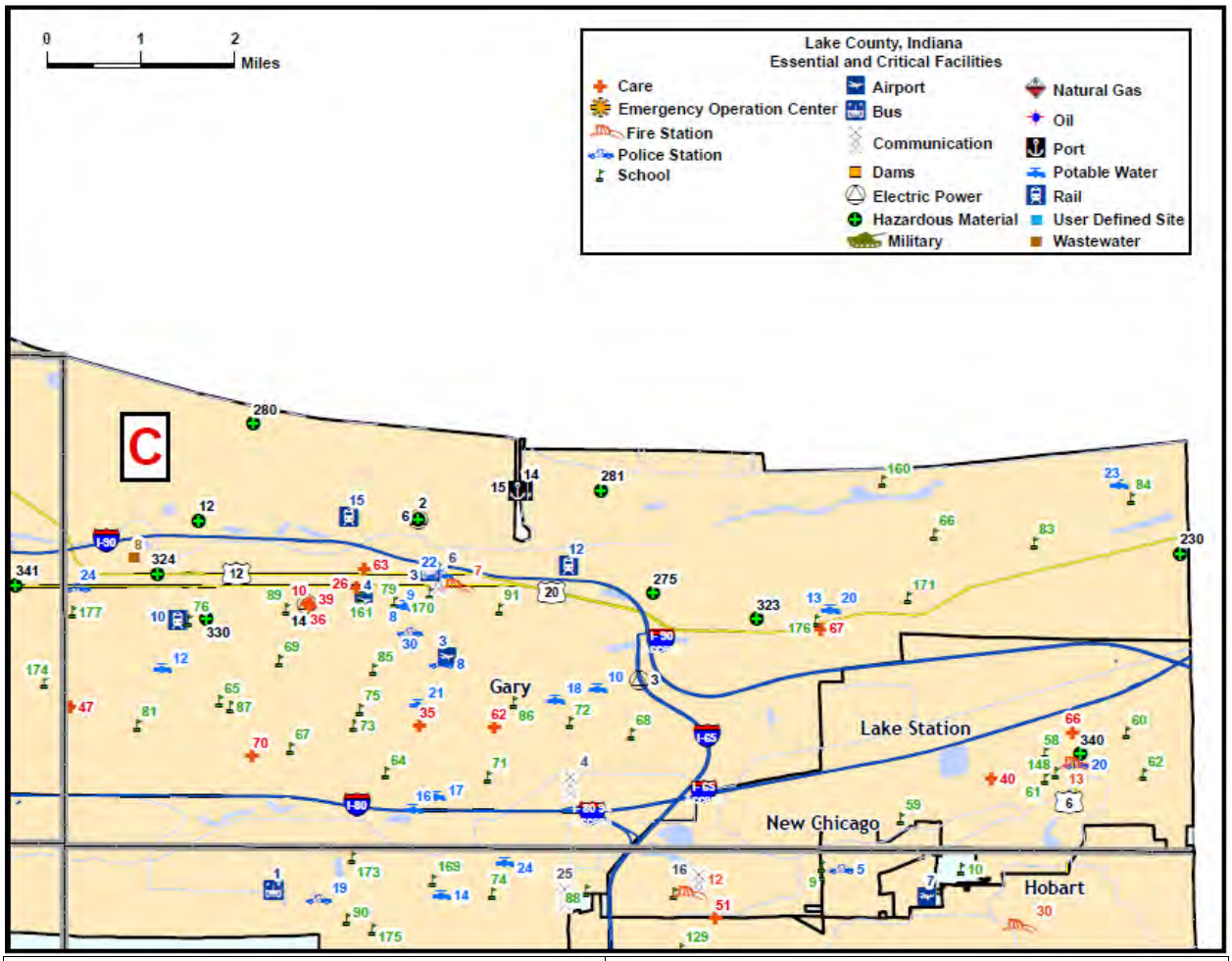


ID#	Name	Facility Type	ID#	Name	Facility Type
2	GARY/CHICAGO Airport	Airport/Heliport	25	Hammond City Police Dept	Police Dept
6	ESCC	Airport/Heliport	26	Hammond Police Dept	Police Dept
2	Progressive Transportation Svc	Bus	32	Central Police Station	Police Dept
4	Hammond Transit System	Bus	11	Cline Ave (Peoples Water)	Potable Water
5	East Chicago Bus Transit	Bus	19	East Chicago Booster	Potable Water
1	St Margaret Mercy Healthcare Ctrs	Care	26	JR Bradley Pump Station	Potable Water
11	St. Catherine Hospital Inc	Care	29	Kennedy Ave Storage	Potable Water
12	Calumet Surgery Ctr	Care	30	River Bend Pump Station	Potable Water
83	Columbia Medical Center	Care	31	Water Tanks	Potable Water
84	Concentra Medical Center	Care	32	Calumet Pump Station	Potable Water
85	Davita Comprehensive Renal Care	Care	33	Water Tanks	Potable Water
86	Medical Clinics of America	Care	34	Water Tanks	Potable Water
87	South Side Medical Clinic	Care	39	Water Dept	Potable Water
88	Caatherine McCauley Clinis	Care	41	Water Tower	Potable Water
25	Community Health Center	Care	42	Water Tower	Potable Water
27	Ophelia Steen Family and Health	Care	1	CSXT East Chicago Bulk TransFlo	Rail
38	Gary Black Oak	Care	2	Arro Packaging Co: East Chicago	Rail
44	Munster Med Inn	Care	3	MDT Transloading Services: Hammond	Rail
46	Lake County Nursing &	Care	8	Citgo Petroleum Corp: East	Rail

ID#	Name	Facility Type	ID#	Name	Facility Type
	Rehabilitation Ctr			Chicago	
90	Hammond Clinic	Care	11	Dav-Con Steel Processing: Hammond	Rail
1	WJOB	Communication	17	Southshore Train Station (HMD)	Rail
13	NEW	Communication	18	Southshore Train Station (EC)	Rail
15	NEW	Communication	35	Grissom Elem School	School
27	East Chicago 911	Communication	50	Benjamin Franklin Elem School	School
28	T-Mobile	Communication	51	Carrie Gosch Elem School	School
29	Cell Tower	Communication	52	Benjamin Harrison Elem Sch	School
30	Cell Tower	Communication	54	William McKinley Elem Sch	School
31	Cell Tower	Communication	55	George Washington Elem School	School
33	NIPSCO	Communication	56	Joseph L Block Jr High School	School
37	Cell Tower	Communication	70	Brunswick Elem School	School
38	Cell Tower	Communication	77	Ivanhoe Elem School	School
51	Fire Station	Communication	99	Donald E Gavit Mdl/High Sch	School
55	Unknown	Communication	100	Hammond High School	School
56	Unknown	Communication	101	Morton Senior High School	School
57	Lincoln School	Communication	102	Area Career Center	School
58	City Hall	Communication	103	Charles N Scott Middle School	School
61	Sanitary District	Communication	104	Lee L Caldwell Elem Sch	School
62	Rhodia	Communication	105	Columbia Elem School	School
68	Bradley Pumpkin Store	Communication	106	Thomas A Edison Elem Sch	School
12	Majestic Star Casino	Electric	108	Warren G Harding Elem Sch	School
1	Hammond Civil Defense	EOC	109	Washington Irving Elem Sch	School
6	East Chicago Public Safety	EOC	110	Thomas Jefferson Elem Sch	School
13	Hammond Police Communications	EOC	111	Kenwood Elem School	School
19	Hammond Fire Dept	Fire Dept	112	Lafayette Elem School	School
34	East Chicago Fire Dept Station 3	Fire Dept	113	Abraham Lincoln Elem Sch	School
35	East Chicago Fire Dept Station 4	Fire Dept	114	Maywood Elem School	School
40	Fire Station #1	Fire Dept	115	Morton Elem School	School
42	Fire Station #5	Fire Dept	116	Orchard Drive Elem Sch	School
43	Fire Station #7	Fire Dept	117	Lew Wallace Elem School	School
44	Fire Station #6	Fire Dept	118	Frank O'Bannon Elem School	School
45	Fire Station #8	Fire Dept	121	Judith Morton Johnston Elem	School
13	AMG Resources Corp	Hazmat Site	133	James B Eads Elem Sch	School
21	Silgan Containers Corp.	Hazmat Site	146	St Stanislaus School	School
33	Citgo Petroleum Corp	Hazmat Site	150	Saint Casimir School	School
43	Dupont East Chicago Plant	Hazmat Site	151	Saint Catherine Of Siena School	School
72	Union Tank Car Co. Plant 1	Hazmat Site	152	Saint John Bosco School	School
77	National Briquett Corp.	Hazmat Site	154	Bishop Noll Institute	School
80	National Processing Co.	Hazmat Site	163	West Side High School	School
81	National Refractories and Minerals Corp	Hazmat Site	164	Henry W Eggers Elem/Md Sch	School
84	Pollution Control INDS Inc	Hazmat Site	165	Intergenerational Center	School
121	Dietrich Ind Inc	Hazmat Site	174	Aspire Charter Academy	School
122	Davies Imperial Coatings Inc	Hazmat Site	181	Purdue University Calumet	School
129	Jupiter Aluminum Corp.	Hazmat Site	183	Sawyer College	School
161	Equilon East Chicago Terminal	Hazmat Site	184	Hammond Head Start	School
162	Rhodia Inc.	Hazmat Site	185	Pied Piper Preschool	School
205	AGA Gas Inc	Hazmat Site	186	Woodland Childcare	School
206	Hammond Lead Prods. Halox	Hazmat Site	187	Indiana College of Commerce	School
213	Hammond Group Inc, Halstab Div	Hazmat Site	189	Gibson Nature Center	School

ID#	Name	Facility Type	ID#	Name	Facility Type
214	Harbison Walker Refractories	Hazmat Site	190	Purdue Entreprenurial Center	School
216	LaSalle Steel Co.	Hazmat Site	191	The Shepherd's Academy	School
341	One Shot LLC	Hazmat Site	192	Montessori Children's Schhouse	School
342	Great Lakes Metals LLC	Hazmat Site	193	Baptists School	School
347	Hammond LLC	Hazmat Site	195	City Baptists School	School
349	Wolverine	Hazmat Site	4	East Chicago Public Library	User Defined Site
351	165th Street Complex	Hazmat Site	6	Heritage Hall	User Defined Site
352	Ameritech	Hazmat Site	8	Martin Luther King Center	User Defined Site
353	Arrow Cleaners	Hazmat Site	11	Roxana Center	User Defined Site
354	Cintas #319	Hazmat Site	12	151st St Center	User Defined Site
355	ASF - Keystone Inc	Hazmat Site	14	City Hall	User Defined Site
356	D & D Industries	Hazmat Site	15	Central Services	User Defined Site
357	Defense Nat'l Stockpile Ctr, Hammnd Depo	Hazmat Site	18	Post Office	User Defined Site
358	First Transit Inc	Hazmat Site	21	Senior Citizens Building	User Defined Site
359	Gas City Pantry	Hazmat Site	30	Family and Social SVS Adm	User Defined Site
360	Hammond Operating Headquarters	Hazmat Site	31	Hammond Animal Control	User Defined Site
361	Huhtamaki Food Service Inc	Hazmat Site	32	Hammond City Offices	User Defined Site
362	IHB Gibson Yard	Hazmat Site	33	Hammond Health Dept	User Defined Site
363	Illco	Hazmat Site	34	Hammond Recycling Dept	User Defined Site
364	Illiana Transit Warehouse	Hazmat Site	35	Hammond Sanitation Gargage	User Defined Site
365	Lear Corporation	Hazmat Site	36	Hammond Sewer Maintenance	User Defined Site
366	Patten Industries	Hazmat Site	37	Judge office	User Defined Site
367	Purdue University Calumet	Hazmat Site	38	Lake County Commissioner	User Defined Site
368	Resco Products Inc	Hazmat Site	39	Northern District of Indiana	User Defined Site
369	SBC	Hazmat Site	40	Lake County Welfare Dept.	User Defined Site
370	Speedway #8335	Hazmat Site	41	North Township Trustee Office	User Defined Site
371	Speedway #8305	Hazmat Site	44	US Social Security Adm	User Defined Site
372	Speedway #8332	Hazmat Site	45	Hammond Civic Center	User Defined Site
373	Sprint Hammond Pop	Hazmat Site	46	E.B. Hayward Library	User Defined Site
374	United Parcel Service	Hazmat Site	47	Main Library	User Defined Site
377	Linde Gas, LLC	Hazmat Site	48	Howard Library	User Defined Site
1	National Guard Armory	Military	49	Jean Shepherd Community Center	User Defined Site
14	East Chicago Police Dept	Police Dept	7	East Chicago Sanitary District	WWTP
15	Lake County Sheriff's Office	Police Dept	15	Hammond Sanitary District WWTP	WWTP

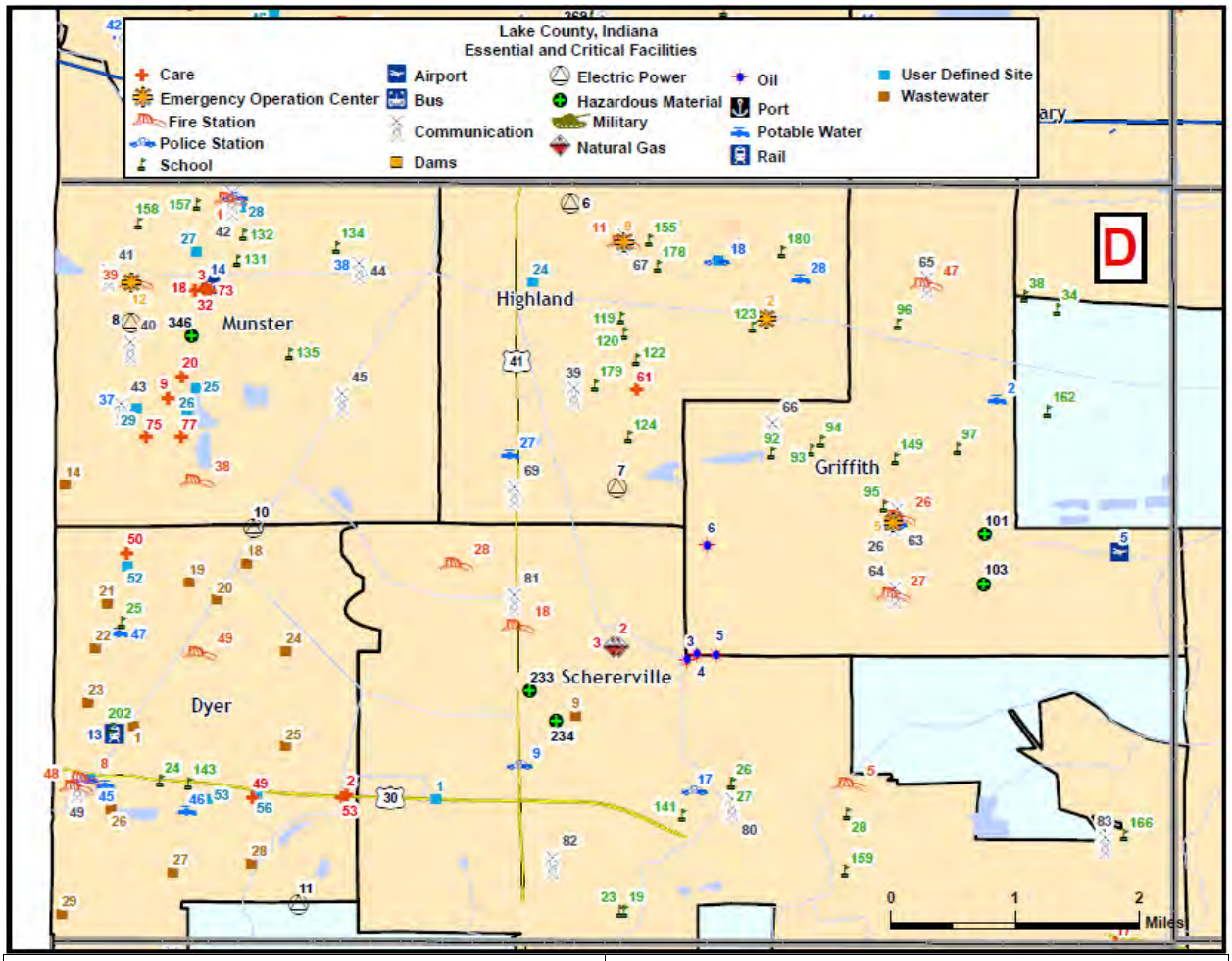
Region C



ID#	Name	Facility Type	ID#	Name	Facility Type
3	Police	Airport	13	Miller Booster Station	Potable Water
4	Northwest Family Hosp	Airport	16	28th & Madison	Potable Water
3	Gary Public Transportation	Bus	17	27th & Washington	Potable Water
10	Methodist Hospital Northlake Campus	Care	18	Martin Luther King	Potable Water
26	Community Health Ctr	Care	20	Miller Reservoir	Potable Water
35	Gary 21st Avenue	Care	21	19th Avenue Tower	Potable Water
36	Grant Street	Care	23	Miller Tower	Potable Water
39	Methodist Hospital North Campus	Care	10	Chicago Steel & Tinplate: Gary	Rail
40	Lake Station	Care	12	Roll & Hold Warehousing: Gary	Rail
47	Clark Nursing and Rehab Ctr	Care	15	EJ & E M of W Control Ctr Kirk Yard	Rail
62	Simmons Loving Care	Care	58	Thomas A Edison Jr-Sr HS	School
63	West Side Health Care Ctr	Care	59	Alexander Hamilton Elem Sch	School
66	Lake Park Residential Care Inc	Care	60	Virgil I Bailey Elem School	School
67	Miller Beach Terrace	Care	61	Central Elem School	School
70	Timberview Health Care Ctr	Care	62	Carl J Polk Elem School	School
79	Progressive Care Unit	Care	64	Theodore Roosevelt High Sch	School
4	WLTH	Communication	65	Tolleston Middle School	School
6	W18AT	Communication	66	Emerson Visual Arts	School
2	Mitchell DH Generating Station	Electric Power	67	Benjamin Banneker Elem Sch	School
3	NIPSCO Aetna Flood Mgmt & Maintenance	Electric Power	68	Mary M Bethune Early Child Dev Ctr	School

ID#	Name	Facility Type	ID#	Name	Facility Type
14	Methodist Hospital	Electric	69	Beveridge Elem School	School
7	Gary Fire Prevention Bureau	Fire Dept	71	George Washington Carver Sch	School
13	Lake Station Fire Dept	Fire Dept	72	Watson Academy	School
6	Northern Indiana Public Service Co.	Hazmat Site	73	McCullough Academy	School
12	North American Refractory Co.	Hazmat Site	75	Lincoln Achievement Ctr	School
230	Chris Craft Indl Prods Inc	Hazmat Site	76	Martin Luther King School Alt	School
275	Republic Techs. Intl Gary Dunes	Hazmat Site	79	Jefferson Elem School	School
279	PVS Techs Inc	Hazmat Site	81	Alain L Locke Elem Sch	School
281	USS Gary Works	Hazmat Site	83	Benjamin Banneker Elem Sch	School
320	Republic Techs Intl Gary 7th Ave	Hazmat Site	84	Nobel Elem School	School
324	Anderson Development Co.	Hazmat Site	85	Horace S Norton Elem Sch	School
330	Tinplate Partners Intl	Hazmat Site	86	Dunbar-Pulaski Middle School	School
340	Prochemco Inc	Hazmat Site	87	Ernie Pyle Elem School	School
8	Gary Police Dept	Police Dept	89	John H Vohr Elem School	School
20	Lake Station Police Dept	Police Dept	91	Emerson VPA	School
22	Lake County Sheriff's Ofc	Police Dept	148	St Francis Xavier School	School
24	Gary Police Community Relation	Police Dept	160	Charter School of the Dunes	School
30	Gary Police Civil Svc Comm	Police Dept	161	Thea Bowman Leadership Academy	School
14	USX Corp., Gary Works, East Dock.	Port	170	21st Century Charter School	School
15	USX Corp., Gary Works, West Dock.	Port	171	KIPP Lead College Prep	School
8	Park Station	Potable Water	176	Christ Baptist Christian Academy	School
9	Low Service Building	Potable Water	177	Lighthouse Academy Inc	School
10	Service Ctr	Potable Water	8	Gary Sanitary District	WWTP
12	13th & Jennings Station	Potable Water			

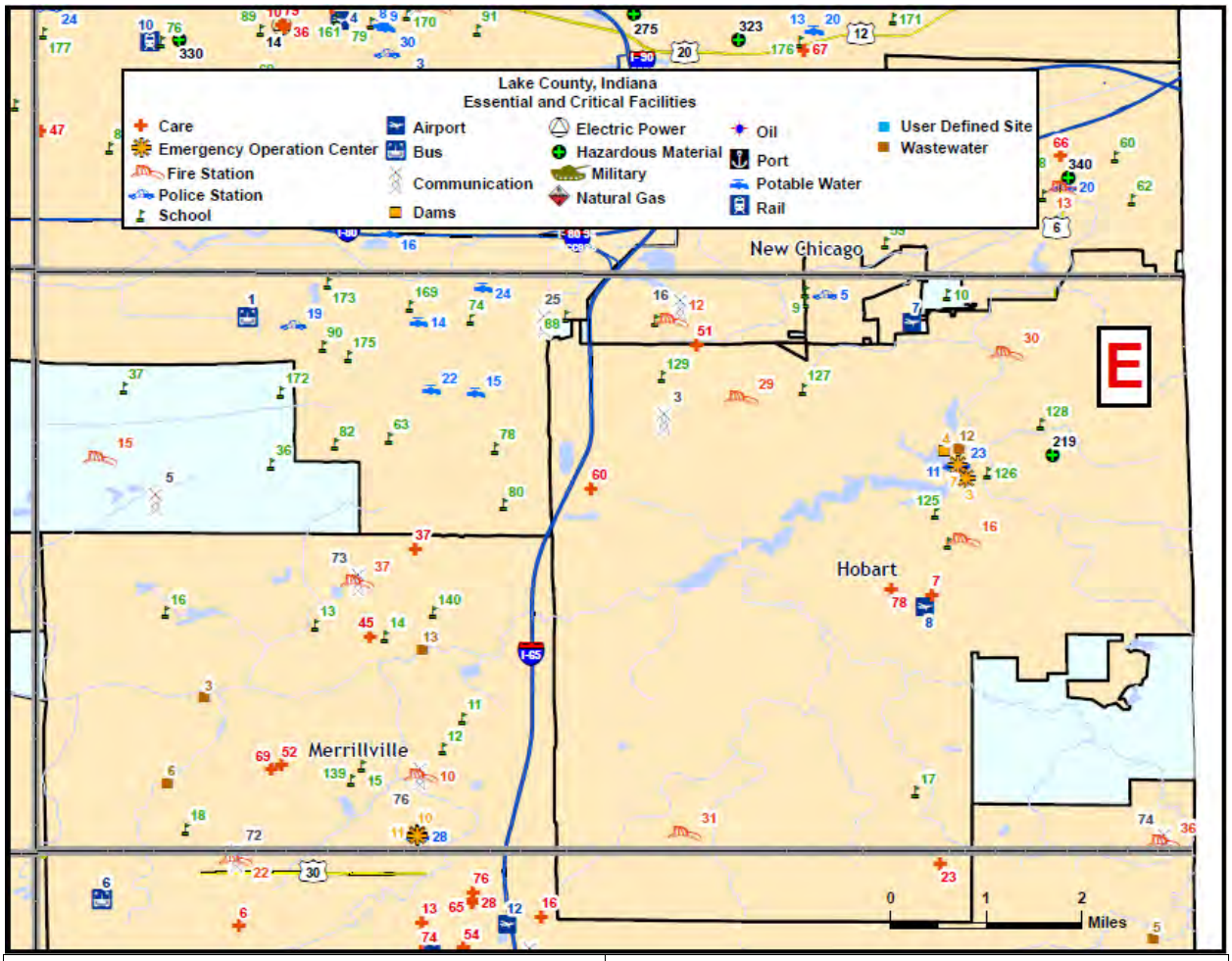
Region D



ID#	Name	Facility Type	ID#	Name	Facility Type
5	Griffith-Merrillville	Airport	2	Water Pump Stn	Potable Water
14	Community Hospital	Airport	27	US 41 Water Tower	Potable Water
2	St. Margaret Mercy Healthcare Ctrs Inc	Care	28	Ridge Road Water Tower	Potable Water
3	Community Hospital	Care	36	Water Tanks	Potable Water
9	Franciscan Physicians Hospital	Care	37	Water Tanks	Potable Water
17	Ctrs for Pain Management	Care	38	Water Tank	Potable Water
18	Community Surgery Ctr LLC	Care	45	Municipal Water Utility	Potable Water
20	Munster Same-Day Surgery Ctr	Care	46	Water Tower	Potable Water
32	Community Hospital	Care	47	Water Tower	Potable Water
49	Regency Place of Dyer	Care	13	DYER	Rail
50	Dyer Nursing and Rehab	Care	178	Highland Christian School	School
53	Transitional Care Ctr of St. Margaret	Care	19	Michael Grimmer Middle School	School
61	Walnut Creek at Highland	Care	23	James H Watson Elem Sch	School
73	Transitional Care Ctr at Community Hosp	Care	24	Kahler Middle School	School
75	Care Ctr at Hartsfield Village	Care	25	Protsman Elementary School	School
77	Commons at Hartfield Village	Care	26	West Lake Spec Ed Coop	School
26	Police Dept	Communication	27	Homan Elementary School	School
39	AT&T Switch Office	Communication	28	Peifer Elementary School	School
40	Miner Electronics	Communication	34	Calumet High School	School
41	No name given	Communication	38	The Ensweiler Academy	School

ID#	Name	Facility Type	ID#	Name	Facility Type
42	No name given	Communication	92	Beiriger Elementary School	School
43	No name given	Communication	93	Griffith Senior High School	School
44	No name given	Communication	94	Griffith Middle School	School
45	No name given	Communication	95	Franklin Elementary School	School
49	Police Dept	Communication	96	Eldon Ready Elementary School	School
63	Central Fire Station	Communication	97	Elsie Wadsworth Elem Sch	School
64	South Fire Station	Communication	119	Highland High School	School
65	North Fire Station	Communication	120	Highland Middle School	School
66	Unknown	Communication	122	Mildred Merkley Elem School	School
67	Fire Station #1	Communication	123	Southridge Elementary School	School
69	Water Company	Communication	124	Allen J Warren Elem Sch	School
75	Fire Station	Communication	131	Munster High School	School
80	Reder Park	Communication	132	Wilbur Wright Middle School	School
81	600 Block	Communication	134	Ernest R Elliott Elem Sch	School
82	Unknown	Communication	135	Frank H Hammond Elem Sch	School
83	Unknown	Communication	141	Saint Michael School	School
6	NIPSCO Sub Station	Electric Power	143	Saint Joseph School	School
7	NIPSCO Sub Station	Electric Power	149	Saint Mary School	School
8	NIPSCO Sub Station	Electric Power	155	Our Lady Of Grace School	School
10	NIPSCO Substation	Electric Power	157	Saint Thomas More School	School
11	NIPSCO Substation	Electric Power	158	Saint Paul's Lutheran School	School
2	Highland Civil Defense	EOC	159	Campagna Academy Charter Sch	School
5	Griffith EOC	EOC	162	Longfellow Elementary School	School
9	Central Fire	EOC	166	Forest Ridge Academy	School
12	Munster Public Works	EOC	179	Calvary Baptist School	School
1	Munster Fire Dept	Fire Dept	180	Bible Baptist School	School
5	Schererville Fire Dept	Fire Dept	202	White Oak Childrens Ctr	School
8	Dyer Fire Dept	Fire Dept	1	SBC Schererville Central Office	User Defined Site
11	Highland Fire Dept	Fire Dept	23	Highland Town Hall	User Defined Site
18	Schererville Fire Dept	Fire Dept	24	Lincoln Ctr Evac/recovery	User Defined Site
26	Griffith Station #1	Fire Dept	25	Centennial Park	User Defined Site
27	Griffith Station #2	Fire Dept	26	Veterans Memorial Park	User Defined Site
28	Fire Station #4	Fire Dept	27	Public Library	User Defined Site
38	Munster Fire Dept Station III	Fire Dept	28	Visual Art Ctr	User Defined Site
39	Munster Fire Dept Station II	Fire Dept	29	Town of Munster Bus Barn	User Defined Site
47	North Fire Station	Fire Dept	52	Childrens Daycare Ctr	User Defined Site
48	Dyer Fire Dept	Fire Dept	53	World of Rainbows Learning Ctr	User Defined Site
49	Dyer Fire Station #2	Fire Department	55	Dyer Town Hall	User Defined Site
102	LaSalle Steel Co.	Hazmat Site	56	US Government Ctr	User Defined Site
103	American Chemical Service Inc	Hazmat Site	57	Munster Town Hall	User Defined Site
233	Mason Corp	Hazmat Site	1	Dyer WWTP	WWTP
234	Avery Dennison	Hazmat Site	9	Schererville WWTP	WWTP
346	Pepsi	Hazmat Site	14	Storm Water Pump Station	WWTP
2	Texas Eastern Products Pipeline Co	Natural Gas	18	Lift Station	WWTP
3	Texas Eastern Trans Compressor Station	Natural Gas	19	Lift Station	WWTP
3	Laketon Refining Corp	Oil	20	Lift Station	WWTP
4	Marathon Oil Company	Oil	21	Lift Station	WWTP
5	Texas Oil Company	Oil	22	Lift Station	WWTP
6	Embridge	Oil	23	Lift Station	WWTP
2	Munster Police Dept	Police Dept	24	Lift Station	WWTP
4	Griffith Police Dept	Police Dept	25	Lift Station	WWTP
9	Police Dept	Police Dept	26	Lift Station	WWTP
13	Dyer Police Dept	Police Dept	27	Lift Station	WWTP
17	Schererville Police Dept	Police Dept	28	Lift Station	WWTP
18	Highland Police Dept	Police Dept	29	Lift Station	WWTP

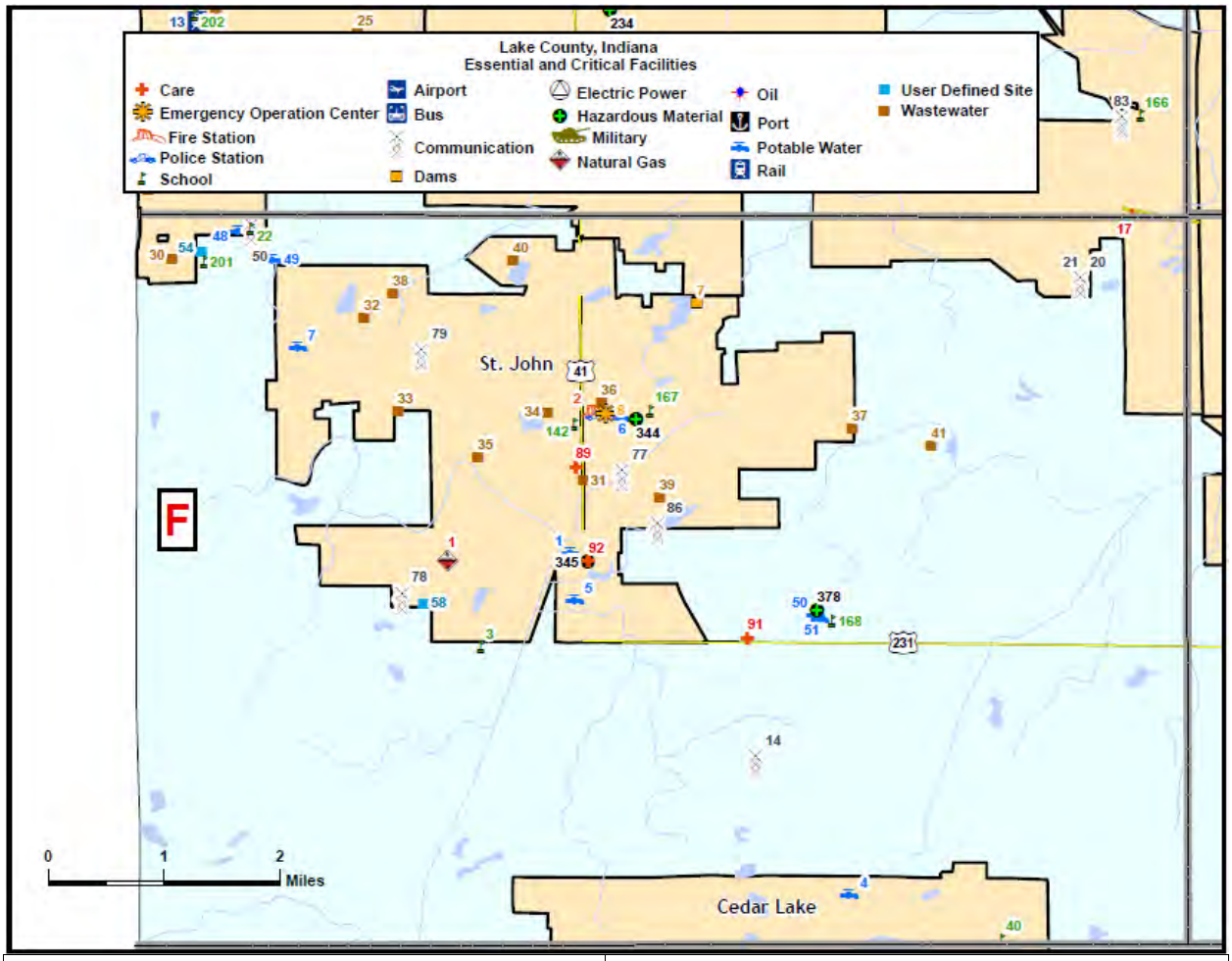
Region E



ID#	Name	Facility Type	ID#	Name	Facility Type
7	Hobart Sky Ranch	Airport	22	41st & Massachusetts Tower	Potable Water
8	St. Mary Medical Ctr	Airport	24	32nd & Georgia	Potable Water
1	Gary Public Transportation	Bus	7	River Forest Jr-Sr High School	School
7	St. Mary Medical Ctr	Care	8	Henry S Evans Elementary Sch	School
37	Gary Glenn Park	Care	9	River Forest Elementary Sch	School
45	North Lake Nursing and Rehab	Care	10	John I Meister Elementary School	School
51	Miller's Merry Manor	Care	11	Merrillville High Sch	School
52	Towne Centre Health Care	Care	12	Pierce Middle School	School
60	Sebo's Nursing and Rehab	Care	13	Merrillville Intermediate School	School
69	Terrace at Towne Centre	Care	14	Henry P Fieler Elem Sch	School
78	Brentwood Assisted Living Community	Care	15	Homer Iddings Elem Sch	School
3	WLTH	Communication	16	Edgar L Miller Elem Sch	School
5	WWCA	Communication	17	John Wood Elementary School	School
16	NEW	Communication	18	Jonas E Salk Elem Sch	School
25	WGVE-FM	Communication	36	Hosford Park Elementary	School
73	Fire Station #4	Communication	37	Lake Ridge Middle School	School
74	Fire Station #3	Communication	63	Lew Wallace High School	School
76	Fire Station #1	Communication	74	Benjamin Franklin Elem School	School
4	Lake George Dam	Dam	78	Bailly Elementary School	School
3	Hobart City Civil Defense	EOC	80	Kuny Elementary School	School
7	Hobart EMA	EOC	82	Arthur P Melton Elem School	School
10	Town Hall	EOC	88	Gary Career Ctr	School

ID#	Name	Facility Type	ID#	Name	Facility Type
11	Police Dept Mobile Unit	EOC	90	Daniel Webster Elem Sch	School
10	Merrillville Fire Dept	Fire Dept	125	Hobart High School	School
12	Lake Station Fire Dept	Fire Dept	126	Hobart Middle School	School
15	Calumet Township Fire Dept	Fire Dept	127	George Earle Elementary Sch	School
16	Hobart Fire Dept	Fire Dept	128	Liberty Elementary School	School
29	Hobart Fire Dept House #2	Fire Dept	129	Ridge View Elementary School	School
30	Hobart Fire Dept House #3	Fire Dept	130	Joan Martin Elementary School	School
31	Hobart Fire Dept House #4	Fire Dept	139	Aquinas Catholic Comm School	School
36	Merrillville Fire Dept #3	Fire Dept	140	Andrean High School	School
37	Merrillville Fire Dept #4	Fire Dept	156	Saint Bridget School	School
219	Praxair Distribution Inc	Hazmat Site	169	Indiana University Northwest	School
5	New Chicago Police Dept	Police Dept	172	Gary Lighthouse Charter School	School
11	Hobart Police Dept	Police Dept	173	Gary Lighthouse Charter School	School
19	Community Policing	Police Dept	175	Embassies of Christ Ambassador Academy	School
23	Hobart Police-Detective Bureau	Police Dept	3	Community Utilities of Gary	WWTP
28	Police Dept	Police Dept	6	Independence Hill	WWTP
14	35th Ave Booster Station	Potable Water	12	Hobart Lift Station	WWTP
15	41St & Carolina Station	Potable Water	13	Merrillville Conservancey District	WWTP

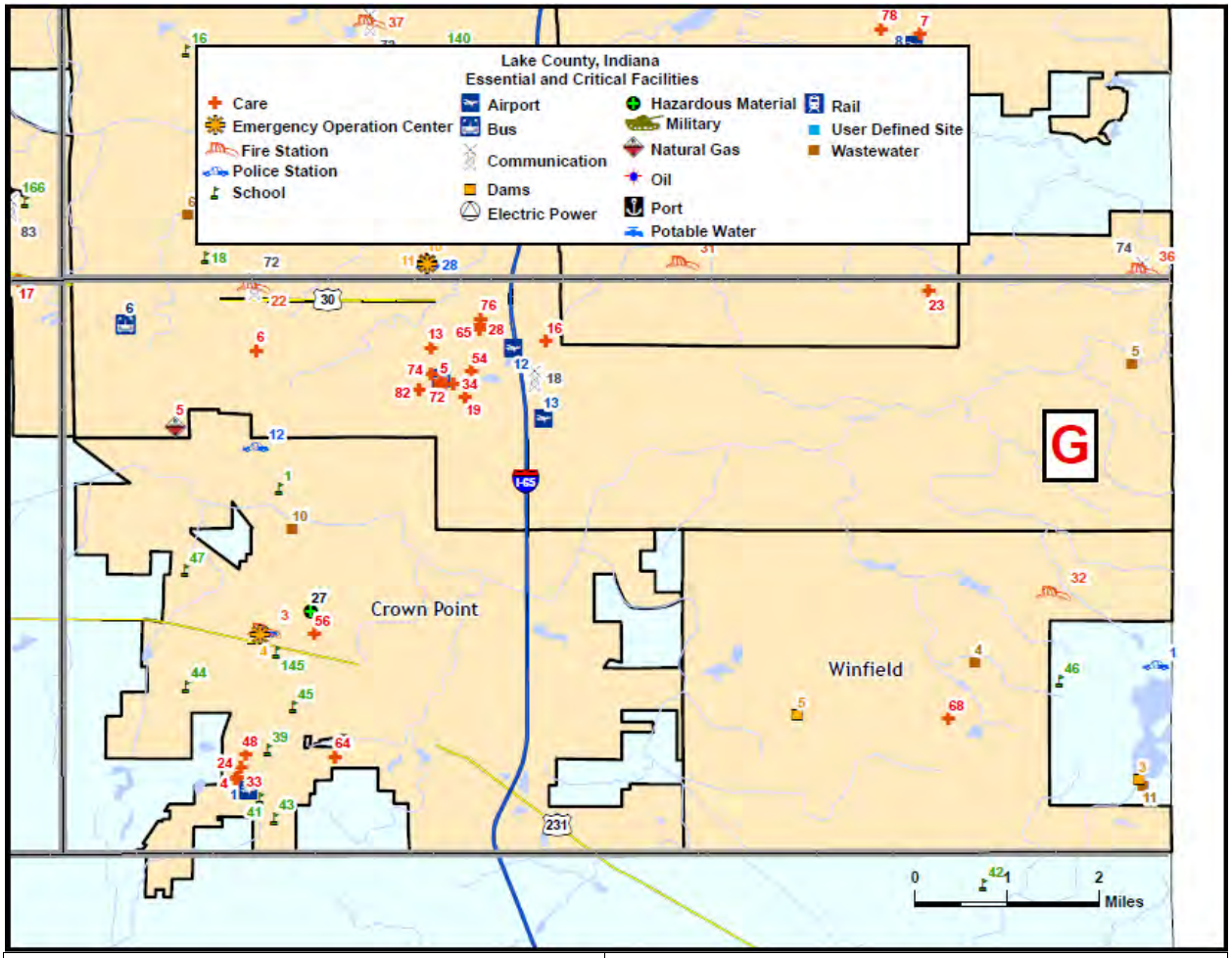
Region F



ID#	Name	Facility Type	ID#	Name	Facility Type
89	Community Hospital Outpatient	Care	49	Water Tower	Potable Water
91	St Anthony Medical Center	Care	50	Water Tower	Potable Water
92	Da Vita St John Dialysis Center	Care	51	Water Treatment and Well	Potable Water
14	W240BJ	Communication	3	Lincoln Elementary School	School
20	891019MA	Communication	22	George Bibich Elementary Sch	School
21	891019MA	Communication	201	Grace Lutheran	School
50	Bibich School Emergency Siren	Communication	40	Douglas MacArthur Elem Sch	School
77	Fire Training Site	Communication	142	Saint John Evangelist School	School
78	Ice Arena Emergency Siren	Communication	167	Clark Middle School	School
79	Emergency Siren	Communication	168	Crown Point Christian School	School
86	Cell Tower	Communication	54	Daycare Center	User Defined Site
7	Lake Hills Dam	Dam	58	Midwest Ice arena	User Defined Site
8	St John Town Hall	EOC	30	Lift Station	WWTP
2	St John Fire Dept	Fire Dept	31	Lift Station	WWTP
344	St John Public Works	Hazmat Site	32	St John Lift Station 2	WWTP
345	St John Water Works	Hazmat Site	33	St John Lift Station 4	WWTP
378	St John Water Works	Hazmat Site	34	St John Lift Station 5	WWTP
1	ANR Pipeline Co St. John	Natural Gas	35	St John Lift Station 6	WWTP
3	St John Police Dept	Police Dept	36	St John Lift Station 7	WWTP
1	St. John Water Works	Potable Water	37	St John Lift Station 8	WWTP
4	Havenwood Pumphouse	Potable Water	38	St John Lift Station 9	WWTP
5	Well #4	Potable Water	39	St John Lift Station 10	WWTP

ID#	Name	Facility Type	ID#	Name	Facility Type
6	East Side Water Tower	Potable Water	40	St John Lift Station 12	WWTP
7	West Side Water Tower	Potable Water	41	St John Lift Staion 13	WWTP
48	Water Tower	Potable Water			

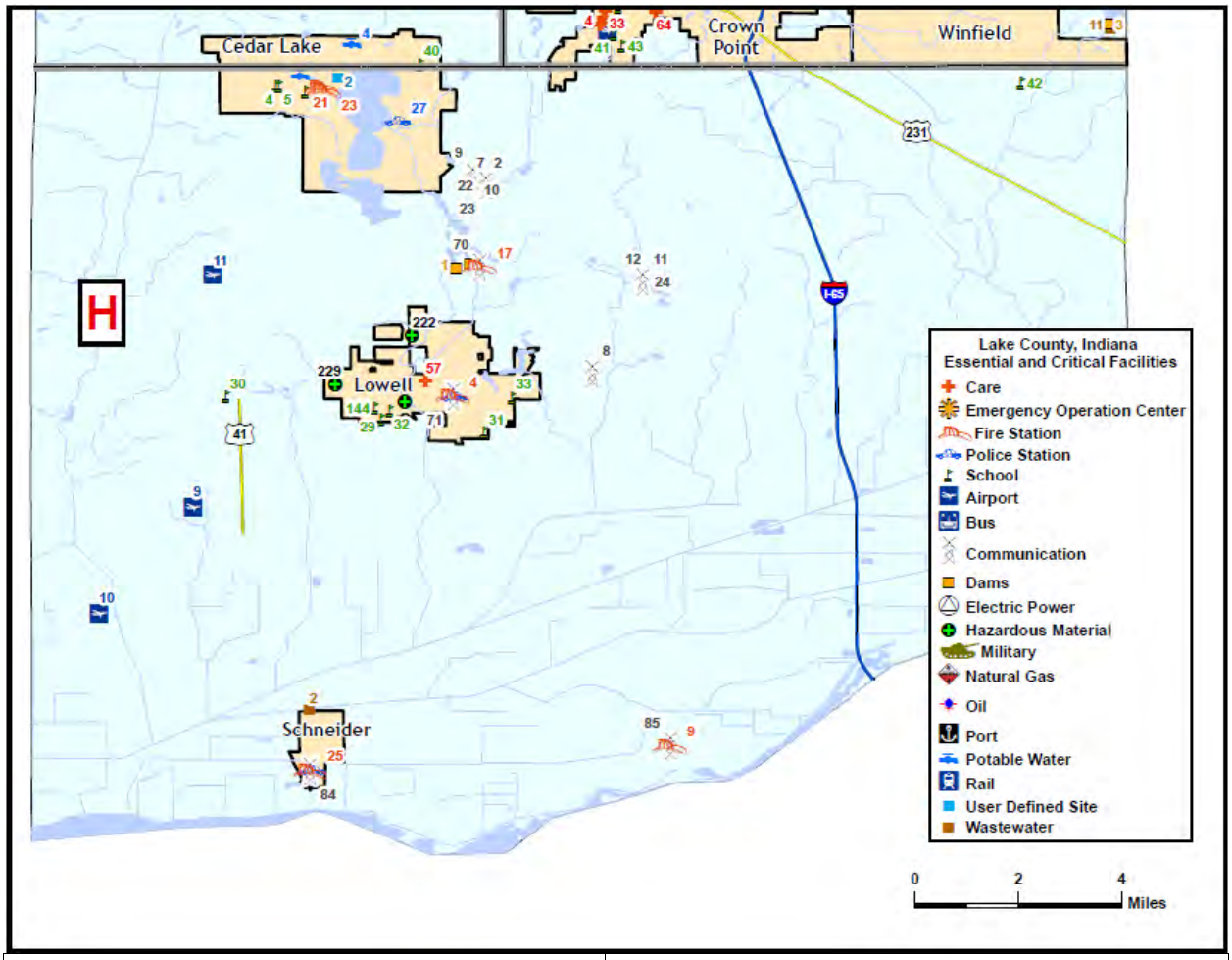
Region G



ID#	Name	Facility Type	ID#	Name	Facility Type
1	St. Anthony	Airport	18	NEW	Communication
12	NIPSCO Southlake Complex	Airport	72	Fire Station #2	Communication
13	Kirk	Airport	3	Lake of the Four Seasons (Lower)	Dam
15	Broadway Methodist	Airport	5	GS DD No B-64 (GC 17)	Dam
6	Chicago Charter Express	Bus	4	Crown Point Civil Defense	EOC
4	St. Anthony Medical Ctr of Crown Point	Care	3	Crown Point City Fire Dept	Fire Dept
5	Methodist Hospital Southlake Campus	Care	22	Ross Township Fire Station	Fire Dept
6	Southlake Ctr for Mental Health	Care	32	LOFS Volunteer Fire Force	Fire Dept
13	Novamed Eye Surgery Ctr Merrillville	Care	27	Vesuvius USA - Crown Point Plant	Hazmat Site
15	IMA Endoscopy Surgical Ctr	Care	5	NIPSCO	Natural Gas
16	Grand Park Surgical Ctr Inc	Care	1	Lakes Of Four Seasons Security	Police Dept
19	Merrillville Ctr for Advanced Surgery	Care	7	Crown Point Police Dept	Police Dept
23	Lake Park Surgicare LLC	Care	12	Lake County Sheriff Bureau-Id	Police Dept
24	Apac Surgery Ctr II	Care	1	Eagle Park Community School	School

ID#	Name	Facility Type	ID#	Name	Facility Type
28	Merrillville WIC Program	Care	39	Robert Taft Middle School	School
33	St. Anthony Medical Ctr	Care	41	Dwight D Eisenhower Elem Sch	School
34	Methodist Hospital Southlake Campus	Care	43	Crown Point High School	School
48	St. Anthony Home	Care	44	Lake Street Elementary School	School
54	Southlake Nursing and Rehab Ctr	Care	45	Solon Robinson Elementary Sch	School
56	Colonial Nursing Home	Care	46	Jerry Ross Elementary School	School
64	Wittenberg Lutheran Village	Care	47	Timothy Ball Elementary Sch	School
65	Lincolnshire Health Care Ctr	Care	145	Saint Mary School	School
68	Chicagoland Christian Village	Care	4	Winfield Township WWTP	WWTP
72	Progressive Care Unit	Care	5	Deep River Water Park WWTP	WWTP
74	Outlook Pointe at Merrillville	Care	10	Crown Point WWTP	WWTP
76	Alterra Sterling House of Merrillville	Care	11	Twin Lakes Utility	WWTP
82	Broadwest Surgical Ctr	Care			

Region H



ID#	Name	Facility Type	ID#	Name	Facility Type
9	Wietbrock	Airport	21	Cedar Lake Ambulance Svc	Fire Dept
10	Lowell	Airport	23	Cedar Lake Vol. Fire-Ambulance	Fire Dept
11	Sutton's Field	Airport	25	West Creek Township Fire Dept	Fire Dept
57	Lowell Healthcare Ctr	Care	221	Rieter Automotive N.A. Inc	Hazmat Site
2	WYIN	Communication	222	SACO Inds Inc	Hazmat Site

ID#	Name	Facility Type	ID#	Name	Facility Type
7	WYIN	Communication	224	Avery Dennison Mfd	Hazmat Site
8	WZVN	Communication	6	Lowell Police Dept	Police Dept
9	WZVN	Communication	16	Schneider Police Dept	Police Dept
10	WZVN	Communication	27	Cedar Lake Police Dept	Police Dept
11	WXRD	Communication	3	Water Tower Entry Point 1	Potable Water
12	WXRD	Communication	43	Lowell Water Treatment Plant	Potable Water
22	910409MF	Communication	2	Jane Ball Elementary School	School
23	910409MF	Communication	4	Hanover Central Jr High	School
24	WWLO	Communication	5	Hanover Central High Sch	School
46	New Emergency Siren	Communication	29	Oak Hill Elementary School	School
47	Emergency Siren	Communication	30	Lake Prairie Elementary Sch	School
48	Cedar Lakes Public Works Emergency Siren	Communication	31	Three Creeks Elem School	School
70	Fire Station	Communication	32	Lowell Middle School	School
71	Fire Station	Communication	33	Lowell Senior High School	School
84	Fire Station	Communication	42	Winfield Elementary School	School
85	Shelby Fire Station	Communication	144	Saint Edward's School	School
1	Lake Dalecarlia Dam (East)	Dam	197	Trinity Evangelical Lutheran Preschool	School
2	Lake Dalecarlia Dam (West)	Dam	198	Lowell Christian Academy	School
6	No name given	Dam	2	Cedar Lake Public Works Dept	User Defined Site
4	Lowell Fire Dept	Fire Dept	2	Schneider WWTP	WWTP
9	Shelby Fire Dept	Fire Dept	16	Lowell Wastewater Treatment Plant	WWTP
17	Fire Dept	Fire Dept			

Appendix F – USGS Stream Gauge Data

The following gauge information was obtained from The National Oceanic and Atmospheric Administration (NOAA) Advanced Hydrologic Prediction Service website (www.weather.gov/ahps/). For Lake County, data is provided for two points: Little Calumet River at Munster and Kankakee River at Shelby.

Little Calumet River at Munster

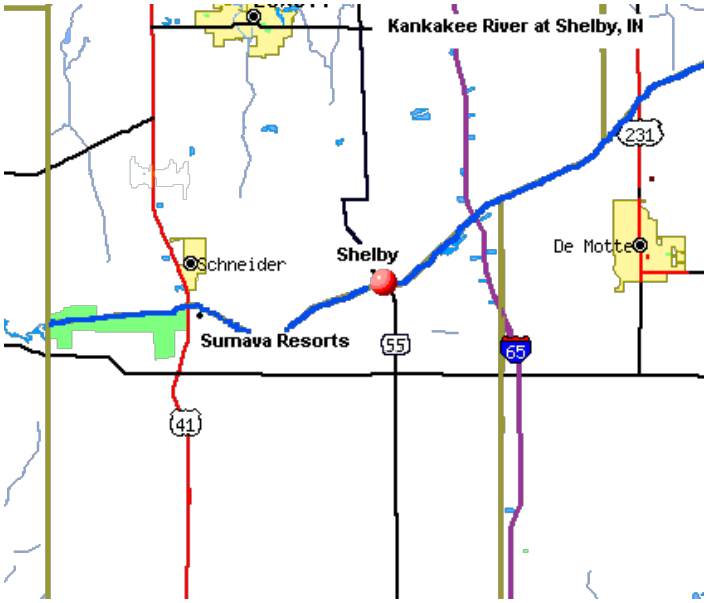
Flood Categories (in feet)

Major Flood Stage:	17
Moderate Flood Stage:	14
Flood Stage:	12
Action Stage:	11.5

Historical Crests
(1) 17.31 ft on 09/14/2008
(2) 17.03 ft on 11/28/1990
(3) 16.40 ft on 06/14/1981
(4) 16.20 ft on 07/19/1996
(5) 16.03 ft on 12/04/1982
(6) 15.68 ft on 02/22/1997
(7) 15.66 ft on 06/02/1989
(8) 15.35 ft on 05/13/2002
(9) 14.88 ft on 08/25/2007
(10) 14.43 ft on 12/25/1965

Feet	Flood Impacts
15.0	Flooding begins to affect some residences near the river.
12.0	Minor overbank flooding immediately adjacent to the river begins.

Kankakee River at Shelby



Flood Categories (in feet)

Major Flood Stage:	12.5
Moderate Flood Stage:	11
Flood Stage:	9
Action Stage:	8.8

Historical Crests
(1) 12.98 ft on 03/24/1982
(2) 12.86 ft on 09/18/2008
(3) 12.32 ft on 01/14/2005
(4) 12.25 ft on 03/09/1985
(5) 12.23 ft on 07/25/1996
(6) 12.11 ft on 03/02/1997
(7) 11.92 ft on 08/23/1990
(8) 11.91 ft on 01/02/1991
(9) 11.80 ft on 01/08/1993
(10) 11.78 ft on 04/29/1999

Feet	Flood Impacts
13.0	Indiana Route 55 is flooded. Extensive flooding occurs to the Sumava Resorts area. Water approaches the top of levees.
12.5	Water flows over part of US 41.
11.5	Flood waters surround a number of homes located 1 mile east of Sumava Resorts. Some homes are affected just across the state line in Illinois.
10.0	Flooding affects county and local roads. Wildwood Estates and Sumava Resorts begin to experience some flooding.
9.0	Lowland agricultural flooding begins.

Appendix G – Adopting Resolutions

Resolution #_____

ADOPTING THE LAKE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, Lake County recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHERAS, Lake County participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the Lake County Board hereby adopts the Lake County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED that the Lake County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Indiana Emergency Management Agency and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS _____ Day of _____, 2010.

_____
County Board Member

_____
County Board Member

_____
County Board Member

_____
Attested by: County Clerk