

**COOK COUNTY  
MULTI-JURISDICTIONAL  
HAZARD MITIGATION PLAN  
VOLUME 2 - Municipal Annexes**

**Hazel Crest Annex**

**FINAL**

July 2019

Prepared for:



Cook County  
Department of Homeland Security and Emergency Management  
69 W. Washington St., Suite 2600  
Chicago, Illinois 60602

Toni Preckwinkle  
President  
Cook County Board of Commissioners

William Barnes  
Executive Director  
Cook County Department of Homeland  
Security & Emergency Management

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## Hazard Mitigation Point of Contact

<b>Primary Point of Contact</b>	<b>Alternate Point of Contact</b>
Charles Dryer, Public Works Director 3000 W. 170th Pl. Hazel Crest, Illinois 60429 Telephone: 708-335-9620 Email: <a href="mailto:cdryer@villageofhazelcrest.com">cdryer@villageofhazelcrest.com</a>	Samuel Hunter, Interim Fire Chief 3000 W. 170th Pl. Hazel Crest, IL 60429 Telephone: 708-335-9630 ext. 511 Email: <a href="mailto:shunter@villageofhazelcrest.com">shunter@villageofhazelcrest.com</a>

## Jurisdiction Profile

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation:** 1911
- **Current Population:** The 2018 US Census population estimate for Hazel Crest was 13,694.
- **Population Growth:** From 2010 to 2016, the population in Hazel Crest declined by 1.5 percent, following a declining trend that started from 200 to 2010, with a decrease of around 4 percent.
- **Location and Description:** The village is bordered by Markham to the north, Harvey to the northeast, East Hazel Crest to the east, Homewood to the southeast, Flossmoor to the south and Country Club Hills to the west. Interstate 80 parallels the south border. According to the 2010 census, the village has a total area of 3.41 square miles (8.8 km<sup>2</sup>), of which 3.39 square miles (8.8 km<sup>2</sup>) (or 99.41%) is land and 0.02 square miles (0.052 km<sup>2</sup>) (or 0.59%) is water.
- **Brief History:** William and Carrie McClintock arrived in the area in 1890, purchasing 80 acres between Homewood and Harvey. They were impressed by the activity along the Illinois Central Railroad, especially with the upcoming World’s Columbian Exposition. McClintock platted and registered the land as South Harvey, anticipating benefits from the interest in and advertising for the planned industrial city of Harvey. However, South Harvey was fairly quickly annexed by the village of Homewood. By late 1895, resident’s organized a community church and led a successful campaign to de-annex from Homewood. Carrie McClintock led a petition drive to change the name from South Harvey to Hazel Crest, after the many thickets of hazelnut bushes there. In 1910 the area had 310 residents, who voted to incorporate as Hazel Crest in 1911. Residents soon began municipal services, a volunteer fire department, a public school, and St. Anne’s Roman Catholic Church.
- **Climate:** The climate in the Village of Hazel Crest is classified as humid continental, with all four seasons distinctly represented: wet springs; hot/often humid summers; pleasant autumns; and cold winters. Annual precipitation is average - reaching its lowest points in the months of January and February and peaks in the months of May and June. Snowfall in the City has ranged from 9.8 inches (1920–21) up to 89.7 inches (1978–79). Winter conditions can persist well into April and even occasionally into May. Thunderstorms are especially prevalent in the spring as the Village’s proximity to Chicago’s lakeside location makes it a center of conflicts between large volumes of warmer and colder air, triggering many kinds of severe weather. In the summer humidity is usually moderately high and temperatures ordinarily reach anywhere between 78 and 92 °F (26 and 33 °C). Overnight temperatures in summer usually drop to around 65–70 °F (18–21 °C). Although in July and August, there are usually several nights where the temperature drops below 60 °F (16 °C). The community’s yearly precipitation is on average 36 inches; however, during the summer, rain arises from short-lived, hit-or-miss rain rather than actual prolonged rainfalls as thunderstorms also occur with regularity at night. In a normal summer, temperatures exceed 90 °F (32 °C) on 23 days. Summer is both the rainiest and sunniest season. The extreme heat that Hazel Crest is capable of experiencing during the height of the summer season can persist into the autumn season. Temperatures have reached 100 degrees as late as September 7 (with 99 °F or 37 °C occurring as late as September 29), and temperatures have reached the lower-to-mid 90s Fahrenheit (low 30s Celsius) as late as October 6. Conversely,

temperatures have dropped below freezing overnight as early as September 23, and subzero temperatures (below  $-18^{\circ}\text{C}$ ) have arrived as early as November 23. Therefore, Autumn, in some ways, is a calmer season than any of the other three in the Village of Hazel Crest.

- **Governing Body Format:** The Village of Hazel Crest operates under the Village President/Trustee form of government. The legislative body consists of the Village President, Board of six Trustees and Village Manager. The Village President and Board of Trustees serve a term of four years. This body of Government will assume the responsibility for the adoption and implementation of this plan. The Village Manager is responsible for day-to-day operation of the Village and oversees 8 departments including the Village Administrators Office, Finance Department, Building Department, Fire Department, Police Department, Public Works Department, Water Department, and Animal Department.
- **Development Trends:** Early development occurred in the vicinity of 170th Street, between the Illinois Central Railroad and Dixie Highway. As the Village grew, this became the town center and more homes were built in the area west of Dixie Highway. This older section of the Village is now known as Hazel Crest Proper. In more recent times the old town center declined as government offices relocated and price conscious residents were attracted to new outlying commercial developments. The bigger portion of the Village, south of I -80/I-294 is comprised mostly of newer 1960s, 1970s and 1980s subdivisions with single-family homes arranged along winding curvilinear streets. Expansive open space areas, parks and creeks/floodways weave through the developed areas and, in combination with the undulating terrain, contribute to a “green” and pleasant overall appearance. Higher density residential developments are found at several locations. A variety of housing types are available and there is an adequate stock of affordable and special-need housing South Suburban Hospital, a full service acute care facility, is located at 177th Street and Kedzie Avenue. Roadside commercial developments are located along some of the main arterial streets. The largest concentrations of retail space are located along 183rd Street west of Kedzie Avenue and at the 175th Street and Kedzie Avenue intersection. Industrial development is very limited and mostly confined to the south side of 167th Street east of Kedzie Avenue. There are currently many properties available in Hazel Crest and can be viewed on the Village website for those interested.

## Capability Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

<b>TABLE: LEGAL AND REGULATORY CAPABILITY</b>					
	<b>Local Authority</b>	<b>State or Federal Prohibitions</b>	<b>Other Jurisdictional Authority</b>	<b>State Mandated</b>	<b>Comments</b>
<b>Codes, Ordinances &amp; Requirements</b>					
Building Code	Yes	No	No	Yes	Ord. No. 14-2012, § 3, 7-24-12
Zonings	Yes	No	No	Yes	Appendix C - Zoning : 2008
Subdivisions	Yes	No	No	No	Appendix A – Subdivision Regulations: 1958
Stormwater Management	Yes	No	Yes	Yes	Ord. No. 13-2008, § 1, 6-10-08
Post Disaster Recovery	No	No	No	No	
Real Estate Disclosure	No	No	Yes	Yes	(765 ILCS 77/) Residential Real Property Disclosure Act.
Growth Management	No	No	No	No	
Site Plan Review	Yes	No	No	No	Ord. No. 23-2008, § 1, 10-14-08
Public Health and Safety	Yes	No	Yes	Yes	Cook County Board of Health. Code 1956, § 7.03
Environmental Protection	No	No	No	Yes	IEPA
<b>Planning Documents</b>					

General or Comprehensive Plan	Yes	No	No	No	Hazel Crest Comprehensive Plan March 2007
<i>Is the plan equipped to provide linkage to this mitigation plan?</i>					Yes - Land Use
Floodplain or Basin Plan	No	No	No	No	
Stormwater Plan	No	No	Yes	No	MWRD Detailed Watershed Plan
Capital Improvement Plan	No	No	No	No	
<i>What types of capital facilities does the plan address?</i>					N/A
<i>How often is the plan revised/updated?</i>					N/A
Habitat Conservation Plan	No	No	No	No	
Economic Development Plan	No	No	Yes	Yes	The Economic Development Commission is charged with reviewing all economic development related programs and incentives including tax incentives offered through the Cook County 6b program.
Shoreline Management Plan	No	No	No	No	
<b>Response/Recovery Planning</b>					
Comprehensive Emergency Management Plan	No	No	Yes	Yes	Cook County DHSEM
Threat and Hazard Identification and Risk Assessment	No	No	Yes	No	Cook County DHSEM Preparing THIRA
Terrorism Plan	No	No	Yes	Yes	Cook County DHSEM
Post-Disaster Recovery Plan	No	No	No	No	

Continuity of Operations Plan	No	No	Yes	No	Cook County DHSEM
Public Health Plans	No	No	Yes	No	Cook County DPH

<b>TABLE: FISCAL CAPABILITY</b>	
<b>Financial Resources</b>	<b>Accessible or Eligible to Use?</b>
Community Development Block Grants	Yes
Capital Improvements Project Funding	No
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	Yes
Withhold Public Expenditures in Hazard-Prone Areas	Yes
State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes

<b>TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY</b>		
<b>Staff/Personnel Resources</b>	<b>Available?</b>	<b>Department/Agency/Position</b>
Planners or engineers with knowledge of land development and land management practices	Yes	Engineering Consultant, Economic Development, and Public Works
Engineers or professionals trained in building or infrastructure construction practices	Yes	Engineering Consultant and Public Works
Planners or engineers with an understanding of natural hazards	Yes	Engineering Consultant and Public Works
Staff with training in benefit/cost analysis	Yes	Engineering Consultant
Surveyors	Yes	Engineering Consultant
Personnel skilled or trained in GIS applications	Yes	Engineering Consultant and Cook County GIS Consortium



Scientist familiar with natural hazards in local area	No	
Emergency manager	Yes	Fire Chief
Grant writers	Yes	Engineering Consultant

**TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE**

What department is responsible for floodplain management in your jurisdiction?	Public Works Department
Who is your jurisdiction’s floodplain administrator? (department/position)	Public Works Department
Are any certified floodplain managers on staff in your jurisdiction?	Village appointed engineer
What is the date of adoption of your flood damage prevention ordinance?	Ord. No. 13-2008, § 1, 6-10-08
When was the most recent Community Assistance Visit or Community Assistance Contact?	10/18/1997. Community Assistance Visit was closed 7/21/2003
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Yes. Certified Floodplain Management and more technical training opportunities
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No, but the Village is interested in participating.

**TABLE: COMMUNITY CLASSIFICATIONS**

	Participating?	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	Yes	Unknown	Unknown

Public Protection/ISO	Yes	Unknown	Unknown
StormReady	Yes	Gold (Countywide)	2014
Tree City USA	Yes	Recognized	1986

## Jurisdiction-Specific Natural Hazard Event

The information provided below was solicited from the jurisdiction and supported by NOAA and other relevant data sources.

The *Natural Hazard Events Table* lists all past occurrences of natural hazards within the jurisdiction. Repetitive flood loss records are as follows:

- Number of FEMA-Identified Repetitive Loss Properties: 2
- Number of FEMA-Identified Severe Repetitive Loss Properties: 0
- Number of Repetitive Flood Loss/Severe Repetitive Loss Properties That Have Been Mitigated: 0

TABLE: NATURAL HAZARD EVENTS			
Type of Event	FEMA Disaster Number (if applicable)	Date	Preliminary Damage Assessment
Severe Weather	-	7/13/2016	-
Severe Storms, Straight-Line Winds, Flooding	DR-4116	4/26/2013	-
Severe Winter Snow Storms	DR-1960	1/31/2011	-
Severe Storms and Flooding	DR-1935	7/19/2010	-
Severe Storms and Flooding	DR-1800	9/13/2008	-
Severe Storms and Flooding	DR-1729	8/20/2007	-

### Jurisdiction-Specific Hazards and Impacts

Hazards that represent a county-wide risk are addressed in the Risk Assessment section of the 2019 Cook County Multi-Jurisdictional Hazard Mitigation Plan Update. This section only addresses the hazards and their associated impacts that are **relevant** and **unique** to the municipality.

**Flood:** Flooding occurs as a result of heavy rain in Pot Hills and Twin Creeks (these areas are East of Kedzie 178th -190th). In addition, the Village's over 100-year-old water mains could contribute to major flooding due to any kind of shift in-ground or eruption.

**High Winds:** In the case of high winds, the Village will determine what trees and damage materials are needed for disposal.

**Extreme Cold:** The Village is susceptible to flooding as a result of extreme cold, in that the temperature could cause water main breaks.

**Extreme Heat:** June 15th 2018 - Highs could push past 95 degrees, residents who do not have access to air conditioning, are encouraged to utilize cooling centers open throughout Cook County.

**Severe Weather:** July 13th 2016 - A well-organized complex of thunderstorms progressed from west to east across northern Illinois and northwest Indiana, bringing scattered wind damage to mainly areas along and south of the I-80 corridor. Some of the more pronounced wind damage occurred in Kankakee County based on reports. In addition, heavy rainfall occurred causing patchy minor flooding. Large tree over one foot in diameter downed.

**Widespread Power Outage:** Hazel Crest assesses the need for identifying community shelters (generator(s), cots, blankets, and portable communication devices, i.e. radios.) in the event of a natural disaster.

## Hazard Risk Ranking

The *Hazard Risk Ranking Table* below presents the ranking of the hazards of concern. Hazard area extent and location maps are included at the end of this chapter. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes.

<b>TABLE: HAZARD RISK RANKING</b>		
<b>Rank</b>	<b>Hazard Type</b>	<b>Risk Rating Score (Probability x Impact)</b>
1	Severe Weather	54
2	Severe Winter Weather	54
3	Tornado	45
4	Earthquake	32
5	Flood	15
6	Drought	2
7	Dam Failure	0

## Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2019 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2019 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2014.

The *Hazard Mitigation Action Plan Matrix Table* below lists the actions that make up the jurisdiction’s hazard mitigation plan. The *Mitigation Strategy Priority Schedule Table* identifies the priority for each action.

TABLE: HAZARD MITIGATION ACTION PLAN MATRIX						
Status	Hazards Mitigated	Objectives Met	Lead Agencies	Estimated Cost	Sources of Funding	Timeline/Projected Completion Date (a)
<b>Action H4.1</b> —Improve Stormwater drainage system capacity by cleaning and clearing existing ditches of debris and any other obstructions that would impede drainage.						
Ongoing	Flood, Severe Weather, Severe Winter Weather	1, 2, 9, 13	City of Hazel Crest	Low	IEPA, Grants	Ongoing
<b>Action H4.2</b> —Protect infrastructure and critical facilities from damage by engineering and/or retrofitting facilities to withstand hazards.						
Ongoing	All	1, 2, 9, 13	City of Hazel Crest	High	General Revenue, Grant	Long-term
<b>Action H4.3</b> —Improve stormwater drainage capacity by increasing the capacity of the City’s storm sewer drainage system.						
Ongoing	Flood, Severe Weather	1, 2, 9, 13	City of Hazel Crest	High	General Revenue, Grant	Long-term
<b>Action H4.4</b> —Produce and distribute family and traveler emergency preparedness information about severe winter weather hazards.						

Ongoing	Severe Winter Weather	1, 5, 8	City of Hazel Crest	Low	General Revenue	Short-term
<b>Action H4.5</b> —The televising and repairing of all sanitary sewer lines and the rehabilitation/sealing of all sanitary structures through-out the Village to eliminate infiltration and stop sewer backups.						
Ongoing	Flood, Severe Weather	1, 2, 9	City of Hazel Crest	High	General Revenue, Grant	Long-term
<b>Action H4.6</b> —Participate in the Community Rating System.						
Ongoing	Flood	3, 4, 5, 6, 7, 9, 10, 11, 13	City of Hazel Crest	Low	General Revenue	Short-term
<b>Action H4.7</b> —Develop and maintain a GIS database to track community vulnerability and exposure in known hazard areas.						
Ongoing	Multi-Hazard	1, 2, 5, 6	City of Hazel Crest	High	General Revenue	Short-term and Ongoing
<b>Action H4.8</b> —Completing a stormwater drainage study for known problem areas.						
Ongoing	Flood, Severe Weather	3, 13	City of Hazel Crest	Medium	General Revenue, Grant	Short-term
<b>Action H4.9</b> —Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone areas to prevent future structure damage. Give priority to properties with exposure to repetitive losses.						
Ongoing	All	7, 13	City of Hazel Crest	High	FEMA Hazard Mitigation Grants	Long-term (depending on funding)
<b>Action H4.10</b> —Continue to support the county-wide actions identified in this plan.						
Ongoing	All	All	City of Hazel Crest	Low	General Fund	Short- and Long-term
<b>Action H4.11</b> —Actively participate in the plan maintenance strategy identified in this plan.						
Ongoing	All	3, 4, 6	DHSEM, City of Hazel Crest	Low	General Fund	Short-term
<b>Action H4.12</b> —Consider participation in incentive-based programs such as Tree City and StormReady.						
Ongoing	All	3, 4, 5, 6, 7, 9, 10, 11, 13	City of Hazel Crest	Low	General Fund	Long-term
<b>Action H4.13</b> —Maintain good standing under the National Flood Insurance Program by implementing programs that meet or exceed the minimum NFIP requirements. Such programs include enforcing an						

adopted flood damage prevention ordinance, participating in floodplain mapping updates, and providing public assistance and information on floodplain requirements and impacts.						
Ongoing	Flooding	4, 6, 9	City of Hazel Crest	Low	General Fund	Short-term and Ongoing
<b>Action H4.14</b> —Where feasible, implement a program to record high water marks following high-water events.						
Ongoing	Flooding, Severe Weather	3, 6, 9	City of Hazel Crest	Medium	General Fund: FEMA Grant Funds (Public Assistance)	Long-term
<b>Action H4.15</b> —Integrate the hazard mitigation plan into other plans, programs, or resources that dictate land use or redevelopment.						
Ongoing	All	3, 4, 6, 10, 13	Engineering Consultant, Economic Development ; Public Works	Low	General Fund	Short-term
<b>Action H4.16</b> —Consider the development and implementation of a Capital Improvements Program (CIP) to increase the Village’s regulatory, financial and technical capability to implement mitigation actions.						
Ongoing	All	1, 2, 7	Public Works	High	CIP component of General Fund (if implemented )	Long-term
<b>Action H4.17</b> —Identify community shelters - generator(s), cots, blankets, and portable communication devices, i.e. radios.						
New	Extreme Heat, Extreme Cold, Widespread Power Outage	2, 6, 12	Fire Department	High	TBD	TBD
<b>Action H4.18</b> —Aggressively start replacing sewer lines in phases over a four year period to help prevent further sanitary sewer backup in residents' homes. Start replacing water mains and lines in phases as well.						
New	Flood, High Wind, Snow, Extreme Cold	9	TBD	High	TBD	TBD



**Action H4.19**—Replacing water main lines on Maple Ave and 177th Street.

New	Flood	9	Hazelcrest	1.2 million; High	Army Core	June 2020
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**Action H4.20**—Village Flooding Replacement of Storm and Sanitary Lines in Flooding Area.

New	Flood	1, 2, 3, 7	Village of Hazelcrest	4 million; High	Village	TBD
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(a) Ongoing indicates continuation of an action that is already in place. Short-term indicates implementation within five years. Long-term indicates implementation after five years.

**TABLE: MITIGATION STRATEGY PRIORITY SCHEDULE**

Action Number	Number of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Priority (a)
1	4	High	Medium	Yes	Yes	No	High
2	4	High	High	Yes	Yes	No	High
3	4	High	High	Yes	Yes	No	High
4	3	Medium	Low	Yes	No	No	Low
5	3	High	High	Yes	Yes	No	High
6	2	Medium	Low	Yes	No	Yes	Medium
7	4	Medium	High	Yes	Yes	No	Medium
8	3	Medium	High	Yes	Yes	No	Medium
9	2	High	Medium	Yes	Yes	No	Medium
10	13	Medium	Low	Yes	No	Yes	High
11	3	Medium	Low	Yes	Yes	Yes	High
12	9	Medium	Low	Yes	No	Yes	Medium
13	3	Medium	Low	Yes	No	Yes	High
14	3	Medium	Medium	Yes	Yes	No	Medium
15	5	Medium	Low	Yes	No	Yes	High
16	3	High	High	Yes	No	No	Medium

17	3	High	High	Yes	Unknown	Unknown	High	
18	1	High	High	Yes	Unknown	Unknown	Unknown	
19	1	High	High	Yes	Unknown	Unknown	High	
20	4	High	High	Yes	Unknown	Unknown	High	

(a) See Chapter 1 for explanation of priorities.

### New Mitigation Actions

The following are new mitigation actions created during the 2019 update.

**Action H - 4.17**

<b>Mitigation Action</b>	Identify community shelters - generator(s), cots, blankets, and portable communication devices, i.e. radios.
<b>Year Initiated</b>	2019
<b>Applicable Jurisdiction</b>	Hazel Crest
<b>Lead Agency/Organization</b>	Fire Department
<b>Supporting Agencies/Organizations</b>	Police Department
<b>Applicable Goal</b>	<ul style="list-style-type: none"> <li>• Develop and implement sustainable, cost-effective, and environmentally sound risk-reduction (mitigation) projects.</li> <li>• Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards.</li> </ul>
<b>Applicable Objective</b>	<ul style="list-style-type: none"> <li>• Reduce natural hazard-related risks and vulnerability to potentially isolated populations within the planning area.</li> <li>• Use the best available data, science and technologies to educate the public and to improve understanding of the location and potential impacts of natural hazards, the vulnerability of building types and community development patterns, and the measures needed to protect life safety.</li> <li>• Increase the resilience of (or protect and maintain) infrastructure and critical facilities.</li> </ul>
<b>Potential Funding Source</b>	TBD
<b>Estimated Cost</b>	TBD
<b>Benefits (loss avoided)</b>	TBD
<b>Projected Completion Date</b>	TBD
<b>Priority and Level of Importance (Low, Medium, High)</b>	High Priority
<b>Benefit Analysis (Low, Medium, High)</b>	High - Project will provide an immediate reduction of risk exposure for life and property.
<b>Cost Analysis (Low, Medium, High)</b>	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).
<b>Actual Completion Date</b>	TBD

Recommended Mitigation Action/Implementation Plan and Project Description	
<b>Action/Implementation Plan and Project Description:</b>	

Mitigation Action and Project Maintenance
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Year	Status	Comments
2019	New	
2020		
2021		
2022		
2023		

Mitigated Hazards	
	<b>All Hazards</b>
	Dam/Levee Failure
	Drought
	Earthquake
	Flood
X	Extreme Heat
	Lightning
	Hail
	Fog
	High Wind
	Snow
	Blizzard
X	Extreme Cold
	Ice Storms
	Tornado
	Epidemic or pandemic
	Nuclear Power Plant Incident
X	Widespread Power Outage
	Coastal Erosion
	Secondary Impacts from Mass Influx of Evacuees
	Hazardous Materials Incident

**Action H - 4.18**

<b>Mitigation Action</b>	Aggressively start replacing sewer lines in phases over four year period to help prevent further sanitary sewer backup in residents' homes. Start replacing water mains and lines in phases as well.
<b>Year Initiated</b>	2019
<b>Applicable Jurisdiction</b>	Hazel Crest
<b>Lead Agency/Organization</b>	TBD
<b>Supporting Agencies/Organizations</b>	TBD
<b>Applicable Goal</b>	<ul style="list-style-type: none"> <li>• Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards</li> <li>• Protect public services and critical facilities, including infrastructure, from loss of use during natural hazard events.</li> <li>• Develop, promote, and integrate mitigation action plans.</li> <li>• Promote public understanding of and support for hazard mitigation.</li> </ul>
<b>Applicable Objective</b>	<ul style="list-style-type: none"> <li>• Provide or improve flood protection on a watershed basis with flood control structures and drainage maintenance plans.</li> </ul>
<b>Potential Funding Source</b>	TBD
<b>Estimated Cost</b>	TBD
<b>Benefits (loss avoided)</b>	TBD
<b>Projected Completion Date</b>	TBD
<b>Priority and Level of Importance (Low, Medium, High)</b>	TBD
<b>Benefit Analysis (Low, Medium, High)</b>	High - Project will provide an immediate reduction of risk exposure for life and property.
<b>Cost Analysis (Low, Medium, High)</b>	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).
<b>Actual Completion Date</b>	TBD

Recommended Mitigation Action/Implementation Plan and Project Description	
<b>Action/Implementation Plan and Project Description:</b>	

Mitigation Action and Project Maintenance		
Year	Status	Comments
2019	New	

<b>2020</b>		
<b>2021</b>		
<b>2022</b>		
<b>2023</b>		

Mitigated Hazards	
	<b>All Hazards</b>
	Dam/Levee Failure
	Drought
	Earthquake
X	Flood
	Extreme Heat
	Lightning
	Hail
	Fog
X	High Wind
X	Snow
	Blizzard
X	Extreme Cold
	Ice Storms
	Tornado
	Epidemic or pandemic
	Nuclear Power Plant Incident
	Widespread Power Outage
	Coastal Erosion
	Secondary Impacts from Mass Influx of Evacuees
	Hazardous Materials Incident

**Action H - 4.19**

<b>Mitigation Action</b>	Replacing water main lines on Maple Ave and 177th Street.
<b>Year Initiated</b>	2019
<b>Applicable Jurisdiction</b>	Hazel Crest
<b>Lead Agency/Organization</b>	Hazel Crest
<b>Supporting Agencies/Organizations</b>	
<b>Applicable Goal</b>	<ul style="list-style-type: none"> <li>• Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards.</li> <li>• Protect public services and critical facilities, including infrastructure, from loss of use during natural hazards events.</li> <li>• Develop, promote, and integrate mitigation action plans.</li> <li>• Promote public understanding of and support for hazard mitigation</li> </ul>
<b>Applicable Objective</b>	<ul style="list-style-type: none"> <li>• Provide or improve flood protection on a watershed basis with flood control structures and drainage maintenance plans.</li> </ul>
<b>Potential Funding Source</b>	Army Core
<b>Estimated Cost</b>	1.2 Million
<b>Benefits (loss avoided)</b>	Every 13 feet out of 100 feet has a clamp. Several breaks a year. Less water loss and flooding.
<b>Projected Completion Date</b>	June 2020
<b>Priority and Level of Importance (Low, Medium, High)</b>	High Priority
<b>Benefit Analysis (Low, Medium, High)</b>	High - Project will provide an immediate reduction of risk exposure for life and property.
<b>Cost Analysis (Low, Medium, High)</b>	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).
<b>Actual Completion Date</b>	TBD

Recommended Mitigation Action/Implementation Plan and Project Description	
<b>Action/Implementation Plan and Project Description:</b>	

Mitigation Action and Project Maintenance		
Year	Status	Comments
2019	New	
2020		
2021		



<b>2022</b>		
<b>2023</b>		

Mitigated Hazards	
	<b>All Hazards</b>
	Dam/Levee Failure
	Drought
	Earthquake
X	Flood
	Extreme Heat
	Lightning
	Hail
	Fog
	High Wind
	Snow
	Blizzard
	Extreme Cold
	Ice Storms
	Tornado
	Epidemic or pandemic
	Nuclear Power Plant Incident
	Widespread Power Outage
	Coastal Erosion
	Secondary Impacts from Mass Influx of Evacuees
	Hazardous Materials Incident

**Action H - 4.20**

<b>Mitigation Action</b>	Village Flooding Replacement of Storm and Sanitary Lines in Flooding Area
<b>Year Initiated</b>	2019
<b>Applicable Jurisdiction</b>	
<b>Lead Agency/Organization</b>	Village of Hazelcrest
<b>Supporting Agencies/Organizations</b>	
<b>Applicable Goal</b>	<ul style="list-style-type: none"> <li>• Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards.</li> <li>• Protect public services and critical facilities, including infrastructure, from loss of use during natural hazard events</li> <li>• Develop, promote, and integrate mitigation action plans.</li> <li>• Promote public understanding of and support for hazard mitigation.</li> </ul>
<b>Applicable Objective</b>	<ul style="list-style-type: none"> <li>• Eliminate or minimize disruption of local government operations caused by natural hazards through all phases of emergency management.</li> <li>• Increase the resilience of (or protect and maintain) infrastructure and critical facilities.</li> <li>• Consider the impacts of natural hazards on future land uses in the planning area, including possible impacts from climate change.</li> <li>• Retrofit, purchase, or relocate structures in high hazard areas, including those known to be repetitively damaged.</li> </ul>
<b>Potential Funding Source</b>	Village
<b>Estimated Cost</b>	4 million
<b>Benefits (loss avoided)</b>	TBD
<b>Projected Completion Date</b>	TBD
<b>Priority and Level of Importance (Low, Medium, High)</b>	High Priority
<b>Benefit Analysis (Low, Medium, High)</b>	High - Project will provide an immediate reduction of risk exposure for life and property.
<b>Cost Analysis (Low, Medium, High)</b>	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).
<b>Actual Completion Date</b>	

**Recommended Mitigation Action/Implementation Plan and Project Description**

<b>Action/Implementation Plan and Project Description:</b>	
--	--

<b>Mitigation Action and Project Maintenance</b>		
<b>Year</b>	<b>Status</b>	<b>Comments</b>
2019	New	
2020		
2021		
2022		
2023		

<b>Mitigated Hazards</b>	
	<b>All Hazards</b>
	Dam/Levee Failure
	Drought
	Earthquake
X	Flood
	Extreme Heat
	Lightning
	Hail
	Fog
	High Wind
	Snow
	Blizzard
	Extreme Cold
	Ice Storms
	Tornado
	Epidemic or pandemic
	Nuclear Power Plant Incident
	Widespread Power Outage
	Coastal Erosion
	Secondary Impacts from Mass Influx of Evacuees
	Hazardous Materials Incident

### Ongoing Mitigation Actions

The following are ongoing actions with no definitive end or that are still in progress. During the 2019 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

**Action H - 4.1**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.1	Improve stormwater drainage system capacity by cleaning and clearing existing ditches of debris and any other obstructions that would impede drainage.	
Status Description: Yes	Ongoing activity. Clearing roots and debris in lines at a cost of \$77,000 average.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action H - 4.2**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.2	Protect infrastructure and critical facilities from damage by engineering and/or retrofitting facilities to withstand hazards	
Status Description: Yes	Ongoing activity.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action H - 4.3**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.3	Improve stormwater drainage capacity by increasing the capacity of the Village's storm sewer drainage system.	
Status Description: Yes	Limited funding available. Repaired three (3) points in sewer line breakage. 17002 POE, Edgewater and 17317 Kedzie cost \$60,000.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action H - 4.4**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.4	Produce and distribute family and traveler emergency preparedness information about severe winter weather hazards	
Status Description: Yes	Per Village's website and other outreach activities.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action H - 4.5**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.5	The televising and repairing of all sanitary sewer lines and the rehabilitation/sealing of all sanitary structures through-out the Village to eliminate infiltration and stop sewer backups.	
Status Description: Yes	Limited funding available at this time. Clearing all lines to line the sewer lines in phases.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action H - 4.6**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.6	Participate in the Community Rating System	
Status Description: Yes	Limited staffing available to begin the process; however, will soon be allocating staff to begin this task.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action H - 4.7**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.7	Develop and maintain a GIS database to track community vulnerability and exposure in known hazard areas.	
Status Description: Yes	Limited funding available. Had GIS system updated and built to suit village estimated cost of \$20,000.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action H - 4.8**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.8	Completing a stormwater drainage study for known problem areas.	
Status Description: Action Taken?	Ongoing activity. Had engineering firm outline problem areas and come up with estimates to repair.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		



**Action H - 4.9**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.9	Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone areas to prevent future structure damage. Give priority to properties with exposure to repetitive losses.	
Status Description: Action Taken?	Limited funding available at this time.	X
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action H - 4.10**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.10	Continue to support the county-wide actions identified in this plan.	
Status Description: Action Taken?	Ongoing activity.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action H - 4.11**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.11	Actively participate in the plan maintenance strategy identified in this plan.	
Status Description: Action Taken?	Ongoing activity.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action H - 4.12**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.12	Consider participation in incentive-based programs such as Tree City and StormReady.	
Status Description: Action Taken?	This consideration is ongoing. Will participate in 2017, if funding permits.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action H - 4.13**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.13	Maintain good standing under the National Flood Insurance Program by implementing programs that meet or exceed the minimum NFIP requirements. Such programs include enforcing an adopted flood damage prevention ordinance, participating in floodplain mapping updates, and providing public assistance and information on floodplain requirements and impacts.	
Status Description: Action Taken?	Ongoing activity.	O
<p>Completion status legend:  <b>N</b> = New    <b>O</b> = Action Ongoing toward Completion  <b>C</b> = Project Completed    <b>R</b> = Want Removed from Annex    <b>X</b> = No Action Taken</p>		

**Action H - 4.14**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.14	Where feasible, implement a program to record high water marks following high-water events.	
Status Description: No	Limited funding to begin this program. But will begin the process if funding permits in 2017.	X
<p>Completion status legend:  <b>N</b> = New    <b>O</b> = Action Ongoing toward Completion  <b>C</b> = Project Completed    <b>R</b> = Want Removed from Annex    <b>X</b> = No Action Taken</p>		

**Action H - 4.15**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.15	Integrate the hazard mitigation plan into other plans, programs, or resources that dictate land use or redevelopment,	
Status Description: Yes	Ongoing effort as the Village has existing up to date comprehensive plans and TODs in place.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action H - 4.16**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# H—4.16	Consider the development and implementation of a Capital Improvement Program (CIP) to increase the Village's regulatory, financial and technical capacity to implement mitigation actions.	
Status Description: Yes	The Village has a current CIP and will continue its ongoing efforts to increase the Village's regulatory, financial, and technical capacity to implement mitigation actions.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

### Completed Mitigation Actions

Hazel Crest has no completed actions at this time

## Future Needs to Better Understand Risk/Vulnerability

No needs have been identified at this time.

## Additional Comments

No additional comments at this time

## HAZUS-MH Risk Assessment Results

HAZEL CREST EXISTING CONDITIONS	
2010 Population	14,100
Total Assessed Value of Structures and Contents	\$3,309,804,80
Area in 100-Year Floodplain	179.88 acres
Area in 500-Year Floodplain	179.88 acres
Number of Critical Facilities	28

HAZARD EXPOSURE IN HAZEL CREST						
	Number Exposed		Value Exposed to Hazard		Total	% of Total Assessed Value Exposed
	Population	Buildings	Structure	Contents		
<b>Dam Failure</b>						
Buffalo Creek	0	0	\$0	\$0	<b>\$0</b>	0.00%
U. Salt Cr. #2	0	0	\$0	\$0	<b>\$0</b>	0.00%
Touhy	0	0	\$0	\$0	<b>\$0</b>	0.00%
U. Salt Cr. #3	0	0	\$0	\$0	<b>\$0</b>	0.00%
U. Salt Cr. #4	0	0	\$0	\$0	<b>\$0</b>	0.00%
<b>Flood</b>						
100-Year	39	12	\$2,890,982	\$1,445,491	<b>\$4,336,473</b>	0.13%



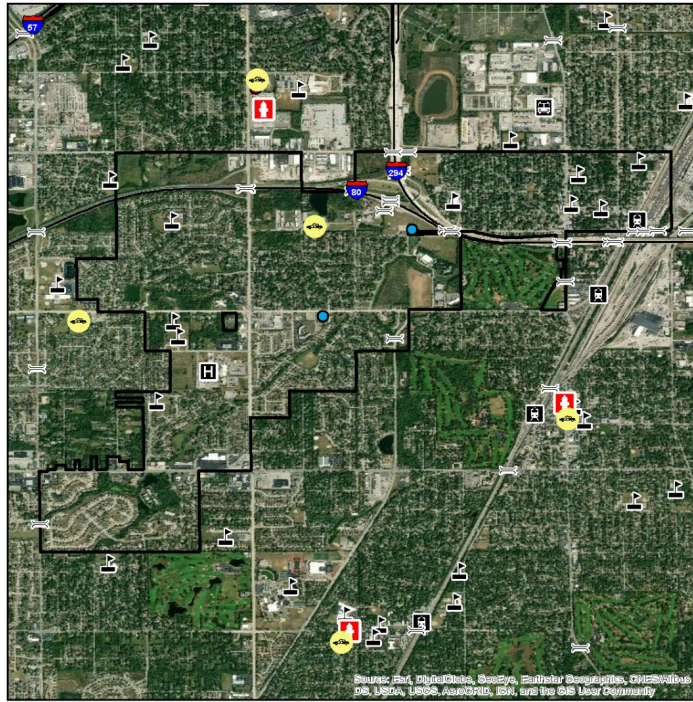
500-Year	523	161	\$35,918,860	\$17,959,430	<b>\$53,878,290</b>	1.63%
<b>Tornado</b>						
100-Year	—	—	\$334,109,174	\$179,075,390	<b>\$513,184,565</b>	15.50%
500-Year	—	—	\$1,406,892,709	\$1,057,594,979	<b>\$2,464,487,689</b>	74.46%

**ESTIMATED PROPERTY DAMAGE VALUES IN HAZEL CREST**

	Estimated Damage Associated with Hazard			% of Total Assessed Value Damaged
	Building	Contents	Total	
<b>Dam Failure</b>				
Buffalo Creek	\$0	\$0	<b>\$0</b>	0.00%
U. Salt Cr. #2	\$0	\$0	<b>\$0</b>	0.00%
Touhy	\$0	\$0	<b>\$0</b>	0.00%
U. Salt Cr. #3	\$0	\$0	<b>\$0</b>	0.00%
U. Salt Cr. #4	\$0	\$0	<b>\$0</b>	0.00%
<b>Earthquake</b>				
1909 Historical Event	\$13,072,486	\$3,565,292	<b>\$16,637,778</b>	0.50%
<b>Flood</b>				
10-Year	\$0	\$0	<b>\$0</b>	0.00%
100-Year	\$100,073	\$36,758	<b>\$136,831</b>	0.00%
500-Year	\$3,734,48	\$1,751,046	<b>\$5,485,532</b>	0.17%

<b>Tornado</b>				
100-Year	\$33,410,917	\$17,907,539	<b>\$51,318,456</b>	1.55%
500-Year	\$205,406,336	\$154,408,867	<b>\$359,815,203</b>	10.87%

# Hazard Mapping

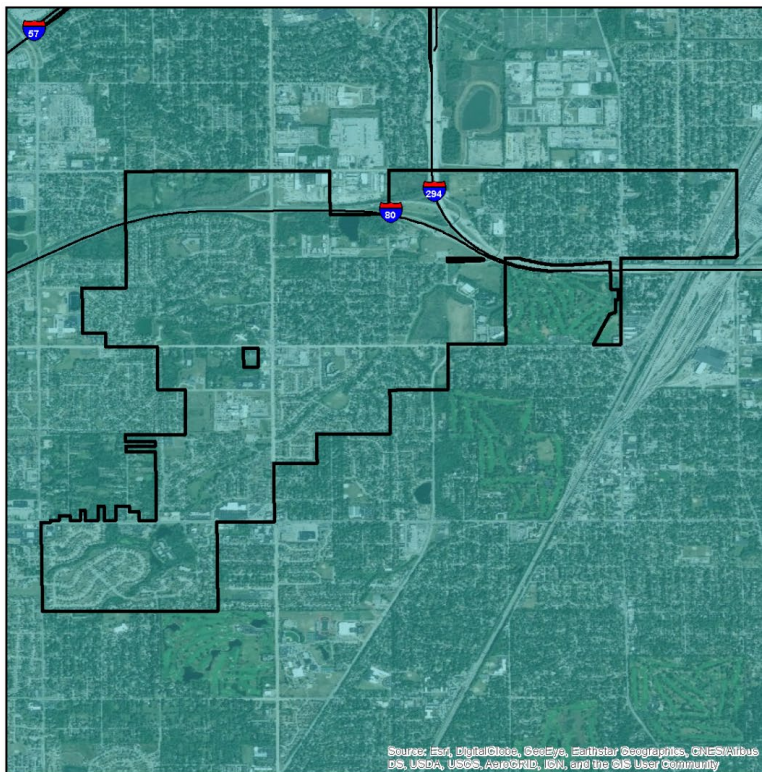
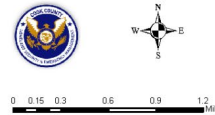


## VILLAGE OF HAZEL CREST

### CRITICAL INFRASTRUCTURE

- Oil Facilities
- Transit Centers
- Military Facilities
- Police Stations
- Fire Stations
- Hazardous Waste
- Airports
- Hospitals
- Highway Bridges
- Warming Centers
- Cooling Centers
- Schools
- Railroad Stations

Base Map Data Sources:  
Cook County, ESRI



## VILLAGE OF HAZEL CREST

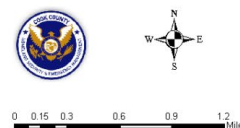
### PEAK GROUND ACCELERATION FOR A 100 YEAR EARTHQUAKE EVENT

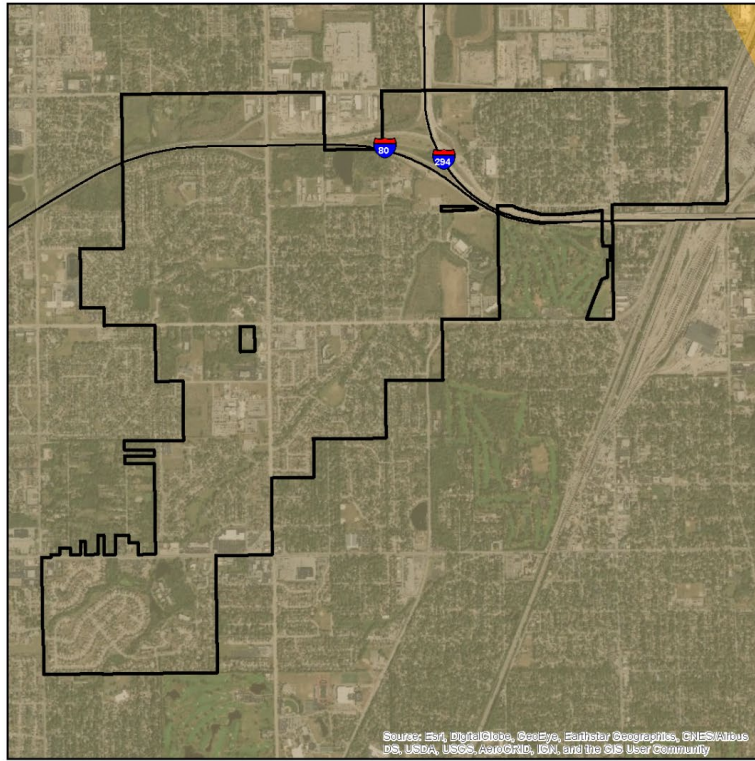
- Mercalli Scale, Potential Shaking**
- II-III Weak

Data provided by the USGS Earthquake Hazards Program and Cook County.

Probabilistic seismic-hazard maps were prepared for the conterminous United States for 2014 portraying peak horizontal acceleration and horizontal spectral response acceleration for 0.2- and 1.0-second periods with probabilities of exceedance of 10 percent in 50 years and 2 percent in 50 years. All of the maps were prepared by combining the hazard derived from spatially smoothed historical seismicity with the hazard from fault-specific sources. The acceleration values contoured are the random horizontal component. The reference site condition is firm rock, defined as having an average shear-wave velocity of 760 m/s in the top 30 meters corresponding to the boundary between NEHRP (National Earthquake Hazards Reduction Program) site classes B and C.

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**VILLAGE OF HAZEL CREST**  
**NATIONAL EARTHQUAKE HAZARD REDUCTION PROGRAM (NEHRP) SOIL CLASSIFICATION**

- TYPE**
- C - Very Dense Soil, Soft Rock
  - D - Stiff Soil
  - F - Site Specific Evaluation

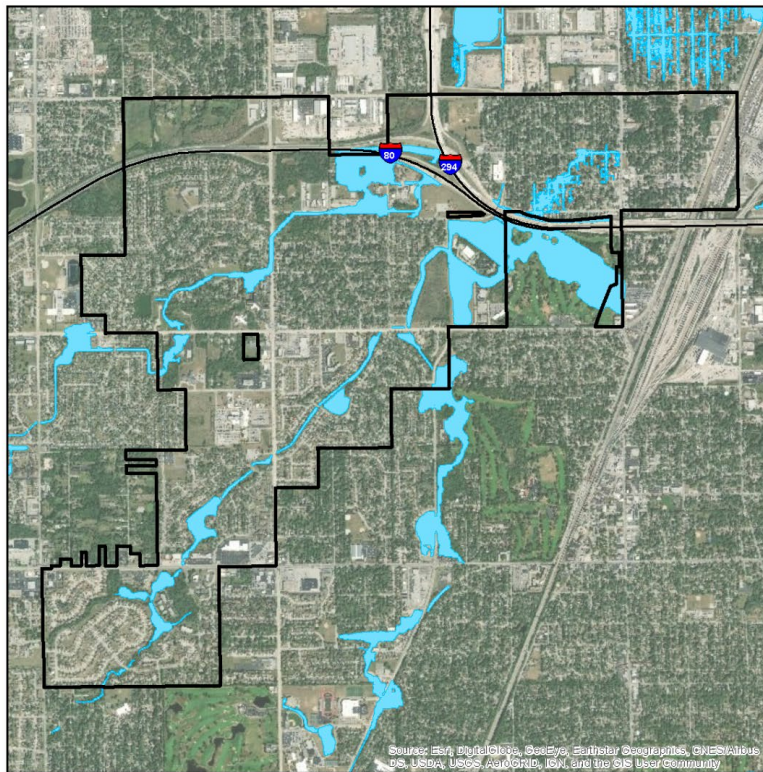
Data provided by the Illinois State Geological Survey and Cook County.

The Central United States Earthquake Consortium (CUSEC) State Geologists produced a regional Soil Site Class map (NEHRP Soil Profile Types Map), a Liquefaction Susceptibility Map and a Soil Response Map for the 8 states to be used in the FEMA New Madrid Catastrophic Planning Initiative Phase II work. The USGS Geologic Investigation Series I-2788 Map of Surficial Deposits and Materials in the Eastern and Central United States (East of 102 degrees West Longitude) by David S. Fullerton, Charles A. Burch and Jean N. Pomeroy (2003) was the base map used for this work. Each State Geological Survey produced its own state map version of the Soil Site Class and Liquefaction Susceptibility maps. The procedures outlined in the NEHRP provisions (Building Seismic Safety Council, 2004) and the 2003 International Building Codes (International Code Council, 2003) were followed to produce the soil site class maps. CUSEC State Geologists used the entire column of soils material down to bedrock and did not include any bedrock in the calculation of the average shear wave velocity for the column, since it is the soil column and the difference in shear wave velocity of the soils in comparison to the bedrock which influences much of the amplification.

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus ds, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**VILLAGE OF HAZEL CREST**  
**COOK COUNTY MWRDGC 100-YEAR INUNDATION AREA**

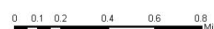
**COOK COUNTY MWRDGC 100-YEAR INUNDATION AREA**

- 100-year Inundation Area

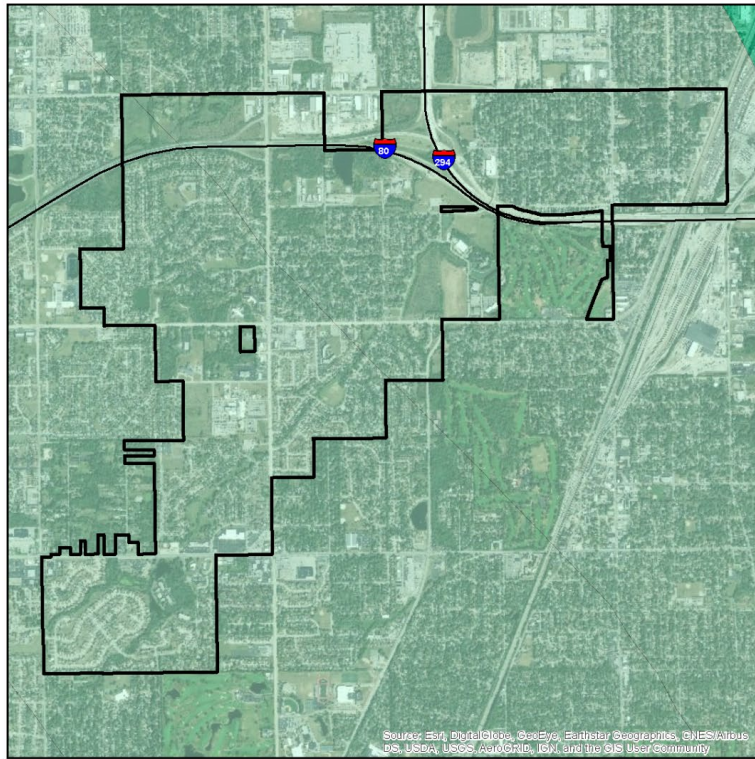
MWRDGC Data provided by Metropolitan Water Reclamation District of Greater Chicago and Cook County.

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**DISCLAIMER:** The Cook County MWRDGC 100-year Inundation Map is provided to show general flood risk information regarding floodplains and inundation areas. This map is not regulatory. Official FEMA Flood Insurance Study information and regulatory maps can be obtained from <http://www.fema.gov>.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus ds, USDA, USGS, AeroGRID, IGN, and the GIS User Community



### VILLAGE OF HAZEL CREST

#### LIQUEFACTION SUSCEPTIBILITY



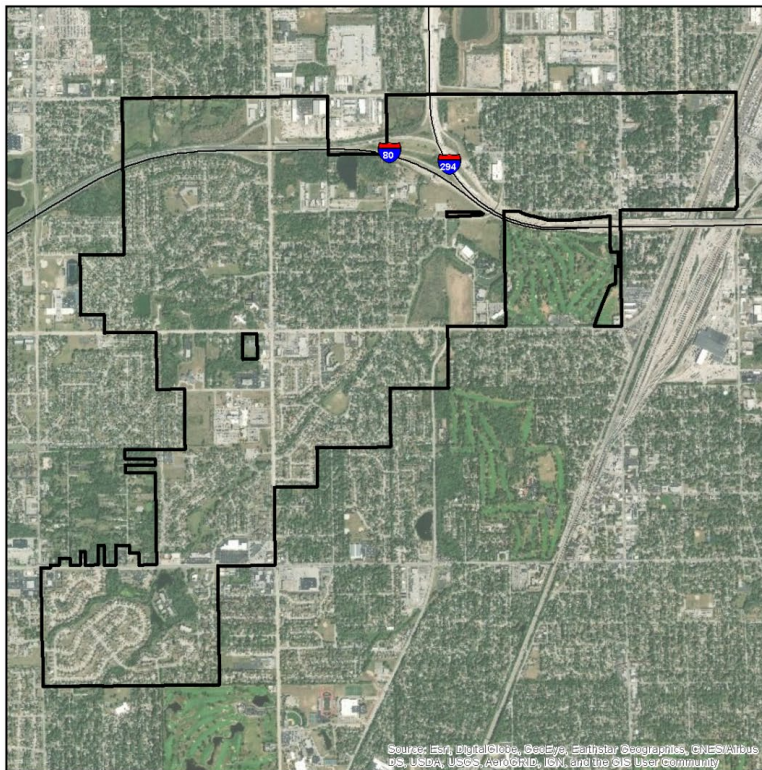
Data provided by the Illinois State Geological Survey and Cook County.

The Central United States Earthquake Consortium (CUSEC) State Geologists produced a regional Soil Site Class map (NEHRP Soil Profile Type Map), a Liquefaction Susceptibility Map and a Soil Response Map for the 8 states to be used in the FEMA New Madrid Catastrophic Planning Initiative Phase II work. The USGS Geologic Investigation Series I-2789 Map of Surficial Deposits and Materials in the Eastern and Central United States (East of 102 degrees West Longitude) by David S. Fullerton, Charles A. Bush and Jean N. Penehal (2003) was the base map used for this work. Each State Geological Survey produced its own state map version of the Soil Site Class and Liquefaction Susceptibility maps. The procedures outlined in the NEHRP provisions (Building Seismic Safety Council, 2004) and the 2003 International Building Codes (International Code Council, 2003) were followed to produce the soil site class maps. CUSEC State Geologists used the entire column of soils material down to bedrock and did not include any bedrock in the calculation of the average shear wave velocity for the column, since it is the soil column and the difference in shear wave velocity of the soils in comparison to the bedrock which influences much of the amplification.

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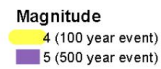


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus ds, USDA, USGS, AeroGRID, IGN, and the GIS User Community



### VILLAGE OF HAZEL CREST

#### 100- AND 500- YEAR TORNADO EVENTS



Historic tornado data provided by NOAA/NWS showing the initial points and paths of all F4 and F5 events observed from 1950 to 2017.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus ds, USDA, USGS, AeroGRID, IGN, and the GIS User Community