

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

**Brookfield Annex**

**FINAL**

July 2019

Prepared for:



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## Hazard Mitigation Point of Contact

Primary Point of Contact	Alternate Point of Contact
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## Jurisdiction Profile

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

- **Date of Incorporation:** 1893
- **Current Population:** The US Census 2016 population estimate for Brookfield was 18,753.
- **Population Growth:** Based on 2010 and 2016 Census data, there was a slight decrease in population of 1.16 percent. Brookfield is landlocked and so does not expect population growth.
- **Location and Description:** The Village of Brookfield covers about 3 square miles, about 13 miles west of the City of Chicago. Brookfield is home to the Brookfield Zoo, operated by the Chicago Zoological Society and owned by the Cook County Forest Preserve. The Village is between La Grange and La Grange Park to the west, McCook and Countryside to the south, Riverside and Lyons to the east, and North Riverside and Westchester to the north.
- **Brief History:** The Village of Brookfield was originally settled after the Chicago, Burlington and Quincy Railroad ran a line through the area in 1864. Samuel Eberly Gross, an attorney from Chicago, began buying up large parcels of land in what is now Brookfield. “Grossdale” was founded in 1889 as a place where working families could buy affordable homes with train access to the city. The town was incorporated in 1893. It was not until 1905 that the name of the community changed to Brookfield. In 1934, the Chicago Zoological Park opened. Commonly called the Brookfield Zoo, it quickly grew to gain international fame as a zoo, educational institution, and research facility.
- **Climate:** The area’s weather patterns are typical of the Midwest and Great Lakes region. Summers are warm, with average summer temperature in the low-80s, reaching the mid-90s annually. Winter weather is typically very cold, with averages in the low-20s and temperatures and wind chills below zero for a few weeks each year. Brookfield averages about 38 inches of snowfall per year, and receives an average 39 inches of rain.
- **Governing Body Format:** The Village of Brookfield has a Council-Manager form of government, with a Board of six Trustees and one President, elected to four year terms. This body will assume responsibility for adopting and implementing this plan. The Village has four departments: Administration and Finance, housing the Village Manager’s office, Finance, Building and Planning divisions; Fire; Police and Public Works, which is responsible for the Parks and Recreation division. The Village has eight advisory commissions and committees that report to the Board of Trustees.
- **Development Trends:** Brookfield’s development trends, like many other communities in the area, slowed significantly after the recession of 2008. Moderate development is anticipated over the next few years. Residential development is at the most significant pace of the last decade and the Village is beginning a new commercial economic development initiative, hoping to increase commercial activity within Brookfield. The Village has two established Tax Increment Financing (TIF) Districts: the Ogden Ave. TIF, in existence since 2008, and the adjacent Congress Park TIF, established in late 2011. The Congress Park TIF acquired property which had been distressed—the former Moose Hall property. The Village has established a temporary commuter

parking lot on the land. The Ogden Ave. TIF District has seen private development by current business owners mostly in the form of remodels and updating of facilities. There has also been new business located in the Ogden TIF, including Advance Auto Parts, Pita Pit, DJ's Scuba Shop, Marathon Gas Station and the redevelopment of two parcels into a new Dunkin' Donuts and retail location. In June of 2013, the Village purchased another parcel within the Ogden TIF along Blanchan Ave. The Village will continue to explore various development options in 2013 for both TIFs. As part of a comprehensive economic development strategy, staff continues to be extremely active in discussions with potentially new enterprises seeking to set up or relocate in the Village. Village staff is optimistic that as the economy strengthens, the TIF district will begin to see increased interest by developers. In May 2019, Village officials gave a warm welcome to 2 new multi-family developments in Brookfield. The first is 4531 Forest Avenue, which is the location of a 6-unit upscale, high-tech apartment building featuring all the technology "must-haves" of a contemporary building. The second building will be home to another 6-unit apartment, on the edge of the downtown at 8917 Grant. The developer, Michael Gatto, participated in a groundbreaking ceremony with Village officials. With the foundation already in place, the building is expected to be constructed over the remainder of the calendar year. This will also be the first structure to be built pursuant to the new Zoning Modernization standards. The Village has also been involved in a state panel to increase ways to attract millennials.

## 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>					<b>(Muni Code Chapter)</b>
Building Code	Yes	No	No	Yes	Chapter 12, 2008
Zonings	Yes	No	No	Yes	BOCA, 1996
Subdivisions	Yes	No	No	No	Chapter 48, 1964
Stormwater Management	Yes	No	Yes	Yes	Chapter 20, 2013
Post Disaster Recovery	Yes	No	No	No	Ord. 2012-03, 2012
Real Estate Disclosure	No	No	Yes	Yes	(765 ILCS77/) Residential Real Property Disclosure Act.
Growth Management	Yes	No	No	No	2020 Master Plan, adopted in 2004
Site Plan Review	Yes	No	No	No	Chapter 12, Art. 2 Div. 2, 2010
Public Health and Safety	Yes	No	No	Yes	Chapter 2, Art. 6 1980
Environmental Protection	Yes	No	No	No	Chapter 20, 2013
<b>Planning Documents</b>					

General or Comprehensive Plan	Yes	No	No	No	20 Year Plan/2004
<i>Is the plan equipped to provide linkage to this mitigation plan?</i>			Yes, The 2020 Master Plan, adopted in 2004, is a document that serves as a guide for redevelopment in commercial areas throughout the Village. The 2020 Master Plan is not a blueprint, but a tool, that the Village utilizes to outline the Village’s community and economic development goals, prioritize community and economic development initiatives, and explore various development opportunities.		
Floodplain or Basin Plan	No	No	No	No	
Stormwater Plan	No	No	Yes	No	Regional stormwater impacts are managed by MWRD. The Village lies within the Des Plaines River watershed planning area of MWRD’s comprehensive Stormwater Master Planning Program
Capital Improvement Plan	Yes	No	No	No	2013
<i>What types of capital facilities does the plan address?</i>					All public facilities
<i>How often is the plan revised/updated?</i>					Annually
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	Yes	No	Yes	Yes	Cook County DHSEM
Threat and Hazard Identification and Risk Assessment	No	No	Yes	No	Cook County DHSEM Preparing THIRA
Terrorism Plan	Yes	No	Yes	Yes	Cook County DHSEM
Post-Disaster Recovery Plan	No	No	No	No	
Continuity of Operations Plan	Yes	No	Yes	No	Cook County DHSEM
Public Health Plans	No	No	Yes	No	Cook County DPH

**TABLE: FISCAL CAPABILITY**

<b>Financial Resources</b>	<b>Accessible or Eligible to Use?</b>
Community Development Block Grants	No
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	No
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	No
Withhold Public Expenditures in Hazard-Prone Areas	No



State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	No

**TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY**

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Hancock Engineering Firm
Engineers or professionals trained in building or infrastructure construction practices	Yes	Hancock Engineering Firm
Planners or engineers with an understanding of natural hazards	Yes	Hancock Engineering Firm
Staff with training in benefit/cost analysis	Yes	Staff
Surveyors	Yes	Private Firm
Personnel skilled or trained in GIS applications	Yes	Cook County GIS Consortium
Scientist familiar with natural hazards in local area	No	
Emergency manager	Yes	Bridgeview EMA
Grant writers	Yes	Staff

**TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE**

What department is responsible for floodplain management in your jurisdiction?	Building and Planning
Who is your jurisdiction’s floodplain administrator? (department/position)	Chief Building Officer
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date of adoption of your flood damage prevention ordinance?	N/A
When was the most recent Community Assistance Visit or Community Assistance Contact?	03/20/1996
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?	No
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, not at this time

<b>TABLE: COMMUNITY CLASSIFICATIONS</b>			
	<b>Participating?</b>	<b>Classification</b>	<b>Date Classified</b>
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	Yes	Unknown	Unknown
Public Protection/ISO	Yes	Unknown	--
StormReady	Yes	Gold (Countywide)	2014
Tree City USA	Yes	N/A	1982

## 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: 13
- Number of FEMA-Identified Severe Repetitive Loss Properties: 1
- Number of Repetitive Flood Loss/Severe Repetitive Loss Properties That Have Been Mitigated: None

TABLE: NATURAL HAZARD EVENTS			
Type of Event	FEMA Disaster Number (if applicable)	Date	Preliminary Damage Assessment
Lightning	-	9/3/2018	\$5,000 in property damage.
Extended Winter	-	12/2013 - 3/2014	-
Flood	DR-4116	4/18/2013	-
Storm	-	7/1/2012	-
Storm	-	7/28/2011	-
Storm	-	7/10/2011	-
Storm	-	6/21/2011	-
Blizzard	-	2/1/2011	-
Wind Storm	-	10/26/2010	-
Flood	DR-1935	7/24/2010	-
Flood	DR-1800	9/4/2008	-
Blizzard	-	1/2/1999	-
Flood	DR-798	8/14/1987	-
Flood	DR-776	9/30/1986	-
Blizzard	-	1/14/1979	-
Blizzard	-	1/25/1978	-

### 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.

**Flooding:** The community has experienced street flooding on 47th Street between Eberly Ave to Raymond Avenue, specifically the 4600 Blocks, 3800 Block of Arden Avenue, 3300 Block of Arthur Avenue, 3500 Block of Forest Avenue, 3000/2900 Blocks of Forest/Prairie and Vernon Avenues. In 2012, flash/urban flooding Ogden Avenue was impassable between Joliet Avenue and Lawndale Avenue. In addition to street flooding, basement flooding is a major concern for the area.

**Severe Weather:** In 2011, a huge oak tree was uprooted along 26th Place due to severe. The tree fell on top of a house, but all of the large limbs remained in the air and no damage was reported to the roof. Additional trees, tree limbs and power lines were blown down in the community. Power outages continue to be a concern for the aboveground power lines.

## 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 Winter Weather	54
2	Severe Weather	54
3	Tornado	36
4	Earthquake	33
5	Flood	32
6	Drought	2
7	Dam	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 B12.1</b> —Integrate the local hazard mitigation plan into the safety element of the emergency operations plan, and update the plan annually.						
Ongoing	All	3, 4, 8	Fire Dept.	Low	General Fund	Ongoing (Annual)
<b>Action B12.2</b> —Update and enhance Village building code by adopting the 2012 ICC codes.						
Ongoing	All	3, 4, 10	BD	Low	General Fund	Short-term
<b>Action B12.3</b> —Require that all new construction be designed with a fire sprinkling system.						
Completed	Addresses secondary hazard to all hazards of concern	2, 10	Fire Dept.	Low	General Fund	Completed
<b>Action B12.4</b> —Ensure that new developments be designed to reduce or eliminate flood damage by requiring on-site detention facilities as required.						

Completed	Flood	3, 9, 13	BD	Low	General Fund	Completed
<b>Action B12.5</b> —Provide sandbags and sand to residents in anticipation of rainstorm events, deliver materials to residents and provide public information on how to obtain these materials.						
Ongoing	Flood	2, 6, 9	Public Works	\$3,500; Low	Water Fund	Ongoing
<b>Action B12.6</b> —Continue to participate in mutual aid and intergovernmental agreements, both official and unofficial, for cooperative response to hazards and disasters.						
Ongoing	All	1, 8	Fire Dept., Public Works	Low	General Fund	Ongoing
<b>Action B12.7</b> —Install a storm sewer lift station pump north of Washington Ave. bridge and create new onsite local detention to help mitigate stormwater flooding.						
Completed	Flood	2, 3, 4, 7, 9	Admin, Public Works	\$1,900,000; High	Water Fund, MWRD-Phase II	Completed
<b>Action B12.8</b> —Continue the stormwater 50/50 program to offer residents an incentive to better protect their homes with either overhead sewers or one-way flap valves.						
Completed	Flood	2, 7, 9, 11	Admin	\$100,000; Medium	Water Fund	Completed
<b>Action B12.9</b> —Continue to utilize a reverse-911 call system to communicate emergency information with residents in a timely manner.						
Completed	All	1, 5, 6	Admin	\$13,500; Low	General Fund	Completed
<b>Action B12.10</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	Brookfield	High	FEMA Hazard Mitigation Grants	Long-term (depending on funding)
<b>Action B12.11</b> —Continue to support the countywide actions identified in this plan.						
Ongoing	All	All	Brookfield	Low	General Fund	Short- and long-term
<b>Action B12.12</b> —Actively participate in the plan maintenance strategy identified in this plan.						
Ongoing	All	3, 4, 6	DHSEM (Brookfield)	Low	General Fund	Short-term

<b>Action B12.13</b> —Consider participation in incentive-based programs such as the Community Rating System, Tree City, and StormReady.						
Ongoing	All	3, 4, 5, 6, 7, 9, 10, 11, 13	Brookfield	Low	General Fund	Long-term
<b>Action B12.14</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	Building and Planning	Low	General Fund	Short-term and ongoing
<b>Actions B12.15</b> —Where feasible, implement a program to record high water marks following high-water events.						
Ongoing	Flooding, Severe Weather	3, 6, 9	Brookfield	Medium	General Fund; FEMA Grant Funds (Public Assistance)	Long-term
<b>Action B12.16</b> —Integrate the hazard mitigation plan into other plans, programs, or resources that dictate land use or redevelopment.						
Completed	All	3, 4, 6, 10, 13	Hancock Engineering	Low	General Fund	Completed
<b>Action B12.17</b> —Install the Stormwater S.C.A.D.A. system for pump station at Washington Avenue bridge						
New	Flood	9	Hancock Engineering	Low - \$20,000 for the SCADA system	General Fund/Water fund	2019/2020
<b>Action B12.18</b> —Install a new underground storage system to better manage stormwater						
New	Flood	9	Hancock Engineering	Low - \$200,000 for the storage system	General Fund/Water fund	2019/2020
(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	3	Medium	Low	Yes	No	Yes	High
2	3	Medium	Low	Yes	No	Yes	High
3	2	Medium	Low	Yes	No	Yes	High
4	3	Medium	Low	Yes	No	Yes	High
5	3	Medium	Low	Yes	No	Yes	High
6	2	High	Low	Yes	No	Yes	High
7	5	High	High	Yes	Yes	Yes	High
8	4	Medium	Medium	Yes	No	Yes	High
9	3	High	High	Yes	No	Yes	High
10	2	High	High	Yes	Yes	No	Medium
11	13	Medium	Low	Yes	No	Yes	High
12	8	Low	Low	Yes	Yes	Yes	Low
13	9	Medium	Low	Yes	No	No	Medium
14	3	Medium	Low	Yes	No	Yes	High
15	3	Medium	Medium	Yes	Yes	No	Medium
16	5	Medium	Low	Yes	No	Yes	High
17	1	High	Low	Yes	No	Yes	High
18	1	High	Low	Yes	Yes	Yes	Low

(a) See Chapter 1 for explanation of priorities.

## New Mitigation Actions

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

**Action B-12.17**

<b>Mitigation Action</b>	Install the Storm water S.C.A.D.A system for pump station at Washington Avenue bridge, new underground storage system "storm water" at public works facility parking lot 4545 Eberly Avenue.
<b>Year Initiated</b>	2019
<b>Applicable Jurisdiction</b>	Village of Brookfield
<b>Lead Agency/Organization</b>	Hancock Eng.
<b>Supporting Agencies/Organizations</b>	
<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> <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> </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>	General fund/ water fund
<b>Estimated Cost</b>	200k for storage system/ 20k for SCADA system
<b>Benefits (loss avoided)</b>	Storage system - to prevent more storm water entering our sewer system. SCADA system - provide live data to village
<b>Projected Completion Date</b>	2019/2020
<b>Priority and Level of Importance (Low, Medium, High)</b>	Storage system - low/ SCADA system - high
<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>	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.
<b>Actual Completion Date</b>	

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		
2022		
2023		

Mitigated Hazards	
	All Hazards
	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 B-12.18**

<b>Mitigation Action</b>	Install a new underground storage system to better manage stormwater
<b>Year Initiated</b>	2019
<b>Applicable Jurisdiction</b>	Village of Brookfield
<b>Lead Agency/Organization</b>	Village of Brookfield, Hancock Engineering
<b>Supporting Agencies/Organizations</b>	
<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> <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> </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>	General fund/water fund; Grants
<b>Estimated Cost</b>	\$200,000 for the storage system
<b>Benefits (loss avoided)</b>	Storage system - to prevent more stormwater entering the sewer system.
<b>Projected Completion Date</b>	2019/2020
<b>Priority and Level of Importance (Low, Medium, High)</b>	Low
<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>	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.
<b>Actual Completion Date</b>	TBD

<b>Recommended Mitigation Action/Implementation Plan and Project Description</b>	
<b>Action/Implementation Plan and Project Description:</b>	A <b>possible</b> solution may include installing a new underground storage system (stormwater) at the public works facility parking lot located at 4545 Eberly Avenue.

**Mitigation Action and Project Maintenance**

Year	Status	Comments
2019	New	
2020		
2021		
2022		
2023		

Mitigated Hazards	
	All Hazards
	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 B-12.1**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.1	Integrate the local hazard mitigation plan into the safety element of the emergency operations plan, and update the plan annually.	
Status Description: Yes	Annual updates ongoing.	O
<p align="center"><b>Completion status legend:</b>  <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 B-12.2**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.2	Update and enhance Village building code by adopting the 2012 ICC codes.	
Status Description: Yes	ICC Codes are periodically updated. Currently, we are following 2015 ICC Codes.	O
<p align="center"><b>Completion status legend:</b>  <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 B-12.5**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.5	Provide sandbags and sand to residents in anticipation of rainstorm events, deliver materials to residents and provide public information on how to obtain these materials.	
Status Description: Yes	Sand and sandbags are currently available at the Public Works Facility. In hazardous situations bags are delivered to specific areas of concern or upon request.	O
<p align="center"><b>Completion status legend:</b>                      N = New    O = Action Ongoing toward Completion                      C = Project Completed    R = Want Removed from Annex    X = No Action Taken</p>		

**Action B-12.6**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.6	Continue to participate in mutual aid and intergovernmental agreements, both official and unofficial, for cooperative response to hazards and disasters.	
Status Description: Yes	The Brookfield Public Works Department joined IPWMAN in early 2018. The Fire and police Departments have been a member of a mutual aid entity for several years.	O
<p align="center"><b>Completion status legend:</b>                      N = New    O = Action Ongoing toward Completion                      C = Project Completed    R = Want Removed from Annex    X = No Action Taken</p>		

**Action B-12.10**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.10	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: Yes		O
<p align="center"><b>Completion status legend:</b>                      N = New    O = Action Ongoing toward Completion                      C = Project Completed    R = Want Removed from Annex    X = No Action Taken</p>		

**Action B-12.11**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.11	Continue to support the countywide actions identified in this plan.	
Status Description: Yes		O
<p align="center"><b>Completion status legend:</b>                      N = New    O = Action Ongoing toward Completion                      C = Project Completed    R = Want Removed from Annex    X = No Action Taken</p>		

**Action B-12.12**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.12	Actively participate in the plan maintenance strategy identified in this plan.	
Status Description: Yes		O
<p align="center"><b>Completion status legend:</b>  <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 B-12.13**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.13	Consider participation in incentive-based programs such as the Community Rating System, Tree City, and StormReady.	
Status Description: Yes	Village a member of Tree City USA for 37 years.	O
<p align="center"><b>Completion status legend:</b>  <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 B-12.14**

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.14	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: Yes		O
<p align="center"><b>Completion status legend:</b>                      N = New    O = Action Ongoing toward Completion                      C = Project Completed    R = Want Removed from Annex    X = No Action Taken</p>		

**Action B-12.15**

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.15	Where feasible, implement a program to record high water marks following high-water events.	
Status Description: Yes		O
<p align="center"><b>Completion status legend:</b>                      N = New    O = Action Ongoing toward Completion                      C = Project Completed    R = Want Removed from Annex    X = No Action Taken</p>		

### Completed Mitigation Actions

The following section represents completed mitigation actions, and serves as an archive of identified and completed projects.

**Action B-12.3**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.3	Require that all new construction be designed with a fire sprinkling system.	
Status Description: Yes	Require that all new construction be designed with a fire sprinkling system.	C
<p align="center"><b>Completion status legend:</b>  <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 B-12.4**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.4	Ensure that new developments be designed to reduce or eliminate flood damage by requiring on-site detention facilities as required.	
Status Description: Yes	2015 Stormwater Ordinance requires on-site detention for certain types of buildings (commercial/industrial) and buildings over a certain size.	C
<p align="center"><b>Completion status legend:</b>  <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 B-12.7**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.7	Install a storm sewer lift station pump north of Washington Ave. bridge and create new on-site local detention to help mitigate stormwater flooding.	
Status Description: Yes	Project completed in 2017.	C
<p align="center"><b>Completion status legend:</b>  <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 B-12.8**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.8	Continue the stormwater 50/50 program to offer residents an incentive to better protect their homes with either overhead sewers or one-way flap valves.	
Status Description: Yes	Project terminated after successful implementation.	C
<p align="center"><b>Completion status legend:</b>  <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 B-12.9**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.9	Continue to utilize a reverse-911 call system to communicate emergency information with residents in a timely manner.	
Status Description: Yes	New Everbridge system implemented in 2018 with the WCCC transition for dispatch services.	C
<p align="center"><b>Completion status legend:</b>                      N = New    O = Action Ongoing toward Completion                      C = Project Completed    R = Want Removed from Annex    X = No Action Taken</p>		

**Action B-12.16**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# B-12.16	Integrate the hazard mitigation plan into other plans, programs, or resources that dictate land use or redevelopment.	
Status Description: Yes		C
<p align="center"><b>Completion status legend:</b>                      N = New    O = Action Ongoing toward Completion                      C = Project Completed    R = Want Removed from Annex    X = No Action Taken</p>		



## 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

BROOKFIELD EXISTING CONDITIONS	
2010 Population	18,987
Total Assessed Value of Structures and Contents	\$5,705,300,582
Area in 100-Year Floodplain	141.80 acres
Area in 500-Year Floodplain	223.45 acres
Number of Critical Facilities	32

HAZARD EXPOSURE IN BROOKFIELD						
	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	\$0	0.00%
U. Salt Cr. #2	0	0	\$0	\$0	\$0	0.00%
Touhy	0	0	\$0	\$0	\$0	0.00%
U. Salt Cr. #3	0	0	\$0	\$0	\$0	0.00%
U. Salt Cr. #4	0	0	\$0	\$0	\$0	0.00%
<b>Flood</b>						
100-Year	117	36	\$8,509,849	\$4,254,925	<b>\$12,764,774</b>	0.22%

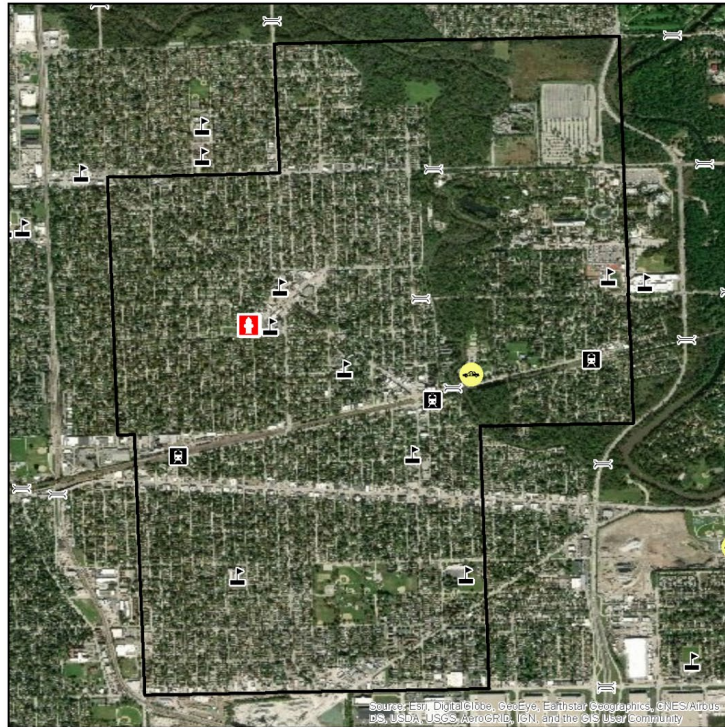
500-Year	504	155	\$43,760,155	\$21,889,078	<b>\$65,640,233</b>	1.15%
<b>Tornado</b>						
100-Year	—	—	\$665,163,119	\$476,962,278	<b>\$1,141,125,397</b>	20.00%
500-Year	—	—	\$1,056,444,186	\$765,105,972	<b>\$1,821,550,158</b>	31.93%

**ESTIMATED PROPERTY DAMAGE VALUES IN BROOKFIELD**

	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	\$45,080,379	\$12,776,049	<b>\$57,856,428</b>	1.01%
<b>Flood</b>				
10-Year	\$0	\$0	<b>\$0</b>	0.00%
100-Year	\$718,598	\$301,893	<b>\$1,020,491</b>	0.02%
500-Year	\$3,352,528	\$1,820,074	<b>\$5,172,602</b>	0.09%

<b>Tornado</b>				
100-Year	\$66,516,312	\$47,596,228	<b>\$114,112,540</b>	2.00%
500-Year	\$154,240,851	\$111,705,472	<b>\$265,946,323</b>	4.66%

# Hazard Mapping



## VILLAGE OF BROOKFIELD

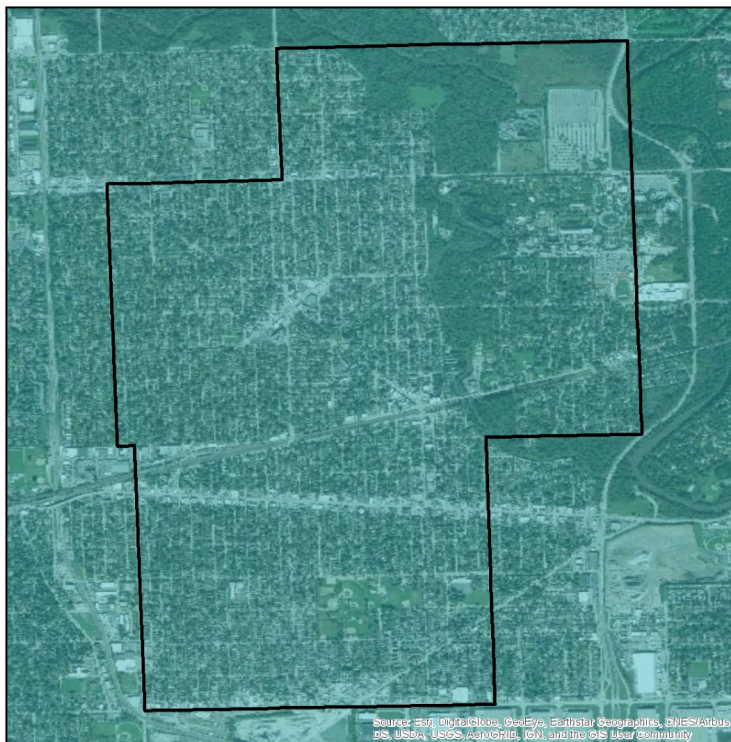
### CRITICAL INFRASTRUCTURE

- 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



Source: ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User community



## VILLAGE OF BROOKFIELD

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

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

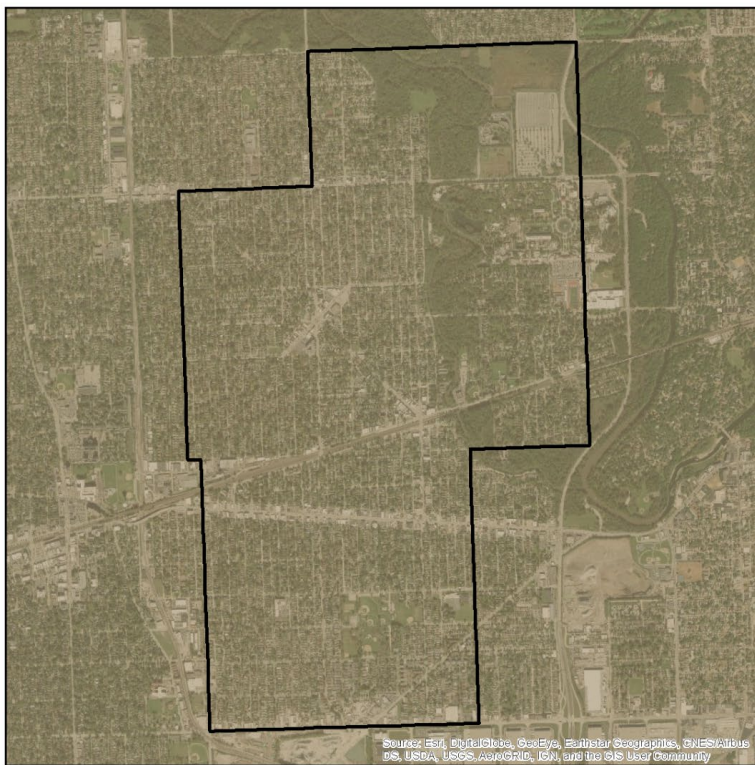
Data provided by the USGS Earthquake Hazards Program and Cook County.

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 100 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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Source: ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User community



### VILLAGE OF BROOKFIELD

#### NATIONAL EARTHQUAKE HAZARD REDUCTION PROGRAM (NEHRP) SOIL CLASSIFICATION

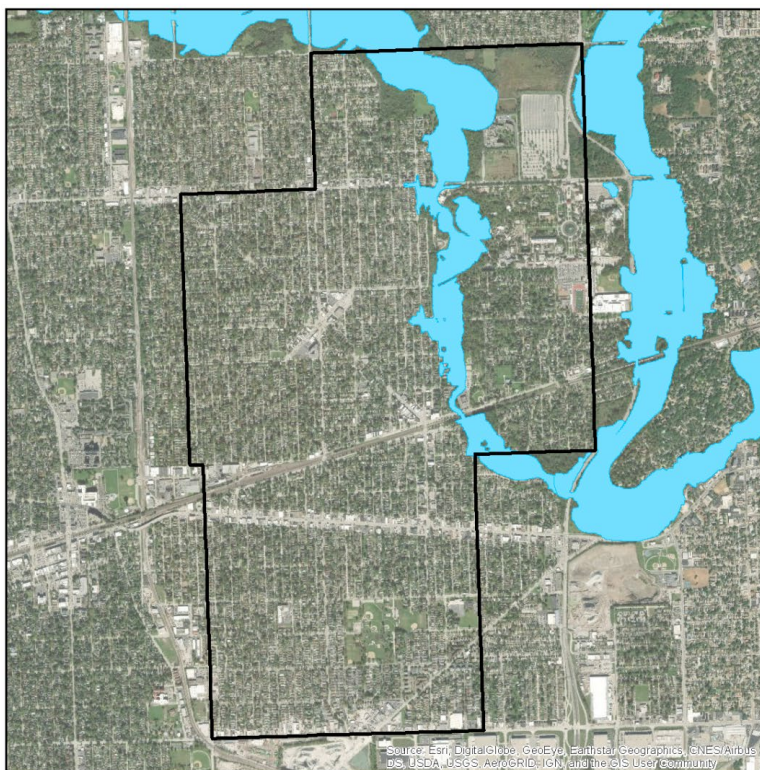
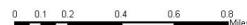
**TYPE**

- 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 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. Parnell (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, 2002) were followed to produce the soil site class maps. CUSEC State Geologists used the entire z 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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### VILLAGE OF BROOKFIELD

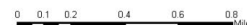
#### COOK COUNTY MWRDGC 100-YEAR INUNDATION AREA

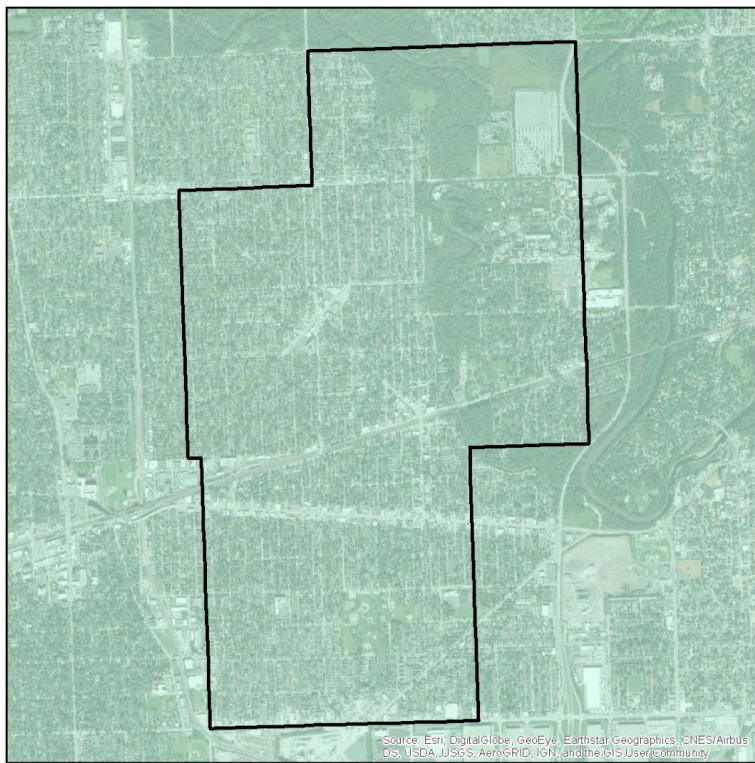
100-year Inundation Area

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>.





### VILLAGE OF BROOKFIELD

#### LIQUEFACTION SUSCEPTIBILITY



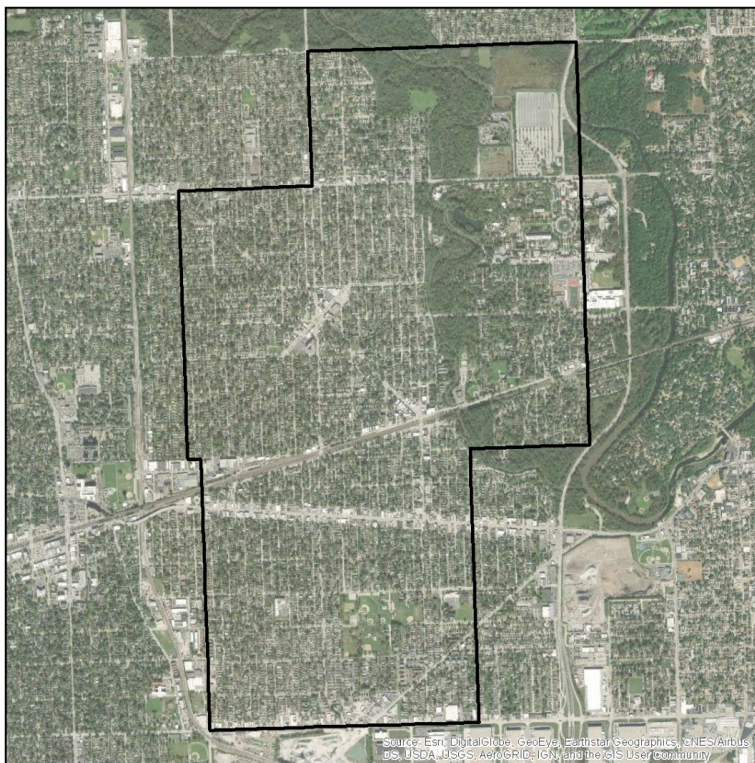
Data provided by the Illinois State Geological Survey and Cook County.

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-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. Bush and Jean N. Fennel (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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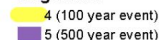
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User community



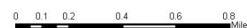
### VILLAGE OF BROOKFIELD

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

##### Magnitude



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