

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

Palos Heights 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

Table of Contents

Hazard Mitigation Point of Contact	2
Jurisdiction Profile.....	3
Capability Assessment	5
Jurisdiction-Specific Natural Hazard Event	10
Hazard Risk Ranking.....	12
Mitigation Strategies and Actions.....	13
New Mitigation Actions	18
Ongoing Mitigation Actions	31
Completed Mitigation Actions	39
Future Needs to Better Understand Risk/Vulnerability	41
Additional Comments.....	42
HAZUS-MH Risk Assessment Results	43
Hazard Mapping.....	46

Hazard Mitigation Point of Contact

Primary Point of Contact	Alternate Point of Contact	Alternate Point of Contact
Christopher Kransberger Building Commissioner 7607 W. College Dr. Palos Heights, IL 60463 Telephone: 708-480-3020 ckransberger@palosheights.org	Adam Jasinski Director of Public Works 7607 W. College Dr. Palos Heights, IL 60463 Telephone: 708-480-3030 ajasinski@palosheights.org	Dave Delaney Deputy Chief of Administration Palos Heights Police Department 7607 W. College Dr. Palos Heights, IL 60463 Telephone: 708-448-5060 Fax: 708-361-9371 ddelaney@palosheightspd.org

Jurisdiction Profile

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

- **Date of Incorporation:** 1959
- **Current Population:** 12,626 as of 2018 U.S. Census population estimate.
- **Population Growth:** The Village of Palos Heights experienced a 11% growth in population since the 2000 census. It is estimated that the Village of Palos Heights experienced a slight population increase from 2010 to 2018, with the largest portion of the Village's recent growth occurring from 2000 to 2010.
- **Location and Description:** The City of Palos Heights is a Southwest suburb of the City of Chicago. It is located approximately five miles southwest of the Chicago border and approximately twenty five miles southwest of downtown Chicago. Palos Heights is the home to Trinity Christian College and Palos Community Hospital. Palos Heights borders several southwest suburban communities including Palos Hills and Worth to the north, Orland Park to the south, Alsip to the east, and Palos Park to the west.
- **Brief History:** Beginning in the 1860s, areas of what is now Palos Heights were farmed by German and Irish families, while the hills were used for pasture. The building of single family residences began in the 1930s and continued throughout the 1940s and 1950s with subdivisions arriving. In 1959, on the fourth try, Palos Heights was incorporated as a city. Trinity Christian College was founded in Palos Heights in the same year. In 1972, Palos Community Hospital was opened.
- **Climate:** Palos Heights averages 36 inches of rain per year and 33 inches of snowfall. The average number of days with any measurable precipitation is 109. On average, there are 186 sunny days per year in Palos Heights. The July high is around 83 degrees and the January low is 11 degrees. The comfort index, which is based on humidity during the hot months, is a 46 out of 100, where higher is more comfortable.
- **Governing Body Format:** Palos Heights utilizes a mayor-aldermanic form of government. The city is broken up into four wards with two aldermen representing each ward. The City Council is made up of a mayor, city clerk, city treasurer and eight aldermen from wards. This body of Government will assume the responsibility for the adoption and implementation of this plan. Palos Heights operates 5 departments including Administration City Hall, Building & Zoning Department, Public Works & Water Department, Recreation Department, and Police Department. Palos Heights is divided between three congressional districts. Most of the city, including all the area in Worth Township, is in Illinois' 1st congressional district; most of the area in Palos Township, excepting some of the southern portions (generally south of 131st Street) are in the 3rd district; an area under 0.05 square miles (100,000 square meters) northeast of 131st Street and 80th Avenue, along with a small area around Palos Community Hospital, is in the 13th district.
- **Development Trends:** Anticipated development levels for Palos Heights are expected to be moderate to high for our area. There are several permits in application process for tear down

and replacement of existing housing units. There are plans in place for several commercial projects including infill in older sections of the downtown district as well as new construction on vacant lots. Actual level of activity will be dependent on City approval and developer ability to perform. The City has adopted its most recent comprehensive plan in 2008 and has been working with committees and staff to implement the plan. The plan emphasizes land use, redevelopment objectives, non-motorized and other transportation improvements, and recreation opportunity improvements. The implementation of the comprehensive plan has been moving forward and is the guide for future growth and development. The 2008 Comprehensive Plan is being updated in 2019. Additional projects that have been ongoing are the Harlem Avenue Corridor Sub-Area Plan which was approved by the City Council in 2008, and it establishes a vision for the future of the Harlem Avenue Corridor, and sets forth goals and objectives to accomplish that vision. The Lake Katherine Nature Center and Botanic Gardens Master Development Plan was approved by the City Council in 2012, and establishes a vision for the future of Lake Katherine, and sets forth goals and objectives to accomplish that vision.

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.

TABLE: LEGAL AND REGULATORY CAPABILITY					
	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
Codes, Ordinances & Requirements					
Building Code	Yes	No	No	Yes	Chapter 150 adopted: 1969
Zonings	Yes	No	No	Yes	Chapter 153 adopted: 1969
Subdivisions	Yes	No	No	No	Chapter 152 adopted: 1969
Stormwater Management	Yes	No	Yes	Yes	State regulates industrial activity from Construction sites 1 acre or larger under section 402 CWA. Chapter 151 adopted: 1992
Post Disaster Recovery	No	No	No	No	
Real Estate Disclosure	No	No	Yes	Yes	(765 ILCS 77/) Residential Real Property Disclosure Act.
Growth Management	Yes	No	No	No	Chapter 12 adopted: 1972

Site Plan Review	Yes	No	No	No	Chapter 151.20 adopted: 2003
Public Health and Safety	No	No	Yes	No	Cook County Board of Health.
Environmental Protection	No	No	No	No	Chapter 155 adopted: 1981
Planning Documents					
General or Comprehensive Plan	Yes	No	No	No	Chapter 12 adopted: 1972
<i>Is the plan equipped to provide linkage to this mitigation plan?</i>					No
Floodplain or Basin Plan	No	No	No	No	
Stormwater Plan	Yes	No	Yes	No	Regional stormwater impacts are managed by MWRD. The City lies within the Cal-Sag watershed planning area of MWRD's comprehensive Stormwater Master Planning Program Chapter 151 adopted: 1992
Capital Improvement Plan	Yes	No	No	No	
<i>What types of capital facilities does the plan address?</i>					Infrastructure & Recreational facilities
<i>How often is the plan revised/updated?</i>					January 1st /Yearly
Habitat Conservation Plan	No	No	No	No	
Economic Development Plan	Yes	No	Yes	Yes	The Economic Development Commission is

					charged with reviewing all economic development related programs and incentives.
Shoreline Management Plan	No	No	No	No	
Response/Recovery Planning					
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	Yes	Yes	Cook County DHSEM
Continuity of Operations Plan	No	No	Yes	No	Cook County DHSEM
Public Health Plans	No	No	Yes	No	Cook County DPH

TABLE: FISCAL CAPABILITY	
Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
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 through referendum
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	Yes

State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes

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	City Engineer
Engineers or professionals trained in building or infrastructure construction practices	Yes	City Engineer/Building Department
Planners or engineers with an understanding of natural hazards	Yes	City Engineer
Staff with training in benefit/cost analysis	Yes	City Engineer
Surveyors	Yes	City Engineer
Personnel skilled or trained in GIS applications	Yes	Cook County GIS Consortium
Scientist familiar with natural hazards in local area	Yes	Will-South Cook Soil Conservation Department
Emergency manager	Yes	Deputy Chief of Police
Grant writers	Yes	City Engineer

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Building Department
Who is your jurisdiction’s floodplain administrator? (department/position)	Building Department
Are any certified floodplain managers on staff in your jurisdiction?	No – Use Outside Consultant
What is the date of adoption of your flood damage prevention ordinance?	June 1992
When was the most recent Community Assistance Visit or Community Assistance Contact?	June 19, 2012
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	Bridges/Kerry Funeral Home
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Based on FEMA maps

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 – as new staff is needed
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 – do not participate Yes we are interested in joining

TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule3	Yes	3	2013
Public Protection/ISO	No	3	2013
StormReady	Yes	Gold (Countywide)	2014
Tree City USA	Yes	N/A	1989

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: 0
- 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
Hail	-	5/20/2014	-
Severe Weather	-	1996	Box culvert replacement
Severe Weather	-	1983	Install sheeting & rip rap at Rt. 83 & creek bed of Navajo Creek

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.

Dam/Levee Failure: A dam is being constructed at Lake Arrowhead. If it ever fails, 70 structures will be flooded near 131st and Harlem during a 100-year flood event.

Flood: The Old Palos neighborhood drainage system has been modified by unpermitted work by residents. This "work" blocked overland flow paths for severe rain.

Extreme heat: Cooling zones are not well communicated to elderly residents. In addition, the water supply needs another tank at the hospital site.

Lightning: Lightning is not a severe risk for the municipality.

Hail: Hail is not a severe risk for the municipality.

Fog: Fog is not a severe risk for the municipality.

High Winds: Tree removal around the roadway. The municipality does not have the equipment to handle large trees.

Earthquake: The municipality does not consider earthquakes a severe risk.

Drought: The community would benefit from a second tank (reservoir) for the hospital.

Severe Weather: Two inches of rain in 30 minutes near 135th and Ridgeland.

Snow: Heavy snow is not a severe risk for the municipality (equipment is updated).

Blizzards: In the event of blizzards, the municipality needs a location to move snow, though blizzards are not considered a severe risk to the municipality.

Extreme Cold: Given the municipality's vulnerability to extreme cold events, the community would benefit from warming center notifications.

Ice Storms: The municipality's vulnerability to the impacts of ice storms would be mitigated by electrical protection.

Tornado: The municipality requires a good tire supply for dumps as well as back-up power in the event of a tornado.

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.

TABLE: HAZARD RISK RANKING		
Rank	Hazard Type	Risk Rating Score (Probability x Impact)
1	Severe Weather	54
2	Severe Winter Weather	54
3	Flood	15
4	Tornado	51
5	Dam Failure	18
6	Earthquake	24
7	Drought	9

Note: The ranking of hazards was subjectively changed based on past experience.

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)
Action P2.1 —Asset management program for water and sewer. The City of Palos Heights will compile information on the existing water and sewer systems throughout the City to determine where upgrades/maintenance is necessary.						
Ongoing	Flood, Severe Weather		City of Palos Heights	Medium	General Revenue	Long-term
Action P2.2 —Cypress Drainage Study to be completed in conjunction with MWRD. The City of Palos Heights will work with MWRD to complete an area-wide drainage study and address flooding issues.						
Ongoing	Flood, Severe Weather		MWRD; City of Palos Heights	Low	General Revenue, MWRD	Short-term
Action P2.3 —Community-wide drainage study to determine what improvements can be completed to reduce/eliminate flooding.						
Ongoing	Flood, Severe Weather		City of Palos Heights	Medium	General Revenue; No funds	Short-term

					currently available	
Action P2.4 —Capital improvement program. Complete regular upgrades throughout the City.						
Ongoing	All		City of Palos Heights	Low	General Revenue, CMAQ funds	Short-term
Action P2.5 —Complete a Dam Evaluation to determine what maintenance/improvements are necessary.						
Ongoing	Flood, Severe Weather		City of Palos Heights	Medium	General Revenue	Short-term
Action P2.6 —Improvements to the bike path near Lake Katherine leading to the Metra station to provide an alternative route to public transportation.						
Completed	All		City of Palos Heights	Low	General Revenue. ITEP Funds	Completed
Action P2.7 —Install new sidewalk to fill in gaps and provide better access to mass transit.						
Completed	All		City of Palos Heights	Medium	General Revenue, CMAQ Funding	Completed
Action P2.8 —Improve and replace the water infrastructure.						
Ongoing	All		City of Palos Heights	Medium	Water Revenue	Long-term
Action P2.9 —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.						
Ongoing	All	7, 13	City of Palos Heights	High	FEMA Hazard Mitigation Grants	Long-term (depending on funding)
Action P2.10 —Continue to support the countywide actions identified in this plan.						
Ongoing	All	All	City of Palos Heights	Low	General Fund	Short- and long-term

Action P2.11 —Actively participate in the plan maintenance strategy identified in this plan.						
Ongoing	All	3, 4, 6	DHSEM, City of Palos Heights	Low	General Fund	Short-term
Action P2.12 —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	City of Palos Heights	Low	General Fund	Long-term
Action P2.13 —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.						
Ongoing	Flooding	4, 6, 9	City of Palos Heights	Low	General Fund	Short-term and ongoing
Action P2.14 —Where feasible, implement a program to record high water marks following high-water events						
Ongoing	Flooding, Severe Weather	3, 6, 9	City of Palos Heights	Medium	General Fund; FEMA Grant Funds (Public Assistance)	Long-term
Action P2.15 —Integrate the hazard mitigation plan into other plans, programs, or resources that dictate land use or redevelopment.						
Ongoing	All	3, 4, 6, 10, 13	Palos Heights Engineer	Low	General Fund	Short-term
Action P2.16 —Hospital Water Storage Redundancy						
New	Drought, Flood, Lightning, Blizzard, Tornado	2, 10		\$500,000; Medium	Grants and Water Rates	2025
Action P2.17 —Additional redundancy for the water reservoir at the Palos Hospital. Adequate water supply and emergency connection are available; however, they require field work for transfer over and need.						

New	Drought, Earthquake, Flood, Extreme Heat, Lightning, High Wind, Extreme Cold, Tornado, Epidemic or Pandemic, Widespread Power Outage	2, 10	Public Works	\$500,000 to \$1 million; Medium	CIP funding	2029
-----	--	-------	--------------	----------------------------------	-------------	------

Action P2.18—Flood Control at Arrowhead Lake

New	Flood	2, 3, 9, 10, 13	MWRD	\$1,615,000; Low	Unknown	Unknown
-----	-------	-----------------	------	------------------	---------	---------

Action P2.19—Flood Control in the vicinity of 131st Street and Cypress Drive

New	Flood	1, 2, 3, 9, 10	MWRD	\$200,000; Low	Unknown	Unknown
-----	-------	----------------	------	----------------	---------	---------

Action P2.20—Lake Catherine Commuter Parking Lot

New	Flood	3	MWRD	Unknown	Unknown	Unknown
-----	-------	---	------	---------	---------	---------

(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	# 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	No	No	Medium
2	3	High	Medium	Yes	Yes	Yes	High
3	3	High	Low	Yes	Yes	No	Medium
4	4	High	Medium	Yes	No	Yes	High

5	5	High	Low	Yes	Yes	No	Medium
6	2	High	Medium	Yes	No	Yes	High
7	2	High	Medium	Yes	No	Yes	High
8	4	High	High	Yes	No	No	Medium
9	2	High	High	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	2	High	Medium	Yes	Yes	Unknown	Medium
17	2	High	Medium	Yes	Yes	Unknown	Medium
18	5	Unknown	Low	Yes	Unknown	Unknown	Unknown
19	5	Unknown	Low	Yes	Unknown	Unknown	Unknown
20	1	Unknown	Unknown	Yes	Unknown	Unknown	Unknown

(a) See Chapter 1 for explanation of priorities.

New Mitigation Actions

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

Action P2.16

Mitigation Action	Hospital Water Storage Redundancy
Year Initiated	2019
Applicable Jurisdiction	City of Palos Heights
Lead Agency/Organization	
Supporting Agencies/Organizations	
Applicable Goal	<ul style="list-style-type: none"> • Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards. • Protect public services and critical facilities, including infrastructure, from loss of use during natural hazard events.
Applicable Objective	<ul style="list-style-type: none"> • Eliminate or minimize disruption of local government operations caused by natural hazards through all phases of emergency management. • Increase the resilience of (or protect and maintain) infrastructure and critical facilities.
Potential Funding Source	Grants and Water Rates
Estimated Cost	\$500,000
Benefits (loss avoided)	Reliable water supply for major hospitals in the community
Projected Completion Date	2025
Priority and Level of Importance (Low, Medium, High)	Medium Priority
Benefit Analysis (Low, Medium, High)	High—Project will provide an immediate reduction of risk exposure for life and property.
Cost Analysis (Low, Medium, High)	Medium—The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
Actual Completion Date	TBD

Recommended Mitigation Action/Implementation Plan and Project Description	
Action/Implementation Plan and Project Description:	Provide additional redundancy to existing water reservoir near the hospital with a secondary tank, an upgraded pump station, new emergency water supply.

Mitigation Action and Project Maintenance		
Year	Status	Comments

2019	New	
2020		
2021		
2022		
2023		

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

Action P2.17

Mitigation Action	Additional redundancy for the water reservoir at the Palos Hospital. Adequate water supply and emergency connection are available; however, they require field work for transfer over and need.
Year Initiated	2019
Applicable Jurisdiction	Palos Heights
Lead Agency/Organization	Public Works
Supporting Agencies/Organizations	N/A
Applicable Goal	<ul style="list-style-type: none"> • Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards. • Protect public services and critical facilities, including infrastructure, from loss of use during natural hazard events.
Applicable Objective	<ul style="list-style-type: none"> • Eliminate or minimize disruption of local government operations caused by natural hazards through all phases of emergency management. • Increase the resilience of (or protect and maintain) infrastructure and critical facilities.
Potential Funding Source	CIP funding
Estimated Cost	\$500,000 to \$1 million
Benefits (loss avoided)	Quick transfer to redundant supply improves safety
Projected Completion Date	2029
Priority and Level of Importance (Low, Medium, High)	Medium priority
Benefit Analysis (Low, Medium, High)	High—Project will provide an immediate reduction of risk exposure for life and property.
Cost Analysis (Low, Medium, High)	Medium—The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, of the cost of the project would have to be spread over multiple years.
Actual Completion Date	

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

Mitigation Action and Project Maintenance
--

Year	Status	Comments
2019	New	
2020		
2021		
2022		
2023		

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

Action P2.18

Mitigation Action	Flood Control at Arrowhead Lake
Year Initiated	2019
Applicable Jurisdiction	City of Palos Heights
Lead Agency/Organization	MWRD
Supporting Agencies/Organizations	City of Palos Heights
Applicable Goal	<ul style="list-style-type: none"> • Develop and implement sustainable, cost-effective, and environmentally sound risk-reduction (mitigation) projects. • Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards. • Protect public services and critical facilities, including infrastructure, from loss of use during natural hazard events and potential damage from such activities.
Applicable Objective	<ul style="list-style-type: none"> • Increase the resilience of (or protect and maintain) infrastructure and critical facilities. • Consider the impacts of natural hazards on future land uses in the planning area, including possible impacts from climate change. • Provide or improve flood protection on a watershed basis with flood control structures and drainage maintenance plans. • Strengthen codes and land use planning and their enforcement, so that new construction or redevelopment can avoid or withstand the impacts of natural hazards. • Encourage hazard mitigation measures that result in the least adverse effect on the natural environment and that use natural processes.
Potential Funding Source	N/A
Estimated Cost	\$1,615,000
Benefits (loss avoided)	N/A
Projected Completion Date	TBD
Priority and Level of Importance (Low, Medium, High)	N/A

Benefit Analysis (Low, Medium, High)	N/A
Cost Analysis (Low, Medium, High)	Low
Actual Completion Date	TBD

Recommended Mitigation Action/Implementation Plan and Project Description

Action/Implementation Plan and Project Description:	ID: NVCR-3 Contract: 10-883-BF Watershed: Cal-Sag Channel Location: Palos Heights, IL Increase floodwater storage in Arrowhead Lake by replacing an existing dam and raising an existing bicycle trail on the north and east sides of the lake in unincorporated Palos Heights, removing 70 structures from the 100-year floodplain.
--	--

Mitigation Action and Project Maintenance

Year	Status	Comments
2019	New	Under construction
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 P2.19

Mitigation Action	Flood Control in the vicinity of 131st Street and Cypress Drive
Year Initiated	2019
Applicable Jurisdiction	City of Palos Heights
Lead Agency/Organization	MWRD
Supporting Agencies/Organizations	City of Palos Heights
Applicable Goal	<ul style="list-style-type: none"> • Develop and implement sustainable, cost-effective, and environmentally sound risk-reduction (mitigation) projects. • Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards. • Protect public services and critical facilities, including infrastructure, from loss of use during natural hazard events and potential damage from such activities.
Applicable Objective	<ul style="list-style-type: none"> • Eliminate or minimize disruption of local government operations caused by natural hazards through all phases of emergency management. • Increase the resilience of (or protect and maintain) infrastructure and critical facilities. • Consider the impacts of natural hazards on future land uses in the planning area, including possible impacts from climate change. • Provide or improve flood protection on a watershed basis with flood control structures and drainage maintenance plans. • Strengthen codes and land use planning and their enforcement, so that new construction or redevelopment can avoid or withstand the impacts of natural hazards.
Potential Funding Source	N/A
Estimated Cost	\$200,000
Benefits (loss avoided)	N/A
Projected Completion Date	TBD

Priority and Level of Importance (Low, Medium, High)	N/A
Benefit Analysis (Low, Medium, High)	N/A
Cost Analysis (Low, Medium, High)	Low
Actual Completion Date	TBD

Recommended Mitigation Action/Implementation Plan and Project Description

Action/Implementation Plan and Project Description:	ID: Palos Heights 4 Contract: 14-259-5F / 17-IGA-04 Watershed: Cal-Sag Channel Location: Palos Heights, IL This project involves the acquisition and demolition of one structure and the installation of a swale and a new downstream storm sewer and outfall to Navajo Creek.
--	--

Mitigation Action and Project Maintenance

Year	Status	Comments
2019	New	Currently under design
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 P2.20

Mitigation Action	Lake Catherine Commuter Parking Lot
Year Initiated	2019
Applicable Jurisdiction	City of Palos Heights
Lead Agency/Organization	MWRD
Supporting Agencies/Organizations	City of Palos Heights
Applicable Goal	<ul style="list-style-type: none"> Develop and implement sustainable, cost-effective, and environmentally sound risk-reduction (mitigation) projects.
Applicable Objective	<ul style="list-style-type: none"> Consider the impacts of natural hazards on future land uses in the planning area, including possible impacts from climate change.
Potential Funding Source	N/A
Estimated Cost	N/A
Benefits (loss avoided)	N/A
Projected Completion Date	TBD
Priority and Level of Importance (Low, Medium, High)	N/A
Benefit Analysis (Low, Medium, High)	N/A
Cost Analysis (Low, Medium, High)	N/A
Actual Completion Date	TBD

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

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 P2.1

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 1—Action P2.1	Asset management program for water and sewer. The City of Palos Heights will compile information on the existing water and sewer systems throughout the City to determine where upgrades/maintenance is necessary.	
Status Description: Yes	This is a long term project to be completed as funds become available. Ongoing GIS data collection of water and sewer infrastructure.	O
<p>Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken</p>		

Action P2.2

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 2—Action P2.2	Cypress Drainage Study to be completed in conjunction with MWRD. The City of Palos Heights will work with MWRD to complete an area-wide drainage study and address flooding issues.	
Status Description: Yes	This a short term project that is completed by MWRD and implementation is based on available grants and funds.	O
<p>Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken</p>		

Action P2.3

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 3—Action P2.3	Community-wide drainage study to determine what improvements can be completed to reduce/eliminate flooding.	
Status Description: No	This is a short term project to be completed by the City of Palos Heights that will utilize general revenue as funds become available. No funds currently available.	X
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action P2.4

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 4—Action P2.4	Capital improvement program. Complete regular upgrades throughout the City utilizing general revenue and CMAQ funds as they become available.	
Status Description: No	This is a short term project to be completed by the City of Palos Heights	X
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action P2.5

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 5—Action P2.5	Complete a Dam Evaluation to determine what maintenance/improvements are necessary.	
Status Description: Yes	This is a short term project to be completed by the City of Palos Heights using general revenue funds as they become available. Agreements are signed with MWRD and Cook County.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action P2.8

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 8—Action P2.8	Improve and replace the water infrastructure.	
Status Description: Yes	This is a long term project that will be completed by the City of Palos Heights utilizing water revenue to upgrade aging water system in phases.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action P2.9

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 9—Action P2.9	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: No		X
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action P2.10

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 10—Action P2.10	Continue to support the countywide actions identified in this plan.	
Status Description: Yes		O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action P2.11

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 11—Action P2.11	Actively participate in the plan maintenance strategy identified in this plan.	
Status Description: Yes	Ongoing.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action P2.12

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 12—Action P2.12	Consider participation in incentive-based programs such as the Community Rating System, Tree City, and StormReady.	
Status Description: Yes	Attended seminars and collecting information.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action P2.13

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 13—Action P2.13	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: Yes		O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action P2.15

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 14—Action P2.14	Where feasible, implement a program to record high water marks following high-water events	
Status Description: Action Taken?	Ongoing monitoring, no high-water events last year.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action P2.15

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
#15—Action P2.15	Integrate the hazard mitigation plan into other plans, programs, or resources that dictate land use or redevelopment.	O
Status Description: Yes		O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Completed Mitigation Actions

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

Action P2.6

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 6—Action P2.6	Improvements to the bike path near Lake Katherine leading to the Metra station to provide an alternative route to public transportation.	
Status Description: Yes	This is a short term project to be completed by the City of Palos Heights utilizing general revenue and Illinois Transportation Enhancement Program (ITEP) funds. State funded project.	C
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action P2.7

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# 7—Action P2.7	Install new sidewalk to fill in gaps and provide better access to mass transit.	
Status Description: Yes	The City of Palos Heights will utilize CMAQ funding along with general revenue as it becomes available to complete this short term project.	C
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Future Needs to Better Understand Risk/Vulnerability

The City of Palos Heights needs to complete 4 studies/programs to better understand the vulnerability to identified risks. The first is an asset management program to evaluate the City's water and sewer systems. Second, the Cypress Drainage Study to evaluate the flooding issues in this area. The third is a community-wide drainage study in order to better understand the flooding risks throughout the City. The last is a Dam evaluation to identify the current status of the dam at Lake Arrowhead and if any improvements need to take place.

Additional Comments

No additional comments at this time

HAZUS-MH Risk Assessment Results

PALOS HEIGHTS EXISTING CONDITIONS	
2010 Population	12,515
Total Assessed Value of Structures and Contents	\$2,382,730,837
Area in 100-Year Floodplain	151.88 acres
Area in 500-Year Floodplain	164.50 acres
Number of Critical Facilities	23

HAZARD EXPOSURE IN PALOS HEIGHTS						
	Number Exposed		Value Exposed to Hazard		Total	% of Total Assessed Value Exposed
	Population	Buildings	Structure	Contents		
Dam Failure						
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%
Flood						
100-Year	286	88	\$36,251,694	\$25,190,287	\$61,441,981	2.58%

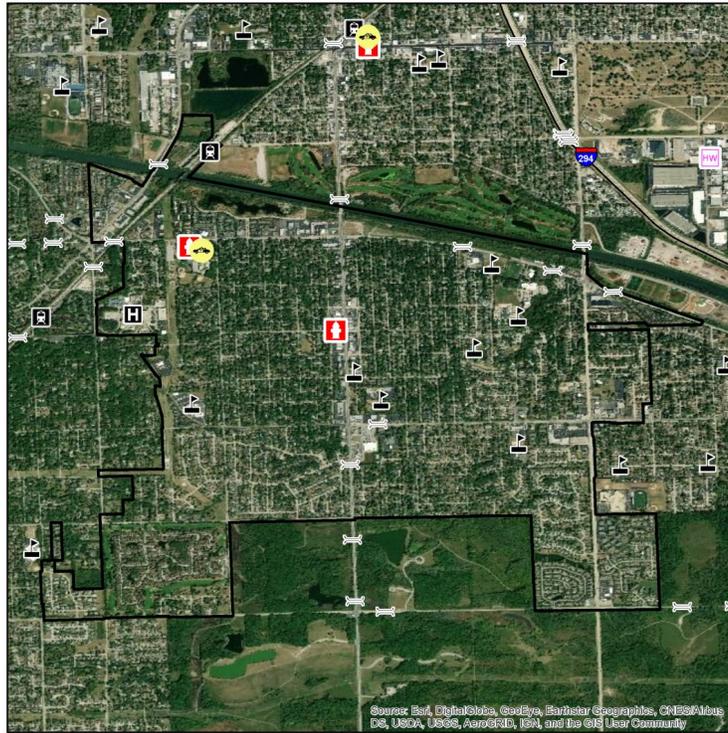
500-Year	338	104	\$41,435,463	\$27,976,152	\$69,411,615	2.91%
Tornado						
100-Year	—	—	\$208,204,474	\$117,407,980	\$325,612,454	13.67%
500-Year	—	—	\$638,032,806	\$381,270,559	\$1,019,303,365	42.78%

ESTIMATED PROPERTY DAMAGE VALUES IN PALOS HEIGHTS

	Estimated Damage Associated with Hazard			% of Total Assessed Value Damaged
	Building	Contents	Total	
Dam Failure				
Buffalo Creek	\$0	\$0	\$0	0.00%
U. Salt Cr. #2	\$0	\$0	\$0	0.00%
Touhy	\$0	\$0	\$0	0.00%
U. Salt Cr. #3	\$0	\$0	\$0	0.00%
U. Salt Cr. #4	\$0	\$0	\$0	0.00%
Earthquake				
1909 Historical Event	\$16,838,256	\$4,554,951	\$21,393,207	0.90%
Flood				
10-Year	\$1,417,444	\$654,541	\$2,071,985	0.09%
100-Year	\$2,295,418	\$894,970	\$3,190,388	0.13%
500-Year	\$3,686,608	\$1,733,057	\$5,419,666	0.23%

Tornado				
100-Year	\$20,820,447	\$11,740,798	\$32,561,245	1.37%
500-Year	\$93,152,790	\$55,665,502	\$148,818,291	6.25%

Hazard Mapping

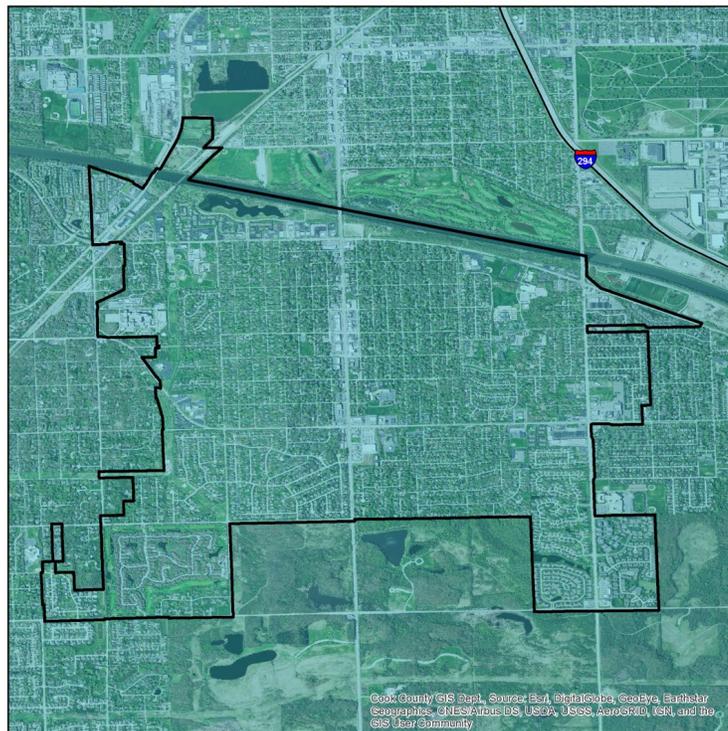


CITY OF PALOS HEIGHTS

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



CITY OF PALOS HEIGHTS

PEAK GROUND ACCELERATION FOR A 100 YEAR EARTHQUAKE EVENT

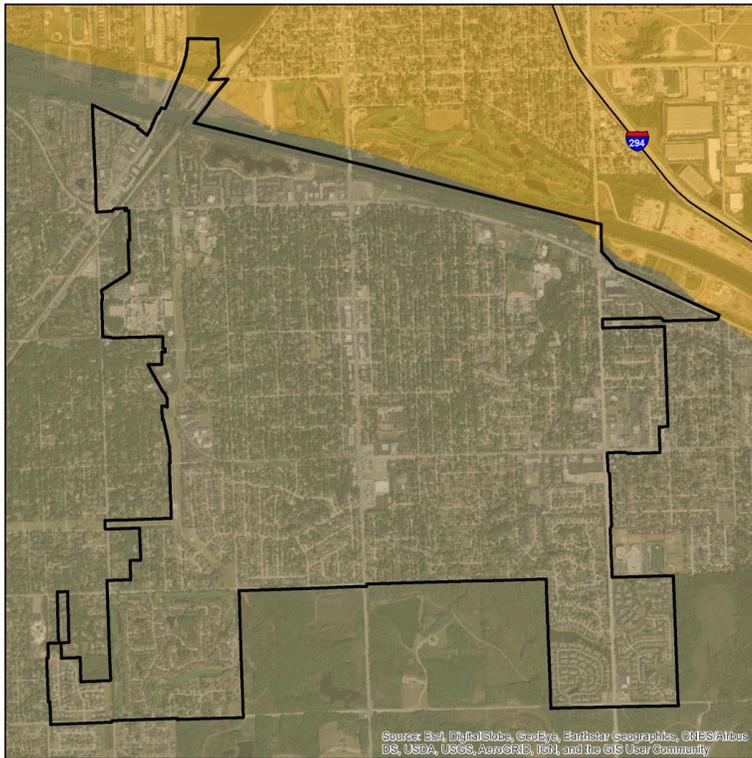
Mercalli Scale, Potential Shaking

- 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 780 m/s in the top 30 meters corresponding to the boundary between NEHRP (National Earthquake Hazards Reduction program) site classes B and C.

The information included on this map has been compiled for Cook County from a variety of sources and is subject to change without notice. Cook County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. Cook County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of Cook County.



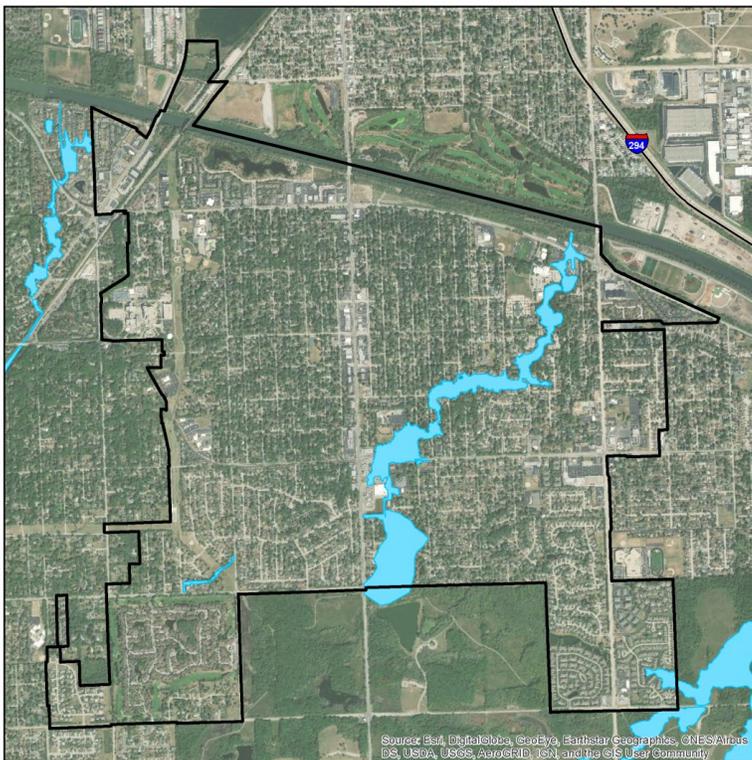
**CITY OF
PALOS HEIGHTS**
NATIONAL EARTHQUAKE HAZARD
REDUCTION PROGRAM (NEHRP)
SOIL CLASSIFICATION

- 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 I work. The USGS Geologic Investigation Series I-2789 Map of Surficial Deposits and Materials in the Eastern and Central United State (East of 102 degrees West Longitude) by David S. Fullerton, Charles A. Bush and Jean H. Pennel (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 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.

The information included on this map has been compiled for Cook County from a variety of sources and is subject to change without notice. Cook County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. Cook County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of Cook County.



**CITY OF
PALOS HEIGHTS**

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

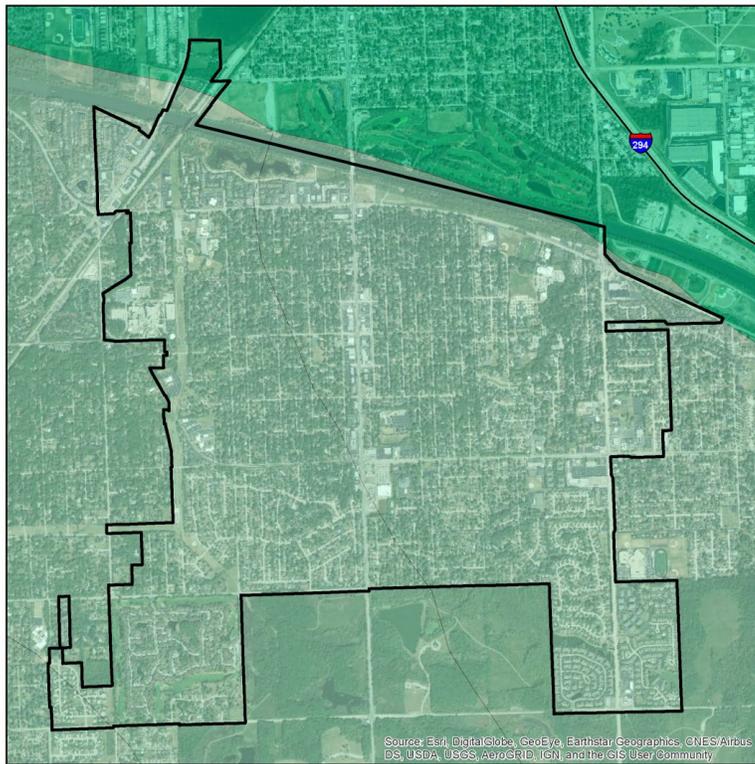
- 100-year Inundation Area

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

The information included on this map has been compiled for Cook County from a variety of sources and is subject to change without notice. Cook County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. Cook County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of Cook County.

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>.





**CITY OF
PALOS HEIGHTS**

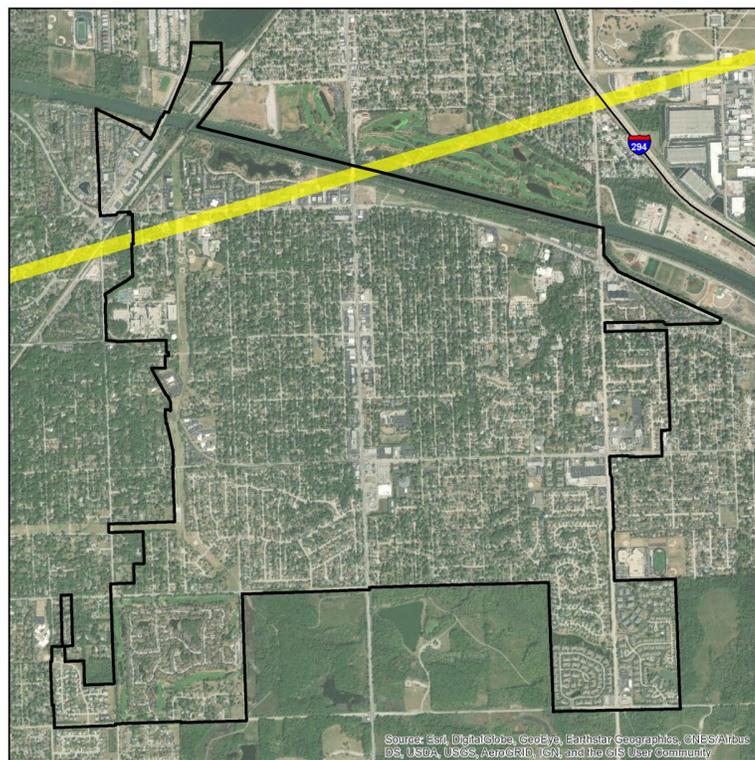
LIQUEFACTION SUSCEPTIBILITY

- LIQUEFACTION SUSCEPTIBILITY**
- high
 - low
 - very low

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 I 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. Penneil (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 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.

The information included on this map has been compiled for Cook County from a variety of sources and is subject to change without notice. Cook County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. Cook County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of Cook County.



**CITY OF
PALOS HEIGHTS**

**100- AND 500- YEAR
TORNADO EVENTS**

- Magnitude**
- 4 (100 year event)
 - 5 (500 year event)

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

