

## Glenview, Illinois – CAP 205 Small Flood Risk Management Federal Interest Determination

### 1 INTRODUCTION

#### 1.1 STUDY PURPOSE AND SCOPE

This study has been initiated to investigate measures to address flood risks associated with overbanking of the West Fork of the North Branch of the Chicago River (WFNBCR) in the Village of Glenview, Illinois. The identified flood prone area includes the Tall Trees neighborhood that borders along the west side of the WFNBCR, and includes 175 single-family homes that were constructed in the early 1960's. The neighborhood has historic flooding problems due to the WFNBCR overtopping its banks as well as back flowing into low-lying areas via the South Navy Ditch or an existing storm sewer system. Recent flooding includes six measurable events since 2007, including three 25-year storms, two 50-year storms, and a 100-year storm in September 2008. Sixty three (63) homes are estimated to have direct structure flooding at the 100-year flood event level.



**Figure 1: Flooding in Tall Trees Neighborhood – September 2008**

#### 1.2 LOCATION

##### 1.2.1 Study Area

The Tall Trees neighborhood is located along the west bank of the WFNBCR at the confluence of the South Navy Ditch in the Village of Glenview, approximately 4.5 miles north of the Chicago City limits in Cook County, Illinois. The study area is within the *North Branch Chicago River – Chicago Sanitary and Ship Canal Watershed*, defined as Hydrologic Unit Code (HUC) 0712000301 by the United States Geological Survey (USGS)

The study area is shown in Figure 2. The WFNBCR watershed upstream of the Tall Trees neighborhood is approximately 23.5 square miles with the headwaters located in Lake County, Illinois. The watershed consists mostly of developed suburban residential and commercial neighborhoods as well as a large portion of forest preserve areas in the northern part of the watershed. The watershed is served by 3 reservoirs, collectively called the Techny Reservoirs (32A, 32B, and 32C), which provide a total of 1,620 acre-feet (528 million gallons) of stormwater storage upstream of the Tall Trees neighborhood.

The South Navy Ditch is approximately 0.5 miles of open channel stream with a subwatershed of approximately 0.15 square miles (94 acres), entirely located within the Village of Glenview. This subwatershed consists almost entirely of single and multi-family residential areas. The South Navy Ditch flows through the Tall Trees neighborhood where it reaches its confluence with the WFNBCR just south (downstream) of the Chestnut Avenue bridge.

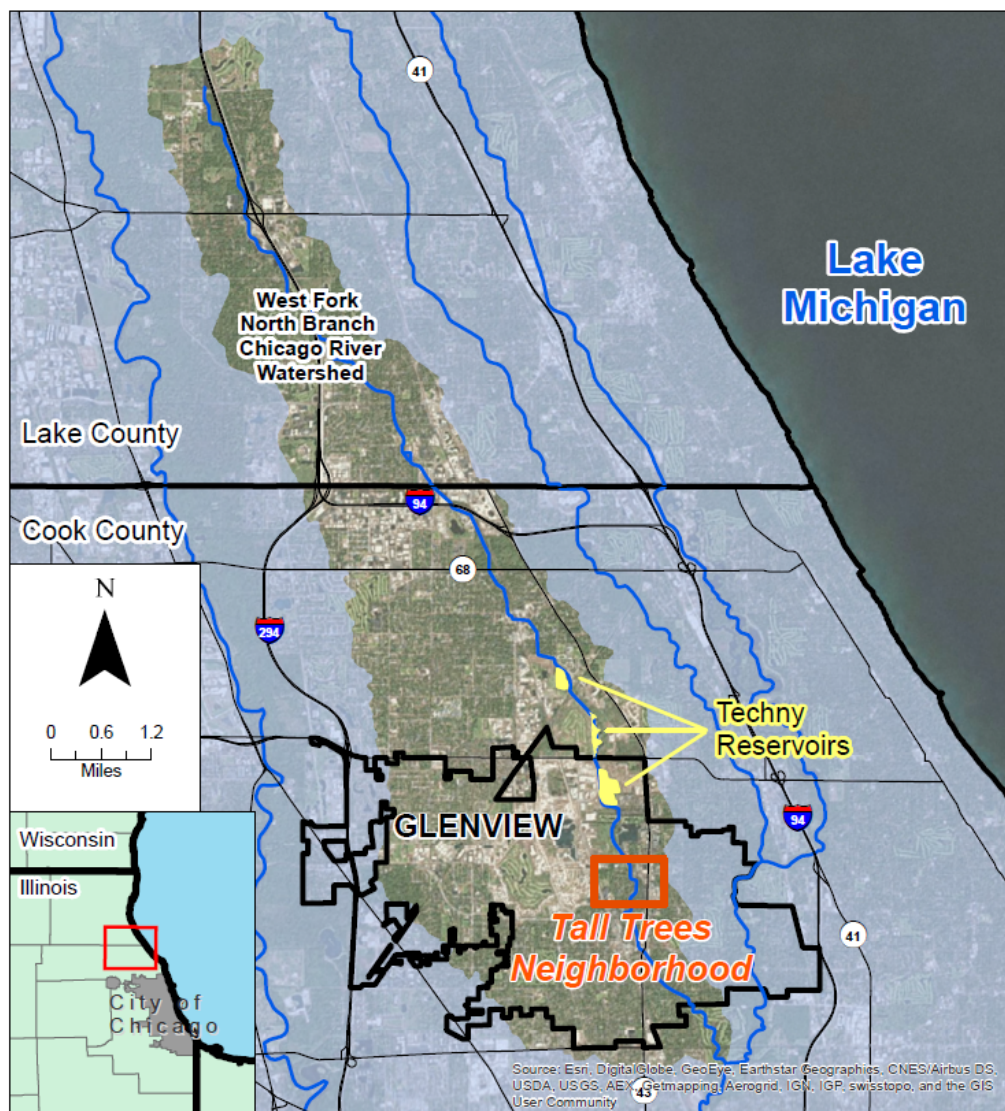


Figure 2: Study Area



### 1.2.2 Project Area

The project area focuses on the Tall Trees neighborhood of Glenview, Illinois, which is located within the Illinois 9th Congressional District, represented by Janice “Jan” Schakowsky. The area is in the *West Fork North Branch Chicago River Watershed* (HUC 071200030103). Constructed in the early 1960s, the neighborhood was later designated by the Federal Emergency Management Agency (FEMA) as a special flood hazard area (SFHA) in the original 1979 flood insurance rate maps (FIRMs). Further, the WFNBCR has a narrow cross-section in the vicinity of the neighborhood, making flow depths extremely sensitive to small amounts of rainfall.

Previous analysis performed for the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) by MWH Global indicated that there are approximately 63 properties within the Tall Trees neighborhood that are subject to damage from a 1% annual chance flood. Of these, 20 are immediately adjacent to the river; the remaining 43 properties are located to the west. However, during extreme flood events residents of all of the 175 homes in the area are impacted as local streets are inundated when the river rises, limiting access into and out of the area. Surface flooding can also contribute to increased infiltration into local sanitary sewers, exacerbating problems with sanitary sewer backup into homes. Figure 3 highlights the hydraulic features of the Tall Trees area.



**Figure 3: Project Area**

### 1.3 STUDY AUTHORITY

*Section 205, Flood Control Act of 1948 (P.L. 80-858), as amended.* Section 205 authorizes the Secretary of the Army, in cooperation with non-Federal interests, to plan, design and construct small flood risk management (FRM) projects. Section 205 projects are part of the U.S. Army Corps of Engineers (USACE) Continuing Authorities Program (CAP). Individual projects are limited to \$10,000,000 in total Federal expenditures, including all planning, design, and implementation costs.

A non-Federal sponsor must support all phases of the project. While the first \$100,000 of feasibility study costs are at 100% Federal expense, the remaining study costs are shared 50% Federal and 50% non-Federal. Design and implementation costs are shared 65% Federal and 35% non-Federal. The non-Federal sponsor must provide all lands, easements, rights-of-way, relocation, and disposal areas (LERRDs). While the sponsor may receive credit toward this cost-share for work-in-kind and LERRDs, a minimum cash contribution of 5% is required. Once a project has been implemented, operations, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the project is a 100% non-Federal responsibility.

FRM projects being considered for further investigation must also meet economic criteria with respect to the benefits and costs associated with the implementation of a project. A Federal interest is determined by having demonstrated National Economic Development (NED) benefits that outweigh costs; i.e. positive net benefits.

### 1.4 RELEVANT PRIOR STUDIES AND REPORTS

The following studies and reports were utilized in determining federal interest in proceeding with a cost-shared feasibility study.

*Detailed Watershed Plan for the North Branch of the Chicago River and Lake Michigan Watershed, January 2011 (MWRDGC, by HDR, Inc.):* The Detailed Watershed Plan (DWP) for the North Branch of the Chicago River and Lake Michigan Watershed was developed to meet the goals of the Cook County Stormwater Management Plan, published by MWRDGC in February 2007. The plan:

- Documents stormwater problem areas
- Evaluates existing conditions
- Provides flow, stage, frequency, and duration information for flood events along the waterway
- Estimates damages associated with stormwater management problems
- Evaluates potential solutions to regional stormwater management problems

The Glenview Tall Trees neighborhood study area was one of the overbank flooding problem areas identified in the DWP (NB-NVDS-GV-FR-06 and NB-WFNB-GV-FL-24). The solution evaluated in the plan (identified as WF-06), which was recommended to reduce flood risk for this area as well as several other identified flood problem areas upstream in Northbrook, Illinois and unincorporated Cook County, Illinois. The proposed project included a modification and expansion of Techny Reservoir 32A as well as a modification to the reservoir's inlet weir and restrictor barrels to fully utilize the additional storage. Total project costs were estimated at \$116.1 Million.



*Project Definition Report for a Flood Control Project for the West Fork of the North Branch of the Chicago River, June 2015 (MWRDGC, by MWH Global):* The goal of this project and report was to build upon the results of the DWP, described above, and to identify and advance cost effective projects for reducing flood damages to properties along the WFNBCR. As part of this effort, the proposed project in the DWP (WF-06) faced significant resistance from the Village of Northbrook due to the impacts that it would have on recreation within the community. Additionally, further analysis indicated that the benefits anticipated for this recommended project were significantly lower than initially estimated, and therefore the project did not proceed towards implementation. As a result, several additional flood risk reduction project concepts were developed and analyzed for the WFNBCR. The concepts developed included floodwall and buyout options, as well as combination options that included compensatory floodplain storage where appropriate. Changes to the Techny Reservoirs 32A and 32C intake structure designs were also reviewed and no changes to the structures were recommended.

The study recommended construction of an approximately 950 foot long floodwall on the west bank of the WFNBCR extending from Chestnut Avenue south through private back yards of affected homes within the Tall Trees neighborhood. The recommended floodwall would provide physical protection up to the 1% annual chance flood level, but would provide no freeboard. Dry floodproofing or site grading measures were proposed for an additional 10 structures which would not be protected by the floodwall structure. Additional elements proposed to provide a comprehensive flood protection system for the Tall Trees neighborhood included a gate structure at the floodwall crossing of South Navy Ditch, a stormwater pump station to provide a reliable outlet for the South Navy Ditch, storm sewer modifications within the Tall Trees neighborhood, and compensatory storage at the Techny Reservoir 32C to mitigate any potential impacts to downstream flood levels. Total project costs were estimated at \$13.5M - \$20M. Although this particular project was recommended, since the costs significantly exceeded estimated benefits, MWRDGC has indicated that they are unlikely to proceed with this project in the near-term future.

## **2 AFFECTED ENVIRONMENT - EXISTING CONDITIONS**

### **2.1 CLIMATE**

Climate in northeastern Illinois is classified as humid continental, characterized by warm summers, cold winters, and daily, monthly, and yearly fluctuations in temperature and precipitation. Average annual rainfall is usually between 30 to 40 inches per year, with greater proportions falling between April and August. Seasonal snowfall averages about 28 inches annually. Early spring floods occur when snow accumulations extend into a period of increasing temperatures that result in melting. If this occurs when soils are already saturated, runoff increases dramatically due to the large area of impervious surfaces within the basin caused by urban development.

## 2.2 SOILS AND GEOLOGY

There is a limited amount of soils data available at this stage of the project as there are no known soil borings within the project area. To collect some initial data about subsurface conditions, two sources were checked. The first was the USDA Web Soil Survey which classifies area soils into general categories. For the Glenview project area, the soil type is “Alfic Udarents”, which is defined as soils in residential areas that have been disturbed, generally consisting of silty clay loam. The second source is the Illinois State Geological Survey which collects soil boring logs during water well drilling. Two borings are within ½ mile of the proposed project and also indicate the subsurface consists of mostly silt and clay. Additional subsurface information will be gathered during the feasibility phase, as needed.

### 2.2.1 Geology and Physiography

Bedrock is approximately 100-200 feet below grade in the project area, and will therefore not be encountered.

## 2.3 SURFACE WATER AND OTHER AQUATIC RESOURCES

### 2.3.1 Surface Water

As discussed in Section 1.2, the surface water in the study area includes the WFNBCR and the South Navy Ditch. The WFNBCR originates in Lake County, Illinois and flows south to Cook County where it passes through the study before it combines with the North Branch of the Chicago River in Morton Grove, Illinois. The South Navy ditch originates in Glenview, Illinois just west of Lehigh Road, approximately 0.2 miles west of the Tall Trees neighborhood and terminates at its confluence with the WFNBCR.

Section 303(d) of the Clean Water Act requires that all states maintain and publish lists of impaired waterways—water that does not meet water quality standards set by those states. In its 2016 303(d) list, the State of Illinois identified impairments in the WFNBCR, summarized in Table 1 below. South Navy Ditch is not mapped as part of this list.

**Table 1: Surface Water Impairments**

Waterway	Designated Uses <sup>1</sup>	Causes	Sources
West Fork North Branch Chicago River (IL_HCCBG-39)	Aquatic Life (N) Fish Consumption (X) Primary Contact Recreation (N) Secondary Contact Recreation (X) Aesthetic Quality (F)	Aldrin, alteration in stream-side or littoral vegetative covers, chloride, DDT, endrin, hexachlorobenzene, dissolved oxygen, total phosphorus, total suspended solids, fecal coliform, changes in stream depth and velocity patterns	Channelization, contaminated sediments, highway/road/bridge runoff (non-construction related), loss of riparian habitat, municipal point source discharges, site clearance (land development or redevelopment), urban runoff/storm sewers, unknown sources

<sup>1</sup> N = Waterway does not support designated use; F = waterway fully supports designated use; X = not assessed  
Source: *Illinois Integrated Water Quality Report and Section 303(d) List, Appendix B-2*. Illinois Environmental Protection Agency – Bureau of Water. 2016.

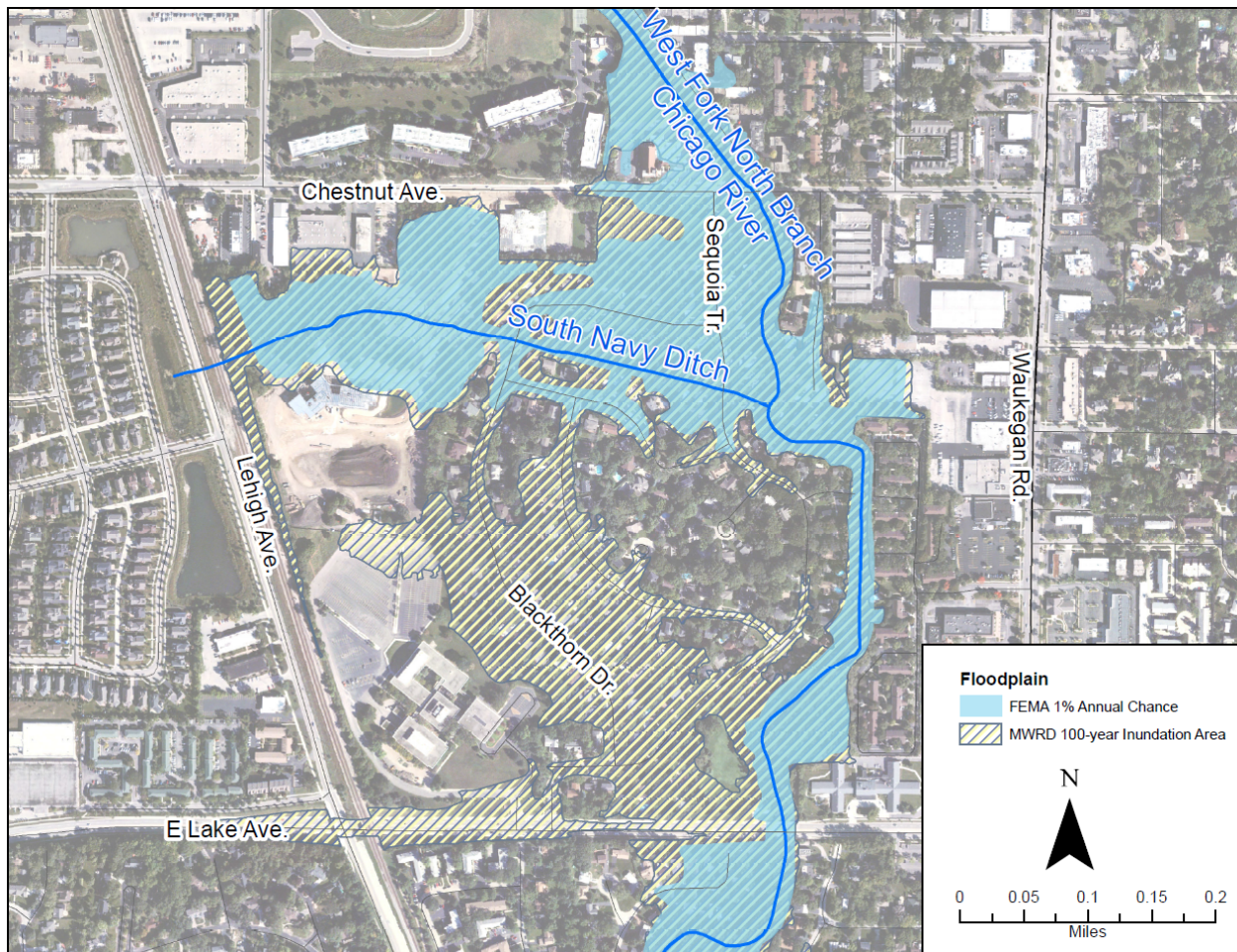


### 2.3.2 Groundwater

A review of groundwater hydrology in the project area will be completed during the feasibility phase.

### 2.3.3 Floodplains

A significant amount of the northern portion of the Tall Trees neighborhood has been designated as SFHA Zone AE by FEMA, indicating that it is anticipated to be inundated by the 1% annual chance flood. Additionally, the area immediately adjacent to both the WFNBCR and the South Navy Ditch has been designated as 'Regulatory Floodway' by FEMA, stipulating that this area must be kept free of encroachments so that the 1% annual chance flood can be conveyed without increasing the base flood elevation. A significant amount of the southern part of the Tall Trees neighborhood is defined as Zone X (areas of 0.2% annual chance flood). MWRDGC has conducted an additional, more detailed, floodplain analysis and has designated a 1% annual chance flood inundation areas, which are slightly different than FEMA's SFHA near the South Navy Ditch and include significantly more area at risk of flooding during the 1% annual chance storm in the southern portion of the neighborhood. FEMA's floodplain and MWRDGC's inundation area are both depicted in Figure 4.



**Figure 4: Floodplain Areas**

### 2.3.4 Wetlands

A preliminary review of the U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) Wetland Mapper shows no known wetlands within the project area (NWI Wetland Mapper V2, data last modified November 22, 2016). The presence or absence of any wetlands will be reviewed onsite during the feasibility phase.

## 2.4 FISH AND WILDLIFE HABITATS

The project areas consists primarily of floodplain forest habitat and the condition of this habitat is highly variable dependent on individual landscaping and other improvements that residents adjacent to the river have implemented on their property. A complete review of fish and wildlife habitats will be conducted during the feasibility phase.

## 2.5 ENDANGERED AND THREATENED SPECIES

### 2.5.1 Federal

The countywide distribution of Federally-listed threatened, endangered, and candidate species was reviewed for Cook County. The following Federally-listed species, their status, and critical habitat are identified by the U.S. Fish and Wildlife Service (USFWS) as occurring within Cook County and have potential habitat within the project area:

- Piping Plover (*Charadrius melodus*) – Endangered – Wide, open, sandy beaches with very little grass or other vegetation
- Rufa Red Knot (*Calidris canutus rufa*) – Threatened – Only actions that occur along coastal areas or large wetland complexes during migratory window of May 1 - September 30
- Eastern Massasauga (*Sistrurus catenatus*) – Threatened – Graminoid dominated plant communities (fens, sedge meadows, peatlands, wet prairies, and shrublands)
- Hine's Emerald Dragonfly (*Somatochlora hineana*) – Endangered – Spring fed wetlands, wet meadows, and marshes
- Rattlesnake-master Borer Moth (*Papaipema eryngii*) – Candidate – Undisturbed prairie and woodland openings that contain their only food plant, rattlesnake-master (*Eryngium yuccifolium*)
- Rusty Patched Bumble Bee (*Bombus affinis*) – Endangered – Grasslands with flowering plants from April through October, underground and abandoned rodent cavities or clumps of grasses above ground as nesting sites, and undisturbed soil for hibernating queens to overwinter
- Eastern Prairie Fringed Orchid (*Platanthera leucophaea*) – Threatened – Moderate to high quality wetlands, sedge meadow, marsh, and mesic to wet prairie
- Prairie Bush Clover (*Lespedeza leptostachya*) – Threatened - Dry to mesic prairies with gravelly soil
- Northern Long-Eared Bat (*Myotis septentrionalis*) – Threatened – Hibernates in caves and mines, swarms in surrounding wooded areas in autumn. Roosts and forages in upland forests and woods
- Indiana Bat (*Myotis sodalis*) – Endangered - Caves, mines (hibernacula); small stream corridors with well-developed riparian woods; upland forests (foraging)



A complete list of Federally-listed threatened, endangered and candidate species found in Illinois and their habitat is published by USFWS at [www.fws.gov/midwest/endangered/lists/illinois-spp.html](http://www.fws.gov/midwest/endangered/lists/illinois-spp.html).

### **2.5.2 State**

To be determined during the feasibility phase.

### **2.5.3 Critical Habitat**

There is no designated critical habitat for any listed or candidate species within or adjacent to the project area. However, the general habitat for roosting of the Northern Long-Eared Bat and the Indiana Bat is located within and adjacent to the project area.

## **2.6 RECREATIONAL, SCENIC AND AESTHETIC RESOURCES**

### **2.6.1 Local Resources**

As the project area consists entirely of private property (excluding public roadways in the neighborhood), there is no public recreation within the area. All scenic and aesthetic resources, mainly the scenic view of the WFNBCR, are available to the private property owners adjacent to the waterway.

### **2.6.2 Regional Resources**

No regional recreation, scenic, or aesthetic resources exist in the project area.

## **2.7 CULTURAL RESOURCES**

No known cultural resources exist in the project area. This will be reviewed during the feasibility phase.

## **2.8 AIR QUALITY**

The study area is within Cook County, Illinois, which is considered a non-attainment area under the Clean Air Act for ozone.

## **2.9 NOISE**

Existing noise in the study area is minimal and associated with background traffic noises from nearby Chestnut Avenue and East Lake Avenue.

## **2.10 HAZARDOUS AND TOXIC SUBSTANCES**

A very limited screening investigation (appropriate with this stage of the project) does not suggest any hazardous, toxic and radioactive waste (HTRW) issues that preclude a conclusion that there is a Federal interest in a flood risk management solution in the general project area.

Because the project area is located in a developed residential and commercial area, the number of returns from the State of Illinois Resource Conservation and Recovery Act (RCRA) and leaking underground storage tank (LUST) database will require additional investigation if a project is selected for implementation. Additional investigation will clarify the status and relationship of adjacent RCRA, LUST, and other regulated activities to aid in the determination if the project area has been impacted by any HTRW occurrences. Due to the limited scope of this preliminary screening, it is possible that environmental issues may be discovered during future investigations. An HTRW investigation cannot

wholly eliminate uncertainty regarding the potential for HTRW associated with a project area. In order to reduce the uncertainty of HTRW in connection with a project area, the HTRW evaluation must consider the work proposed at each location and site specific information that was not evaluated during this preliminary screening.

## 2.11 SOCIOECONOMIC AND ENVIRONMENTAL JUSTICE

No known socioeconomic or environmental justice implications are directly related to the proposed alternatives. This will be reviewed during the feasibility phase, specifically the compliance with EO 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*) and EO 13045 (*Protection of Children from Environmental Health Risks and Safety Risks*).

## 3 PLAN FORMULATION

### 3.1 PROBLEMS AND OPPORTUNITIES

**Problems:** Many residential structures within the Village of Glenview are at risk of flooding as a result of the WFNBCR overflowing its banks and limiting conveyance through the South Navy Ditch due to backwater obstruction. Additionally, residential roadways frequently flood restricting ingress and egress posing a life-safety risk for all residents within the Tall Trees neighborhood.

**Opportunities:** Manage flood risks in the community can reduce economic damages and improve the safety of residents.

### 3.2 OBJECTIVES AND CONSTRAINTS

#### 3.2.1 Planning Objectives

The Federal objective of water and related land resources planning is to contribute to National Economic Development consistent with protecting the nation's environment. For this study, the following planning objectives have been identified:

- Reduce flood risk in the Village of Glenview associated with the WFNBCR adjacent to the Tall Trees neighborhood.
- Improve community awareness of flood risk and ability to respond to flood emergencies.
- Minimize impacts (e.g. aesthetic, scenic, ingress/ egress disturbances) of flood risk management project on residents of the Tall Trees neighborhood.

#### 3.2.2 Planning Constraints

Formulated plans are limited by constraints, including resource, legal, and policy constraints. Resource constraints are associated with limits on knowledge, expertise, experience, ability, data, information, funding, and time. Legal and policy constraints are those defined by law and USACE policy and guidance. For this study, the following constraints have been identified:

- Flood risks addressed in plan formulation are limited to overbank flooding of the WFNBCR and the resulting backwater impacts on the South Navy Ditch—Flooding associated with insufficient



local drainage infrastructure or flooding issues caused directly by the installed sewer system is not within the scope of this study

- Any plans to address flood risk must avoid increasing flood stages in other areas impacted by the WFNBCR and South Navy Ditch

### 3.3 MOST PROBABLE FUTURE WITHOUT PROJECT CONDITIONS

Flood risk in the Tall Trees neighborhood is associated with overbank flooding of the WFNBCR and the South Navy Ditch. There are at least 63 residential structures in the estimated 1% annual chance flood inundation area. Little change, in terms of elevation of structures or returning land to open space, is expected in the area for the without project condition during the 50-year period of analysis and no flood risk management projects outside the scope of this study are anticipated. The historic flooding problems experienced in the neighborhood are expected to persist if no flood risk management project is implemented for the area.

### 3.4 MEASURES TO ACHIEVE PLANNING OBJECTIVES

In order to reduce flood risk, several flood management measures were considered. The costs of all measures considered are expected to fall well below the maximum \$10 million per project Federal cost limit of the Section 205 authority.

#### 3.4.1 Preliminary Structural and Non-Structural Measures

##### 3.4.1.1 Structural Measures

Two separate structural measures were considered to address the flood risk in the Tall Trees neighborhood:

**Sheet Pile Floodwall Adjacent to River** – The construction of a sheet pile floodwall adjacent to the river was considered due to the small footprint required for construction. Since residential homes were constructed along the west bank of the WFNBCR, limited land is available for structural flood risk reduction measures along the river.

**Concrete Block Floodwall Parallel to River** – The construction of a concrete block floodwall parallel, but offset from the river was also considered. Due to residential homes located along the west bank of the WFNBCR, alignment of the floodwall was considered along the road in front of the homes. Dry floodproofing would be considered for structures between the floodwall and the WFNBCR. USACE, Chicago District has implemented similar concrete block floodwall structures along the Little Calumet River in Hammond, Indiana as shown in Figure 5.



**Figure 5: Concrete Block Floodwall Structure**

### **3.4.1.2 Non-structural Measures**

**Dry Floodproofing** – Non-structural measures are activities such as floodproofing, relocations and buyouts, and development of flood warning plans that can manage flood risk without affecting the hydrologic or hydraulic conditions. The only feasible non-structural measure considered for this problem area was dry floodproofing of residential structures. Exclusion of other common non-structural measures is explained below.

### **3.4.2 Excluded Measures**

**Earthen Levee** – The construction of an earthen levee rather than a flood wall was eliminated from consideration due to space constraints. Since this is a residential area, the footprint that would be required for a levee and setback easements is not available without significantly reducing residential back yard space or buying out structures for the construction of the levee. Construction of a levee is not likely to be supported by the Village or private property owners impacted and would significantly increase real estate acquisition costs.

**Elevation or Buy-out of Residential Structures** – Due to the large number of homes that are subject to flood damage, a program of voluntary buy-outs would not be effective for this area. Homes that are currently subject to moderate levels of damage would not meet benefit/cost criteria for buy-outs, and residents throughout the neighborhood would remain vulnerable to the overall effects of widespread flooding.

## **3.5 FORMULATION AND COMPARISON OF ALTERNATIVE SOLUTION SETS**

Three alternative plans beyond ‘No Action’ were considered on a conceptual level. Each of these plans employ one or more of the measures described in Section 3.4.

### **3.5.1 Alternative Plan Descriptions**

**Plan 0 – No Action:** In the No Action plan, no flood risk management measures would be implemented. This plan is synonymous with the future without project conditions.

**Plan 1 – Floodwall through residential back yards adjacent to WFNBCR:** This plan includes the construction of a steel sheet pile floodwall along the west bank of the WFNBCR to isolate the homes in

the Tall Trees neighborhood from the river. This plan is similar to the project proposed in MWRDGC's Project Definition Report described in Section 1.4. After consideration of multiple configurations by MWRDGC's consultant MWH Global, reviews of topography determined that an approximately 950 foot long structure extending from Chestnut Avenue south through private back yards as depicted in Figure 6, could be built to provide physical protection up to the 1% annual chance flood level. This wall would provide physical flood protection up to the design flood level, but would not meet FEMA freeboard standards. Ground elevations in the Tall Trees neighborhood and adjacent areas are such that a floodwall constructed to meet FEMA requirements for freeboard would need to be on the order of about a mile long and include segments extending north across Chestnut Avenue and west along East Lake Street to the railroad crossing. The necessary tiebacks to high ground make providing freeboard cost prohibitive.

The proposed floodwall would provide physical reduction against flooding up to the 1% annual chance flood level (with no freeboard) for about 53 of the 63 properties identified as potentially vulnerable to direct overbank flood damages. Properties that would not be directly protected by the system include six homes near the south end of Riverside Court on the east side of the WFNBCR, and four homes located along the west side of the WFNBCR along Sequoia Trail south of the intersection of Silverwillow Drive and Sequoia Trail. Based on detailed elevation surveys completed by MWH for these properties, it appears that an equivalent level of protection can be provided to the homes through minor on-site dry flood proofing and site grading measures.



**Figure 6: Plan 1 Schematic**



In addition to the flood protection structure itself, other elements of Plan 1 include:

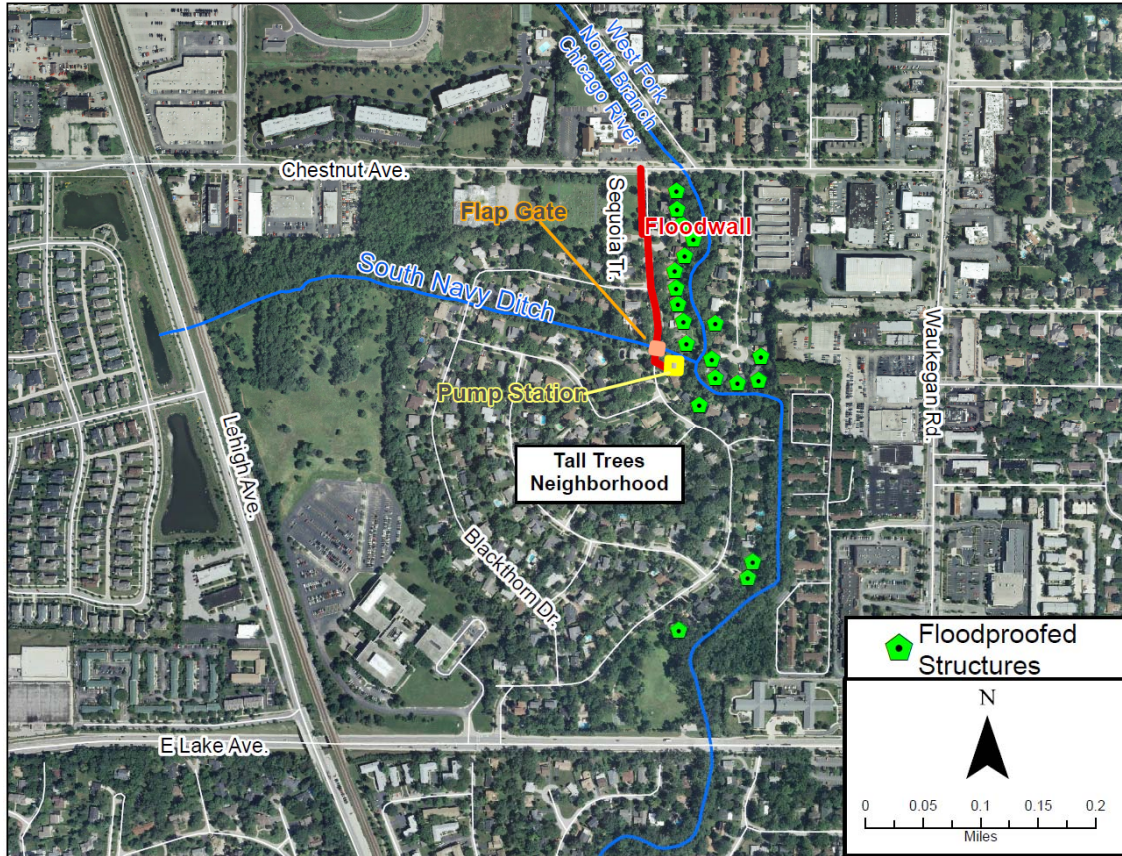
- *A gate structure at the floodwall crossing of the South Navy Ditch.* The gates would normally be left open to allow flow in the South Navy Ditch to drain to the WFNBCR by gravity. During flood events, the gates would be closed to isolate the Tall Trees neighborhood and the South Navy Ditch from backwater from the WFNBCR.
- *A stormwater pump station adjacent to the South Navy Ditch and the WFNBCR.* A new stormwater pump station would be required to provide a reliable outlet for the South Navy Ditch during periods when the WFNBCR is high and the gate structure at the South Navy Ditch is closed. The pump station would be sized to convey peak flows from the South Navy Ditch together with interior runoff from the Tall Trees neighborhood.

Additional improvements may be implemented separately by the Village of Glenview to address local drainage and state regulatory requirements:

- *Storm sewer modifications.* Existing storm sewers draining the Tall Trees neighborhood discharge to the WFNBCR. However, during periods of high river levels, these sewers also provide a means for river water to back up into the Tall Trees neighborhood, flooding low-lying areas along Blackthorn Drive, Basswood Circle, and Silverwillow Drive. A new storm sewer would be constructed along Sequoia Trail from the intersection of Basswood Circle and Sequoia Trail north to the new pump station. A gate would be installed at any existing storm sewer outfalls so that they could be isolated from the river during periods of high stage.
- *Compensatory Storage.* Preliminary model simulations completed by MWH Global indicate that approximately 80 acre-feet of new compensatory storage volume may be needed to comply with the State of Illinois' 'no adverse impact' requirement for construction within the floodway. The new storage would be constructed through a modest expansion of the existing Techny Reservoir 32C facility. Preliminary analysis suggest induced flooding would be minor, not constitute a real estate taking and compensatory storage would not be economically justified. Further analysis will be conducted during the feasibility phase.

**Plan 2 – Floodwall along Sequoia Trail and floodproofing riverward structures:** This plan includes the construction of a concrete block floodwall structure along the Sequoia Trail roadway centerline. In order to construct the 4-foot wide concrete block floodwall, the centerline of the roadway would be shifted 2 feet to the west to maintain the existing lane width for northbound traffic. An additional 8 feet of road widening would be constructed in the south bound lane for a total south bound road width of 18' to facilitate north- and south-bound driving lanes, the concrete block structure, and parked cars on the roadside. The floodwall would have a maximum height of approximately 3.8 feet and provide physical protection up to the 1% annual chance flood level, but would provide no freeboard. This floodwall measure being considered (physical flood protection with no freeboard) would result in property owners remaining within the regulatory floodplain and remaining subject to requirements and constraints associated with floodplain regulations.

Two 15 – 20 foot wide swing gates would be required on either end of the flood protection structure, which would be closed during flood events. Additionally, an approximately 60-foot wide sliding gate would be required at the intersection of Blackthorn Drive and Sequoia Trail. The general proposed alignment of this plan is included in Figure 7.



**Figure 7: Plan 2 Schematic**

On the northern edge of Sequoia Trail near the cemetery, the sidewalk could be raised to act as a flood barrier. An earthen berm would be placed at the pump station property to provide the 628.8' required flood wall elevation, but an additional flood wall may be needed in the adjoining property to the south to reach the required height. To preserve minimum sidewalk width, the sidewalk would be shifted further west. Sidewalk ramps on the corner of Blackthorn Drive and Sequoia Trail may have to be rebuilt. Any modifications to the streets and sidewalks will be reviewed to assure compliance with local codes during the feasibility phase. Emergency vehicle access to residents and hydrants during flood events will be specifically reviewed and confirmed.

Similarly to Plan 1, properties that would not be directly protected by the system include six homes near the south end of Riverside Court on the east side of the WFNBRC, and four homes located along the west side of the WFNBRC along Sequoia Trail south of the intersection of Silverwillow Drive and Sequoia Trail in addition to all houses lining the east edge of Sequoia Trail and north of the stream intersection. Based on detailed elevation surveys completed by MWH for these properties, it appears that an

equivalent level of protection can be provided to the homes through minor on-site dry flood proofing and site grading measures for the structures that are also considered for floodproofing in Plan 1. Further analysis to determine the floodproofing requirements for the houses lining the east edge of Sequoia Trail and north of the stream intersection would need to be completed.

In addition to the flood protection structure itself, other elements of Plan 2 include:

- *A gate structure at the floodwall crossing of the South Navy Ditch.* The gates would normally be left open to allow flow in the South Navy Ditch to drain to the WFNBCR by gravity. During flood events, the gates would be closed to isolate the Tall Trees neighborhood and the South Navy Ditch from backwater from the WFNBCR.
- *A stormwater pump station adjacent to the South Navy Ditch and the WFNBCR.* A new stormwater pump station would be required to provide a reliable outlet for the South Navy Ditch during periods when the WFNBCR is high and the gate structure at the South Navy Ditch is closed. The pump station would be sized to convey peak flows from the South Navy Ditch together with interior runoff from the Tall Trees neighborhood.

Additional improvements may be implemented separately by the Village of Glenview to address local drainage and state regulatory requirements:

- *Storm sewer modifications.* Existing storm sewers draining the Tall Trees neighborhood discharge to the WFNBCR. However, during periods of high river levels, these sewers also provide a means for river water to back up into the Tall Trees neighborhood, flooding low lying areas along Blackthorn Drive, Basswood Circle, and Silverwillow Drive. A new storm sewer would be constructed along Sequoia Trail from the intersection of Basswood Circle and Sequoia Trail north to the new pump station. A gate would be installed at any existing storm sewer outfalls so that they could be isolated from the river during periods of high stage.
- *Compensatory Storage.* Preliminary model simulations completed by MWH Global indicate that approximately 80 acre-feet of new compensatory storage volume may be needed to comply with the State of Illinois' 'no adverse impact' requirement for construction within the floodway. The new storage would be constructed through a modest expansion of the existing Techny Reservoir 32C facility. Preliminary analysis suggest induced flooding would be minor, not constitute a real estate taking and compensatory storage would not be economically justified. Further analysis will be conducted during the feasibility phase.

**Plan 3 – Floodproofing all impacted homes:** This plan consists of floodproofing all 63 homes within the 1% annual chance flood inundation area to protect them from structure and content damage. Dry floodproofing of each individual home is assumed to be feasible. Additional site-specific analyses would be required during the feasibility phase to further develop this plan.





**Figure 8: Plan 3 Schematic**

### 3.5.2 Preliminary Evaluation of Alternative Plans

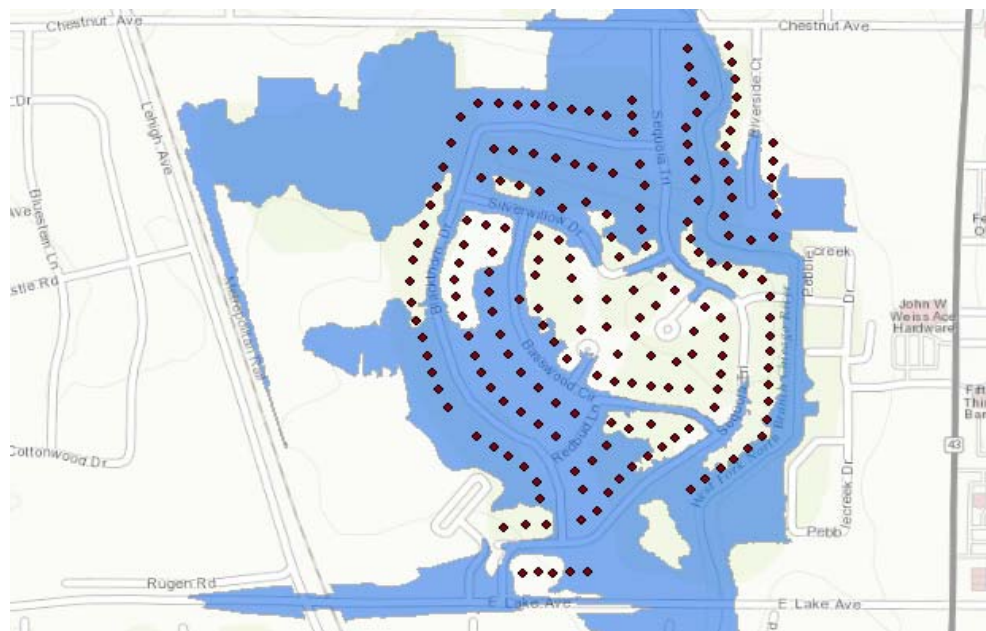
Flood risk management (FRM) benefits consist of reductions in potential flood damages to residential, commercial, industrial and public structures, as well as reductions in other flood related costs such as emergency response, clean-up, and traffic detours. These cost reductions are compared to the costs of project implementation. A project is considered economically justified if the total value of the average annual benefits exceeds the average annual costs.

All structures within the study area are residential. FRM benefits were estimated for reductions in potential flood damages to both the structures and their contents. FRM benefits related to emergency management were also included. Impacts on traffic and clean-up costs were assumed to be minimal and not included in this initial evaluation.

The future without project condition and all alternatives plans were evaluated over a 50 year period, using the current Federal discount rate (2.875%). If the expected annual benefits of a plan exceeds the expected average annual costs, federal interest is determined in proceeding with the feasibility phase.

**Parcel Data and Historical Claims:** MWRDGC conducted field surveys of 339 residential structures that were either in or adjacent to the WFNBCR floodplain. Surveys included first floor elevation and low entry elevation for each residential structure, accompanied by photographs of each survey location. A

database containing the results of the surveys were used to construct a detailed structure inventory consisting of 175 residential parcels as shown in Figure 8.



**Figure 8: Parcels included in economic analysis**

Limited information was available relating to actual damage claims to property and contents for individual residential parcels associated with historical flood events. Limited information was provided by FEMA on individual residential damage claims for historical floods. Overall, property damage data did not include detailed historical claim information for each parcel, or each individual flood event and therefore historical modeling was not included in this analysis.

**Future Without Project Expected Annual Damages:** Given the limited scope of this Federal Interest Determination, a reconnaissance level economic analysis was conducted to quantify the benefits of the proposed alternative plans. The USACE Hydrologic Engineering Center's Flood Damage Assessment (HEC-FDA) version 1.4.1 software tool was utilized to estimate flood damages and potential alternative plan benefits. This software uses risk-based analysis to compute expected annual damages (EAD) in a systematic, evidence based approach for quantifying, describing and communicating risk. Residential home values were indexed up using the Case Shiller Chicago Home Price Index to the most recent report dated October 2016. USACE generic depth damage curves were utilized in HEC-FDA.

Flood profiles were generated using available North Branch Chicago River HEC-RAS modeling that was developed from MWRDGC's Detailed Watershed Plan. Additional precipitation duration model runs were made by USACE for the Great Lakes and Mississippi River Interbasin Study (GLMRIS). The 48-hour precipitation run was determined the critical duration for the 0.01 annual chance event for this reach from the available model runs (3, 12, 24, and 48 hour precipitation duration) and was utilized for this analysis. Table 2 presents flood profile data for various locations and flood events.

**Table 2: Modeled Flood Elevations**

Location	River Station	Modeled Flood Elevation by event [Annual Chance of Exceedance (Recurrence Interval)]					
		50% (2-yr)	10% (10-yr)	4% (25-yr)	2% (50-yr)	1% (100-yr)	0.2% (500-yr)
Downstream of Chestnut Avenue	18579.55	624.10	625.27	625.91	626.89	628.85	631.62
At South Navy Ditch	17714.2	623.71	624.94	625.61	626.49	628.56	631.40
Basswood Circle/Sequoia Tr.	16292.24	623.44	624.67	625.35	626.10	628.17	630.65
Upstream of East Lake Avenue	15456.09	623.31	624.55	625.23	625.96	628.11	630.58

*Elevation: North American Vertical Datum of 1988 (NAVD 88)*

Damages were modeled in HEC-FDA using simulated flood elevations. The estimated damages for each event were used to calculate total average annual without project condition damages of \$352,600.

The emergency management damages were estimated to account for approximately 10% of the residential damages in this analysis since the Village of Glenview reported costs to be significant over the past decade from multiple flood events. Additional evaluation of actual historical emergency response costs will be conducted during the feasibility phase.

**Estimated Flood Risk Management Benefits**

In the *No Action* alternative (Plan 0), no flood risk management measures would be implemented. This plan is synonymous with the future without project conditions, therefore there would be no benefits associated with this plan.

Alternative Plan 1 and Plan 2 developed for this investigation would include a floodwall that provides physical protection up to the 1% annual chance flood level, but would provide no freeboard. It was assumed that dry floodproofing would be implemented with sufficient freeboard to reduce the risk of flooding in excess of the 0.01 annual chance event. Since both plans do not include freeboard due to tieback limitations, they are both assumed to have residual damages. Further detailed analysis of floodwall heights will be conducted during the feasibility phase. H&H modeling of with-project conditions was not conducted as deemed outside the scope of the analysis. As a result, HEC-FDA could not be utilized to generate alternative expected annual damage calculations. Analysis was performed by assuming no damage would occur up to and including the 0.01 annual chance event, then damages above that level utilize without project condition damages. This approach represents a conservative



approach as it assumes residual damages would maintain at existing levels. Implementation of the stormwater pump station should reduce residual damages for events in excess of the 0.01 annual chance event, but quantifying that benefit is outside the scope of this limited economic analysis.

Alternative Plan 3 includes dry floodproofing all homes identified as being damaged at the 0.01 annual chance event. For ease of analysis, the same approach as Alternative Plan 1 and Plan 2 was used to estimate benefits for Plan 3. In practice, dry floodproofing would be implemented with sufficient freeboard to reduce the risk of flooding in excess of the 0.01 annual chance event. As such, this approach includes an estimate of residual damages that in turn reduce benefits for this plan. Further analysis of non-structural plans will be conducted during the feasibility phase.

Economic benefits of a plan are synonymous with damages avoided; therefore, the benefits of a project are equal to the without-project damages minus the with-project damages. Estimated average annual benefits are shown in Table 3.

**Table 3: Summary of Alternative Plan Average Annual Benefits**

Conditions	Average Annual	Present Value Factor	Present Value
<b>Without</b>			
Damages	\$352,600	26.352	\$9,292,000
<b>Alternative Plans 1,2, and 3</b>			
Residual Damages	\$97,400	26.352	\$2,566,000
Plan Benefits*	\$255,200	26.352	\$6,726,000
* Plan Benefits = Without Damages – Residual Damages			

### Estimated Alternative Plan Costs

For the preliminary estimate of costs, several factors were taken into account:

**General Design considerations:** Preliminary cost estimates were developed for all three alternatives. The costs are based on preliminary designs based on the components for each plan listed in Section 3.5.1.

**Real Estate:** Lands, Easements, Relocations, Rights-of-Way, and Disposal Areas (LERRDs) real estate estimates were prepared based on an estimate of acreage required for each alternative plan. Fee values were assumed given the early designs and the small acreages needed for each easement area (i.e. 0.07 acres, 0.11 acres, 0.09 acres, etc.) It is doubtful that portion of the property will be used for other purposes once floodwalls are constructed. The estimated easement requirements are summarized below. Flood protection levee easements and temporary work area easements are required for Plans 1 and 2 as described in Section 3.5.1.

It was assumed that the existing home at [REDACTED] would be demolished and the site will be subsequently used for construction of a flood wall along the creek and a pumping station within the parcel for Alternative Plan 1 and Plan 2. Public Law 91-646, Uniform Relocation Assistance must be provided to the residents of this parcel. Demolition costs would be treated as construction cost and a staging area will be set up within the parcel.

For Plan 1, flood protection levee easements will be secured from ten additional private parties covering the 1.29 acres required for construction of the floodwall. It is assumed that excavated material will be managed within the project footprint and that no additional land acquisition will be necessary for disposal materials. Non-standard estates are not anticipated.

The order of magnitude of estimated real estate costs was sourced from the Cook County Assessor's records and a review of 2016 vacant land sales within the project vicinity. The assessor records for land values appears not to have been updated since approximately 2007; therefore, land values seemed exceptionally low. A review of recently sold lands was conducted to establish an estimated per acre value. A formal gross appraisal will be conducted during the feasibility phase. For Plan 1, approximately three acres of mature trees would be removed. The fair market value of those trees will also be appraised during the feasibility phase.

A summary of the estimated real estate costs for each plan is shown in Table 4. Federal and non-Federal real estate related administration costs are included in Table 9, *Estimated Project Costs and Apportionment* in Section 3.6.2.

**Table 4: Estimated Real Estate Costs**

<b>Plan 0: No Action</b>		
	No LERRDs required	
<b>Plan 1: Floodwall through residential back yards adjacent to WFNBCR</b>		
	Flood protection easements: (10)	\$ [REDACTED]
	P.L. 91-646 just compensation relocation	\$ [REDACTED]
	Subtotal LERR	\$ [REDACTED]
	15% contingency	\$ [REDACTED]
	<b>PLAN 1 TOTAL estimated LERR</b>	<b>\$ [REDACTED]</b>
<b>Plan 2: Floodwall along Sequoia Trail and floodproofing riverward structures</b>		
	P.L. 91-646 just compensation relocation	\$ [REDACTED]
	Land for widening of roadway within right-of-way	\$ [REDACTED]
	Subtotal LERR	\$ [REDACTED]
	15% contingency	\$ [REDACTED]
	<b>PLAN 2 TOTAL estimated LERR</b>	<b>\$ [REDACTED]</b>
<b>Plan 3: Floodproofing all impacted homes</b>		
	No LERRDs required	

**Operations and Maintenance:** This preliminary estimate is based on typical operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) activities for similar floodwalls in the region. The most significant costs would be associated with inspection of and periodically operating gate structures.

Alternative plan average annual costs are presented in Table 5. Items include Contractors Earnings plus Contingencies, Engineering & Design Costs, Construction Management Costs, and Lands, Easements, Rights of Way, Relocations & Disposal Costs (Real estate Costs). Total First and Investment Costs were converted to Average Annual Costs using a 2.875% interest rate and a 50-year project life. Project Average Annual Costs reflect October 2016 price levels and a 2.875% annual interest rate. Interest during construction is based on a 12 month construction period where costs are evenly distributed over the construction period.

**Table 5: Alternative Project Average Annual Costs**

	Estimated Cost (\$1,000)		
	Plan 1	Plan 2	Plan 3
Construction <sup>1</sup>	\$████	\$████	\$████
Engineering and Design (10%)	\$████	\$████	\$████
Construction Management (8%)	\$████	\$████	\$████
LERRDs	\$████	\$████	████
Total First Costs	\$5,910	\$4,603	\$5,146
Annualized First Costs	\$227	\$177	\$198
Annual OMRR&R <sup>2</sup>	\$40	\$33	\$44
Average Annual Cost	\$267	\$210	\$242
<i>Base Year: 2017</i> <i>Federal Discount Rate: 2.875% (FY2017)</i> <i>Price Level: October 2016 (FY2017)</i> <i>Period of Analysis: 50 years</i> <sup>1</sup> Construction estimate includes 18% contingency <sup>2</sup> Annual OMRR&R estimated at 1% of construction costs			

**Benefit-Cost Analysis:** In the evaluation of flood risk management projects, a benefit-cost analysis is intended to provide a measure of net National Economic Development (NED) benefits, which are defined as “increases in the economic value of the goods and services that result directly from a project.” Project benefits are compared to costs. If the benefits of implementing a project are greater than costs, a project has a benefit to cost ratio (benefits divided by costs) greater than one and positive net benefits (benefits minus cost). These projects will make a positive impact on the economy and possess federal interest in their implementation. Table 6 provides a summary of the benefit-cost analysis for each of the alternative plans. Plan 2 and Plan 3 would result in positive net benefits based on this preliminary analysis.



**Table 6: Benefit-Cost Analysis Summary**

	Estimated Value (\$1,000)		
	Plan 1	Plan 2	Plan 3
Average Annual Benefits	\$255	\$255	\$255
Average Annual Costs	\$267	\$210	\$242
Average Annual Net Benefits	-\$12	\$45	\$13
Benefit to Cost Ratio	0.96	1.22	1.05
<i>Base Year: 2017</i> <i>Federal Discount Rate: 2.875% (FY2017)</i> <i>Price Level: October 2016 (FY2017)</i> <i>Period of Analysis: 50 years</i>			

**3.5.3 Risk and Uncertainty**

Due to the limited level of detail in this analysis there is uncertainty in the conclusions presented here. The key assumptions and associated risks are summarized in Table 8, and included in the risk register matrix, included in in Enclosure 1. All of these assumptions could impact Federal interest or plan selection and additional analysis will be conducted to reduce the level of uncertainty and mitigate these risks during the feasibility phase. The risks are qualitatively described in the table using the probability of negative consequences occurring and the expected magnitude of those consequences. The probability and consequence ratings define the level of risk as outlined in Table 7.

**Table 7: Risk Matrix**

Risk Rating Computation Guide			
Likelihood Estimate	Consequence Estimate		
	High	Medium	Low
High	Very High	High	Medium
Medium	High	Medium	Low
Low	Medium	Low	Very Low

**Table 8: Summary of Major Risk Areas that Could Impact Federal Interest**

Risk Area	Probability	Consequence	Risk Level
<p><i>Acquisition of LERRDS:</i> Plans 1 and 2 both rely on acquisition of one residential property as well as a portion of several other residential properties. The non-Federal sponsor, the Village of Glenview has indicated a readiness to acquire property, but there is a risk that landowners will be unwilling to sell and the Villages authority to condemn property has not been established. If real estate easements cannot be acquired, the currently formulated plans may not be feasible.</p>	Low	High	Medium
<p><i>Economic Analysis Assumptions:</i> Due to limited damage information pertaining to historical flooding, claim damage and the uncertainty of the extent of flooding from sewer back up, the economic analysis attempted to account for such factors. Assumptions utilized in the economic model could be incorrect effecting estimated benefits and effect project justification.</p> <p><i>Other economic analysis assumptions which could affect the final analysis include: emergency management costs, estimated construction costs for each alternative, and the presumed federal discount rate at time of project justification.</i></p>	Medium	Medium	Medium

### 3.6 TENTATIVELY RECOMMENDED PLAN

While Plans 2 and 3 are expected to result in positive net benefits based on this preliminary analysis, at this point, it is recommended that all plans be developed further during the feasibility analysis to evaluate all alternative plans costs and benefits.

#### 3.6.1 Tentatively Recommended Plan Description

While further analysis is recommended for all plans, initial feedback from the sponsor indicates highest level of interest in Plans 1 and 2, which preliminarily results in positive net benefits or nearly positive. While Plan 3 also results in positive net benefits, it does not fully comply with the defined objective to minimize impacts on ingress and egress to residents of the Tall Trees neighborhood. While all plans will be further analyzed during Feasibility, Plan 2 is considered the Tentatively Recommended Plan for the purposes of this federal interest determination and the estimated project costs and schedule summarized in the remaining sections of this report.

#### 3.6.2 Estimated Project Costs and Schedule.

Project costs and schedule for the completion of the feasibility phase, design phase, and construction were estimated based on similar USACE Chicago District projects and USACE Great Lakes and Ohio River Division project schedule recommendations. Tables 9 and 10 summarize anticipated project costs and schedule for Plan 2. The cost and schedule are preliminary and will be refined during the feasibility phase of this project.

Plan 2 includes the construction of a concrete block floodwall structure along the Sequoia Trail roadway centerline to isolate the homes in Tall Trees neighborhood as well as a gate structure and pump station to prevent backwater flooding on South Navy Ditch.

**Table 9: Plan 2 Estimated Project Costs and Apportionment (Values in \$1,000)**

	TOTAL	FY2017	FY2018	FY2019	FY2020
<b>Feasibility Study Costs</b>	\$450	\$200	\$250		
FED share **	\$340	\$150	\$190		
non-FED	\$110	\$50	\$60		
<b>Design &amp; Implementation Costs</b>	\$4,336		\$150	\$234	\$3,952
Design Analyses, Plans & Specs	\$█		\$█	\$█	
Construction	\$█			\$█	\$█
LERRDs	\$█				\$█
FED share	\$2,818		\$98	\$152	\$2,569
non-FED	\$1,518		\$53	\$82	\$1,383
non-FED cash/WIK	\$█		\$53	\$82	\$█
non-FED LERRD	\$█				\$█
<b>Total Project Cost</b>	\$4,786	\$200	\$400	\$234	\$3,952
FED share	\$3,158	\$150	\$288	\$152	\$2,569
non-FED	\$1,628	\$50	\$113	\$82	\$1,383
*First \$100,000 is 100% federal responsibility. All Feasibility costs after FCSA execution are shared 50/50.					
**Assume IEPR contract cost of \$130k in FY18 at 100% Federal cost, if determined necessary					
***Design and implementation costs are shared 65% Federal and 35% non-Federal					



**Table 10: Implementation Schedule**

<b>Milestone</b>	<b>Scheduled</b>	<b>Actual</b>
Initiate Feasibility Phase	December 2016	December 2016
Submit Federal Interest Determination Report	March 2017	March 2017
MSC Approved FID report	April 2017	-
Execute Feasibility Cost Share Agreement	May 2017	-
Submit MDM Draft DPR	May 2018	-
MSC Approved MDM Draft DPR	August 2018	-
NEPA Public Review	September 2018	-
Submit Draft Final DPR	November 2018	
MSC Approved Decision Document	February 2018	-
Project Approval - Initiate D&I Phase	February 2018	-
Fully Executed PPA	March 2018	-
ATR Certified Construction Plans and Specifications	March 2019	-
RE Certification / RTA	May 2019	-
Construction Contract Award	July 2019	-
Construction Complete	December 2021	-
Project Closeout	December 2022	-

### **3.6.3 Non-Federal Sponsor Responsibilities**

The non-Federal sponsor, the Village of Glenview, submitted a Letter of Intent (LOI) on 21 February 2017. In the LOI, the sponsor expressed a strong interest in this project and has the desire and capability to provide support via work-in-kind as well as a cost share of project costs. The Non-Federal Sponsor is expected to:

- Execute Feasibility Cost Sharing Agreement (FCSA)
- Participate in formulation of plan that achieves Federal Objective
- Concur with recommended plan and demonstrate partnership capability
- Execute Project Partnership Agreement (PPA), and if applicable, perform any remedial actions associated with CERCLA regulated substances in advance of CAP project execution
- Provide required LERRDs
- Participate in design and Operations & Maintenance (O&M) Plan development
- Accept completed project
- Monitor, operate, and maintain completed project as specified in the PPA and O&M Plan

## **4 ENVIRONMENTAL EFFECTS OF RECOMMENDED PLAN**

Cumulatively, there are minimal environmental effects expected as a result of the development of a recommended plan. A complete analysis of potential effects will be conducted during the feasibility phase and a strong effort will be made to minimize effects. A description of the HTRW investigation recommendations for the feasibility phase are included below; no other impacts associated with any of the environmental resources described in Section 2 are anticipated.

## **4.1 HAZARDOUS AND TOXIC SUBSTANCES**

A Phase I HTRW investigation must be completed for projects sites selected for implementation during the feasibility study, in accordance with ER 1165-2-132. Standard Practice for Environmental Assessments: Phase I Environmental Site Assessment Process (Designation: E 1527-2000) prepared by the American Society for Testing of Materials (ASTM) will be used as supplemental guidance. The investigation will include, but not be limited to, site reconnaissance, database research, interviews, and a record review (including a review of historical aerial photographs and maps) for each project site. Findings of the investigation will be presented in the final feasibility report. The HTRW report will include a summary of findings and a list of recommendations for future HTRW investigations and sampling efforts (phase II investigations), if required.

## **5 MITIGATION OF ADVERSE EFFECTS**

No fish and wildlife mitigation is anticipated for the proposed alternative plans. A detailed analysis to identify mitigation requirements has not been conducted. This analysis will be conducted during the feasibility phase.

## **6 IMPLEMENTATION REQUIREMENTS**

### **6.1 PROJECT PARTNERSHIP AGREEMENT**

The non-Federal sponsor, the Village of Glenview, submitted a Letter of Intent (LOI) on 21 February 2017 requesting assistance from USACE under the CAP Section 205 authority. The non-Federal sponsor supports the project and is willing to share the cost of the project. The letter is included in Enclosure 2.

### **6.2 LANDS, EASEMENTS, RIGHTS-OF-WAY, RELOCATIONS AND DISPOSAL AREAS**

Floodwall easements and temporary work area easements are required for Plan 1 and 2 as described in Section 3.5.1 and 3.5.2. For both Plans 1 and 2, flood protection levee easements and a P.L. 91-646 Uniform Relocation Assistance must be provided for one residential parcel. The sponsor must develop a Relocation Assistance Plan that must be approved by USACE. An analysis of the sponsor's legal and professional capabilities to acquire real estate has been conducted. Further, a real estate risk letter was sent to the sponsor advising the risks associated with acquiring real property interests prior to the signing of the PPA.

### **6.3 MONITORING AND ADAPTIVE MANAGEMENT**

#### **MONITORING AND ADAPTIVE MANAGEMENT**

No monitoring or adaptive management requirement are anticipated for this flood risk management project.

## 6.4 OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION

Based on typical operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) activities for floodwalls in the region, the most significant cost will likely be associated with annual inspection of the structure. Any required closure structures will also require regular inspection and maintenance to ensure functionality.

## 6.5 REGULATORY REQUIREMENTS

**Sections 404 and 401 of the Clean Water Act:** Since the proposed project would be a USACE Civil Works project, a 404 Permit is not required. However, the proposed project will comply with the regulations and statutes set forth in Section of the Clean Water Act.

**Floodway Construction Requirements:** It is not expected that a floodway permit will be required for this project, however plans will be formulated in accordance with IDNR's Part 3708 'Floodway Construction in Northeastern Illinois' permit requirements. The planned project will be coordinated with the IDNR – Office of Water Resources.

## 7 PUBLIC INVOLVEMENT

### 7.1 PUBLIC VIEWS AND COMMENTS

Significant communication with the public has been conducted by MWRDGC and MWH Global as part of the completion of both of the study efforts summarized in section 1.4. Additional public outreach will be conducted as part of the feasibility phase. Public views and comments on the recommended plan will be summarized following public review of the draft report.

### 7.2 STAKEHOLDER AGENCY COORDINATION

Preliminary coordination has occurred with the Village of Glenview, the project sponsor, and MWRDGC. USACE participated in a site visit of the project area with Village staff on 13 December 2016. In addition, a planning charrette was conducted on 9 January 2017 to identify alternatives to meet planning objectives within the CAP Section 205 authority requirements. The charrette included representatives from the USACE, the Village of Glenview, MWRDGC, and MWH Global consultants.

A number of potential Federal, State, and local stakeholders have been identified for future coordination during the feasibility phase, as listed below.

- U.S. Environmental Protection Agency (USEPA)
- U.S. Fish and Wildlife Service (USFWS)
- Federal Emergency Management Agency (FEMA)
- Illinois Environmental Protection Agency (IEPA)
- Illinois Department of Natural Resources (IDNR)
- Illinois Historic Preservation Association (IHPA)
- Village of Glenview
- Cook County, Illinois
- Metropolitan Water Reclamation District of Chicago (MWRDGC)

## **8 FINDING OF NO SIGNIFICANT IMPACT**

It is anticipated that no mitigation is likely to be required, however an Environmental Assessment will be developed during the feasibility phase. Based upon the results of the Environmental Assessment, a determination will be made if a Finding of No Significant Impact (FONSI) can be executed.

## **9 RECOMMENDATION**

The Chicago District recommends continuation of this study into the feasibility phase. This initial assessment has shown that there is a Federal interest in addressing the flooding problems associated with overbank flooding from the WFNBCR in Glenview, Illinois, and that a strong likelihood exists of formulating a feasible and implementable project within the constraints of the CAP Section 205 authority. The non-Federal sponsor, the Village of Glenview, has indicated an intent to enter into a Federal Cost Sharing Agreement (FCSA) to support the completion of the feasibility phase.

## **10 REFERENCES**

North Branch of the Chicago River Detailed Watershed Plan. Prepared for the Metropolitan Water Reclamation District of Greater Chicago by HDR, Inc. January 2011. Chicago, Illinois.

Project Definition Report for a Flood Control Project for the West Fort of the North Branch of the Chicago River. Prepared for the Metropolitan Water Reclamation District of Greater Chicago by MWH Global. June 2015. Chicago, Illinois.