

Executive Summary

Study Information

The U.S. Army Corps of Engineers (USACE) Philadelphia District (NAP) has prepared this draft integrated feasibility report and environmental assessment (IFR/EA) for the Eastwick section of Philadelphia, Pennsylvania Flood Risk Management Study (“study”). The purpose of the study is to investigate and identify technically sound, economically justified, and environmentally acceptable flood risk management (FRM) solutions for Eastwick. The authority for this study is the Continuing Authorities Program (CAP) Section 205 of the Flood Control Act of 1948 (P.L. 80-858), as amended.

Eastwick is an urban residential neighborhood located in the southwest corner of the City of Philadelphia (19153 zip code), Philadelphia County, Pennsylvania (Figure ES-1). The overall study area is highlighted in yellow while the location of the specific study recommendation is identified by the star symbol. As indicated by both the White House Council on Environmental Quality Climate and Economic Justice Screening Tool (CEJST) and the US Environmental Protection Agency (USEPA) Environmental Justice Screening and Mapping Tool (EJScreen), Eastwick is an economically disadvantaged and environmental justice community.



Figure ES-1: Eastwick FRM Study Area

This draft report is being released for concurrent review to the general public, stakeholders and governmental agencies for review and comment. A public meeting will be held to share and discuss the status of the study during the concurrent comment review period for this draft report. Comments will be addressed in the final report where specifics of the tentatively selected plan (TSP) will be optimized. This draft report includes the most up to date hydraulic analysis, including but not limited

to induced flooding and complementary measures (including lowering banks and/or floodplains, increasing natural high ground elevations, and realignment of high ground/berm development at select locations). If any of the complementary measures are deemed effective at minimizing induced flooding, they would need to be evaluated under other engineering disciplines and assessed for environmental and other effects. Given the sensitivity of the induced flooding, additional analyses will be conducted under separate authority or in partnership with stakeholder efforts based on draft report concurrent (Public, stakeholder and USACE Agency Technical Review (ATR)) comment content. These analyses will help to best manage risk associated with the Tentatively Selected Plan (TSP) associated with induced flooding and complementary measures. Additional risks associated with flooding from the Delaware River are not specifically addressed by this study and will require additional partnership or potentially a separate study authority to address.

Problem Statement

The Eastwick neighborhood of Philadelphia experiences recurring flooding that results in considerable economic damages to homes, businesses, industry, and public infrastructure. Of significant concern is the flooding of structures, primarily residential, from Cobbs Creek during high streamflow events. Flooding especially occurs between 78th and 82nd Streets, from the creek to Chelwynde Avenue. There is an opportunity to implement FRM solutions to manage storm-related risks to people, property and infrastructure within the study area. The planning objective of this study is to manage flood risk to people, property and infrastructure associated with Cobbs Creek and Darby Creek floodwaters. A constraint of the study includes contaminated material and associated groundwater located in the landfill underneath an impervious cap installed by the USEPA. The proposed FRM alternatives will be developed to avoid contact and/or impact of existing hazardous, toxic, radioactive waste within the study area.

Plan Formulation

The goal of the Eastwick FRM Study is to manage the study area's risk from flooding, while contributing to National Economic Development (NED) consistent with protecting the Nation's environment, in accordance with national environmental statutes, applicable executive orders, and other Federal planning requirements.

In support of this goal, the planning objective of this study is to manage flood risk to people, property and infrastructure associated with Cobbs Creek floodwaters flowing between the high elevation points of the Clearview Landfill and S. 78th Street into the Eastwick neighborhood study area between the years 2030 to 2080.

An additional planning objective may be to reduce residual flooding and potential induced flooding in the study area. This potential objective will be better defined after the concurrent review of the draft report.

Structural measures including levees and floodwalls and nonstructural measures including structure elevation, floodproofing, and acquisition/buyout were considered. In addition, elements from regional local planning initiatives such as Floodplain Management Plans were considered in the formulation of alternatives and development of the TSP.

Alternative Plans Considered

A variety of alternatives have been considered towards the formulation of a TSP, including:

- No action plan.

Structural alternatives include:

- A levee is an earthen-berm embankment built to reduce the risk of flooding and would be located in the vicinity of Eastwick Park.
- A floodwall is a concrete barrier which is built to reduce the risk of flooding and would be located in the vicinity of Eastwick Park.

Nonstructural alternatives include:

- Structure elevation (elevating homes): this has been ruled out because elevating attached homes would potentially cause structural damage to the houses.
- Dry floodproofing includes making changes to an individual home to block water from entering. Floodproofing did not reduce the structure risk due to the height of floodwaters.
- Acquisition/buyout. This alternative includes purchasing properties that are at high risk of flooding and potentially reverting the acquired land to open space. Consideration of the acquisition of structures was performed for a number of annual exceedance probabilities (AEP) floodplains. This alternative is feasible but negatively impacts community cohesion.

Other alternatives considered included channel modification, flow detention as well as a number of land use/regulatory measures.

Tentatively Selected Plan

The USACE, in partnership with the Philadelphia Water Department (PWD), has identified a recommended plan of constructing a levee along the left bank of Cobbs Creek within the city-owned Eastwick Regional Park and Clearview Landfill (Figure ES-2). The levee typical section includes a crest elevation of +24.7 ft (NAVD88) with a 10-ft wide crest and 2H:1V riprap side slope on the creek side and 3H:1V grass side slope on the community side. The height of the levee above existing grade is approximately 15 ft. The length of the levee would be approximately 1,370 feet. The levee was laid out such that the inner toe is at least 50 feet away from the nearest structure. The plan also assumes that the distance from the outer toe of the levee to the left bank of Cobbs Creek is also covered with grass. The preliminary levee design crest was sufficient to pass the 1% AEP (commonly known as the '100-year storm') flooding without overtopping. The TSP presents an opportunity to provide Federal benefits in a disadvantaged community as Eastwick classifies as an environmental justice community per USACE guidance.

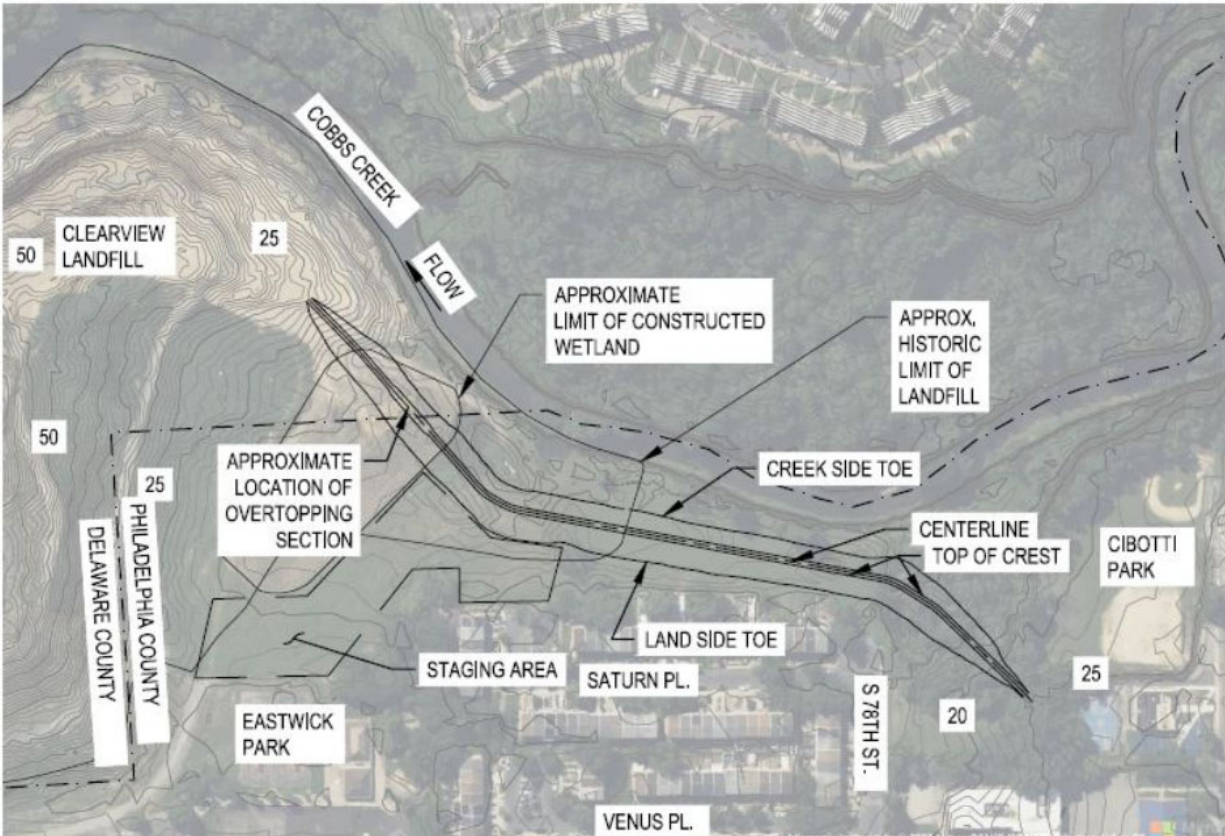


Figure ES - 2. General Layout of Tentatively Selected Plan

The TSP transits the city-owned Eastwick Regional Park and terminates near the Eastwick Recreation Center. As a result, the TSP would have impacts on parks and recreation particularly on the creek side of the levee, but the landward side of the levee may offer new recreational opportunities.

The TSP will be further designed and optimized and ultimately become the recommended plan in the Final IFR/EA. Comments from the public, stakeholders and Federal and non-Federal agencies during the draft IFR/EA concurrent review period will be considered and addressed towards the development of the recommended plan.

Complementary measures are not included in the TSP. Construction costs do not consider costs associated with complementary measures. The addition of these costs may exceed the allowable Federal cost share (\$10 million) under this study authority. This may require additional Federal partnership or USACE Study authority with greater cost limits to consider the inclusion of the complementary measures.

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the USACE determined that the TSP is not likely to adversely affect federally listed species or their designated critical habitat. Compensatory mitigation for wetlands may be required as part of the recommended plan.

The TSP is projected to cost \$13,332,000 in construction costs which would be cost shared 65%/35% Federal/non-Federal (of which \$2,354,000 is for Planning, Engineering & Design [PED]).

Additional costs include \$67,000 in Average Annual Operations, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) over the 50-year period of analysis, \$107,600 for Land, Easements, Rights-Of-Way, Relocation, and Disposal Areas (LERRD), \$358,000 for environmental monitoring (10 years X \$35,800/year) and \$80,000 for adaptive management costs.

The plan selection is in compliance with ER 1105-2-100 *Planning Guidance Notebook* and the ASA(CW) policy directive on *Comprehensive Documentation of Benefits in Decision Document* (05 January 2021). In review of NED, RED, OSE, and EQ planning accounts, the levee alternative (TSP) is the NED Plan and the Net Total Benefits Plan. A life safety analysis has also been performed which identifies that there is not a measurable life safety risk associated with the TSP. The TSP will be optimized prior to the Final IFR/EA. Additionally, detailed comprehensive benefits analyses, induced flooding and complementary measures and levee tie-in into the Clearview Landfill will be further investigated during this time frame.

In its current alignment, the TSP is expected to reduce damages in the area by \$128 million in Present Value terms over the 50-year period of analysis. In FY2023 Price Level and FY2023 Federal Discount Rate (2.5%), the levee alternative has a Benefit-Cost Ratio (BCR) of 8.4 with \$3,986,000 in Average Annual Net Benefits (AANB). Note that the BCR and AANB have been reduced to reflect the induced flooding impacts.

Environmental Assessment

Based on the data presented and continuing coordination with State and Federal resource agencies, no significant adverse environmental impacts are expected to occur as a result of the proposed action. Compensatory mitigation may be required as part of the recommended plan. Currently, the reviews by other Federal, State and local agencies, Tribes, input of the public, and an internal USACE review indicate that the TSP would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required and a Finding of No Significant Impact (FONSI) for the proposed action is appropriate.

Induced Flooding

For the With Project conditions levee plan (TSP), both downstream and upstream impacts were evaluated. Placement of a levee along Cobbs Creek is efficient in eliminating modeled flows through the Eastwick neighborhood. This has the effect of pushing more flow downstream because that flow is no longer leaving Cobbs Creek. More flow downstream leads to marginal water surface elevation (WSEL) increases. Additionally, placement of a levee cuts off a portion of the adjacent floodplain, where floodwaters cannot spread out. This constriction leads to marginal WSEL increases upstream. Generally, WSEL increases dissipate with distance from the potential levee. Moving downstream from Cobbs Creek into Darby Creek, and through the Hook Road bridge, flows spread out through the larger, wider floodplain, and attenuate slightly, leading to WSEL increases that decrease moving downstream toward the Delaware River. Similarly, the largest upstream WSEL increases are generally limited to reaches on both Darby and Cobbs between the confluence and the upstream B&O railroad bridges. These bridges both have limited capacity to pass large floods, leading to backup at the upstream faces of each. This leads to upstream WSEL increases that dissipate to less than 0.5 ft upstream of the railroad crossing.

Residual Flooding

While the TSP levee plan is highly effective, the focus of the plan is to reduce risk associated with Cobbs Creek overflow into Eastwick. As discussed throughout this document, Eastwick is subject to additional impacts from other sources. These include stormwater runoff in excess of storm sewer capacity, and tidal impacts from the Delaware River. Analyses will be conducted prior to the release of the Final report to more definitely quantify impacts of residual flooding due to these other flooding sources. Residual risk associated with TSP is calculated to be 27%.

Complementary Measures

Complementary measures are measures in addition to the TSP that manage the risk of frequent or induced flooding to provide a more comprehensive, integrated FRM solution. To potentially mitigate induced flooding and reduce residual flooding, several complementary measures were assessed. These included lowering banks/floodplain upstream and downstream of Hook Road, increasing natural high ground elevations at multiple locations, and realignment of high ground near the southeast corner of Eastwick to prevent interaction with Darby Creek and the John Heinz National Wildlife Refuge. Complementary measure analyses are not performed in detail associated with this CAP study authority and will need to be performed through subsequent or separate study phases, programs or authorities either from the Federal or non-Federal entities. This decision is a function of the limited capacity, scope and funding levels associated with the USACE CAP Section 205 Program.

Natural and Nature-Based Features (NNBF)

NNBF as complementary measures to USACE's structural levee TSP have been identified to increase the ecological, social, and aesthetic value of the system and will be further evaluated during TSP optimization. Some of these features include trails with seating, levee ramps and stairs, outdoor classrooms/amphitheater, bioswales, managed riparian habitat, tree screens, and levee overlooks.

Specifically, USACE is working with our Engineering With Nature (EWN) partners including the University of Pennsylvania to consider NNBF to potentially incorporate into the final levee design. For example, adding a bike path on the top of the levee to tie into the bike path planned at the Clearview Landfill is one potential consideration. Concept designs are provided in Appendix E. Recreational features will continue be considered throughout plan optimization.

Real Estate Acquisition

The implementation of the TSP requires two parcels within the City of Philadelphia. One parcel is privately owned and the other is owned by the City. The minimum estates required for these parcels are a Temporary Work Area Easement and Perpetual Flood Protection Levee/Floodwall Easement. There are no proposed non-standard estates for these parcels.

In addition, the proposed levee is partially located in Delaware County. Because a portion of the project is on property outside of Philadelphia County, it cannot be acquired by the current NFS. If the NFS is unable to acquire all the property interests necessary for the project, then the project will not be able to be constructed as the NFS cannot meet the real estate terms of the Project Partnership Agreement. One resolution is to work with the adjacent jurisdiction where part of the project resides

to sign on the PPA as a co-sponsor. Note also that the design may be modified during the feasibility phase which could potentially result in the project only being on property the current NFS is authorized and able to acquire.

The Federal Government currently owns no lands in the project area. The PWD is the Non-Federal Sponsor (NFS).