
View looking Southeast from Weehawken Pier

EXECUTIVE SUMMARY

ES 1.0 Introduction and Background

The Rebuild by Design – Hudson River Project, (RBD-HR), the "Project" is a comprehensive urban stormwater management strategy to address impacts from coastal storm surge flooding as well as systemic inland rainfall flooding. The municipalities of Hoboken, Jersey City and Weehawken were inundated by flood waters during Superstorm Sandy in October 2012. With half of Hoboken flooded for several days, most emergency services were unavailable, many residents were evacuated, and the National Guard was deployed to rescue those who could not evacuate. The magnitude of Superstorm Sandy's devastation was primarily attributed to a record-breaking storm surge during high tide. Had Superstorm Sandy been accompanied by a more typical heavy rainfall event, the Study Area's past history suggests that flooding levels and property damage would have been even higher.

As a result of Superstorm Sandy, the United States Department of Housing and Urban Development (HUD) launched the Rebuild by Design (RBD) competition in 2013, inviting interdisciplinary design teams to craft pioneering resiliency solutions to address needs for flood risk reduction within the Superstorm Sandy-affected region. During the course of this competition, a comprehensive urban stormwater management strategy was developed for the Hoboken, Jersey City, and Weehawken area that included hard infrastructure and soft landscape for coastal defense (Resist); policy recommendations, guidelines, and urban infrastructure to slow stormwater runoff (Delay); green and grey infrastructure improvements to allow for greater storage of excess rainwater (Store); and water pumps and alternative routes to support drainage (Discharge). This proposal was selected as a winner of the RBD competition and HUD subsequently awarded the State of New Jersey $230 million for the implementation of the first phase of the "Hudson River Project: Resist, Delay, Store, Discharge" (the Project).

Phase 1 of the Project is described on page 15 of the April 2014 Resist, Delay, Store, Discharge final proposal which states that Phase 1 includes: (1) a master plan for the entire strategy, (2) studies and pilot projects on various aspects of the overall strategy, and (3) the following catalytic projects: coastal defense at Hoboken Station and surroundings, coastal defense at Weehawken Cove, and pump station and greenbelt CSO wetland pilot project. This first phase includes the design and environmental impact analysis of the overall comprehensive master plan of the entire project (including the Resist and Delay, Store, Discharge components), and funding for the construction of the Resist components (the catalytic coastal defense projects). The Delay, Store, Discharge (DSD) elements would be implemented separately by the City of Hoboken or other partners

Figure ES.1 Study Area Map

as funding becomes available. The development of the Project alternatives (including dismissal of certain project concepts) is included in the Final Environmental Impact Statement (FEIS) Section 3.0.

This document evaluates the environmental impacts associated with the Project. Three Build Alternatives and a No Action Alternative were considered. Each Build Alternative includes Resist as well as DSD components. While the current round of funding is for Resist only, this document evaluates all components of the project, including Resist and DSD. The result of this analysis led to the recommendation of Alternative 3 as the Preferred Alternative.

ES 1.1 Flooding Background

The project Study Area encompasses the City of Hoboken and includes the southern portion of the Township of Weehawken and the northern portion of Jersey City (see **Figure ES.1**). The Study Area has the following approximate boundaries: the portion of the Hudson River that encompasses piers within the Study Area to the east; Baldwin Avenue (in Weehawken) to the north; the Palisades to the west; and 18th Street, Washington Boulevard, and 14th Street (in Jersey City) to the south. The upland area within the Study Area is the land above mean high tide, which is approximately 1,020 acres. The Study Area encompasses approximately 233 acres of the Hudson River.

The topography of the Study Area is highest along the east-central portion abutting the coastline of the Hudson River at Castle Point. From here, the land slopes gently downward to the north (towards Weehawken Cove), south (towards the Hoboken Terminal and Jersey City), and to the west (towards the foot of the Palisades).

The Study Area is vulnerable to flooding from both coastal storm surge and inland rainfall events. These flooding problems are attributed to several factors including naturally low topography and proximity to waterways; impervious surface coverage and associated runoff; existing, relatively old, sewer infrastructure with interconnected storm and sanitary sewer lines; and insufficient discharge capability, particularly during high tide.

As seen with Superstorm Sandy, coastal flooding can devastate widespread portions of the Study Area and cause significant economic damage and safety concerns. There are two main entry points of floodwater during coastal storm surge events: (1) the area around Long Slip Canal and Hoboken Terminal and (2) Weehawken Cove. Flood waters enter at these points because they are the lowest areas of topography, in some places no more than three feet above mean sea level.

Systemic inland flooding associated with rainfall tends to be more localized to inland areas of lower elevation, but happens with greater frequency than coastal surges. The systemic inland flooding typically occurs when high volumes of water are brought into the combined storm-sewer system from rainfall events that coincide with an approaching high tide and/or storm surge. During a high tide or storm surge, the water level of the Hudson River can rise above the level of the combined storm-sewer outfalls. As a result, the river traps the water inside the combined storm-sewer system. Water then backs up within the system, flooding low-lying elevation inland areas with stormwater and sometimes sanitary sewage. Based on projections for future sea level rise, the length of time that water is trapped in the combined storm-sewer system is expected to increase in the future.

ES 2.0 Funding, Authority and Agency Roles

The Disaster Relief Appropriations Act of 2013 (Public Law 113-2) was enacted to assist New Jersey's and other disaster-impacted states' recovery efforts for disasters that occurred between 2011 and 2013, including Superstorm Sandy. In that Act, Congress appropriated $16 billion in CDBG-DR funds to be administered by HUD. As recommended by the President's Hurricane Sandy Rebuilding Task Force, HUD launched the Rebuild by Design competition in 2013, inviting interdisciplinary teams to craft pioneering resiliency solutions (see **Figure ES.2**).

On October 16, 2014, HUD announced the award of $230 million in CDBG-DR funds to the State of New Jersey to implement Phase 1 of the proposal titled "Resist, Delay, Store, Discharge." Page 15 of the April 2014 Resist, Delay, Store, Discharge final proposal states that Phase 1 includes three components: (1) a master plan for the entire strategy, (2) studies and pilot projects on various aspects of the overall strategy, and (3) the following catalytic projects: coastal defense at Hoboken Station and surroundings, coastal defense at Weehawken Cove, and pump station and greenbelt CSO wetland pilot project.

In accordance with 24 CFR 58.1(b)(1), the State of New Jersey, acting through the New Jersey Department of Community Affairs (NJDCA), has assumed environmental compliance responsibilities for the Superstorm Sandy CDBG-DR programs on behalf of HUD. The NJDCA has designated the New Jersey Department of Environmental Protection (NJDEP) as the lead agency to assist with the environmental review, including demonstration of compliance with the National Environmental Policy Act (NEPA). The Project's federal funding requires that it comply with NEPA. NEPA outlines the public

Figure ES.2 Rebuild By Design competition idea board

The cooperating agencies are:

- *NJ TRANSIT*
- *Port Authority of New York/New Jersey (PANYNJ)*
- *Environmental Protection Agency (EPA)*

process whereby an agency analyzes a proposed action to determine how the proposed action impacts the environment, and whether other reasonable alternatives are available that reduce, minimize or provide mitigation for unavoidable impacts. The Project's NEPA process began with public scoping which identified the project's purpose and need, study area as well disciplines and resources that would be evaluated as part of the EIS.

The DEIS, which provided an analysis of the potential impacts arising from alternative solutions to address the flooding issues in the Study Area, was prepared by NJDEP to meet this environmental compliance requirement. The DEIS was made available to the general public for comment, as well as circulated to stakeholders, organizations, and government agencies. Three agencies/organizations have been identified as being cooperating agencies: U.S. Environmental Protection Agency (EPA), NJ TRANSIT and the Port Authority of New York/New Jersey (PANYNJ). Additionally, three agencies/organizations have been identified as participating agencies: Federal Transit Agency (FTA), National Marine Fisheries Service (NMFS) and Amtrak.

The purpose of the DEIS is to evaluate environmental impacts from the proposed action. Three Build Alternatives, as well as a No Action Alternative, were considered as part of this decision-making process. A Notice of Availability of the DEIS was published in the Federal Register and local media outlets in accordance with HUD and the Council on Environmental Quality (CEQ) regulations on February 24, 2017. After a 45-day public comment period had concluded on April 10, 2017, substantive public comments pertaining to the DEIS were addressed (see Appendix C) and incorporated into the FEIS where appropriate. The FEIS will be circulated in the same manner as the DEIS (including the publication of a Notice of Availability) and will have a comment period of 30 days. If no additional significant comments are received after the completion of the FEIS comment period, the NJDEP will complete the Record of Decision (ROD). The ROD will designate the Selected Alternative and provide the basis for its selection. It will identify environmental impacts, as well as any required mitigation measures that were developed during the EIS process.

ES 3.0 Purpose and Need

The purpose of the Project is to reduce the flood risk to the Study Area. The Project intends to minimize the impacts from coastal storm surge and rainfall flood events on the community, including adverse impacts to public health, while providing benefits that will enhance the urban condition and recognizing the unique challenges that exist within a highly developed urban area (see **Photograph ES.1**).

The historic flooding and the high likelihood of future flood events from both rainfall and coastal surge flooding has an impact on the lives of Study Area residents from a health, safety, and economic perspective. When critical infrastructure (i.e. fire stations, hospitals, and wastewater treatment plants) is impacted, it affects the welfare of the entire community. The economic livelihood of the community is diminished by the business disruptions caused by flooding and continual costs to repair and restore homes and businesses, with costs often exceeding the average National Flood Insurance claim award. The future potential for flooding in the Study Area is significant based on Hoboken's topography; therefore, the need for a project that minimizes flooding is critical to the health, safety, and economic vitality of Hoboken and its affected neighbors in Jersey City and Weehawken.

ES 3.1 Goals and Objectives

The Project is a comprehensive urban water strategy whose overall purpose is to reduce flood hazard risks that seeks to leverage resiliency investment to enhance the urban condition. The ability to meet this purpose will be measured in terms of Goals and Objectives. Goals are overarching principles that guide decision-making. Goals are measured in terms of Objectives, which are measurable steps to meet the Goal.

Goal: Contribute to Community Resiliency
Objective: The Project will seek to integrate flood hazard risk reduction strategies with emergency, civic,

Photograph ES.1 Aerial view of northern portion of Study Area

and cultural assets. The Project will reduce flood risks within the Study Area, leading to improved resiliency and the protection of accessibility and on-going operations of services (including protecting physical infrastructure such as hospitals, fire stations, and police department buildings, as well as roadways and transit resources). This would allow these key assets to support emergency preparedness and community resiliency during and after flood events.

Goal: Reduce Risks to Public Health
Objective: In addition to providing protection to critical healthcare infrastructure (such as local hospitals and emergency preparedness services), the Project will aim to reduce the adverse health impacts that result from combined sewage backups onto streets and within businesses and residences through a reduction in storm water infiltration into the existing combined sewer collection system.

Goal: Contribute to On-going Community Efforts to Reduce FEMA Flood Insurance Rates
Objective: The City of Hoboken's exposure to flood risks has resulted in some of the highest insurance premiums in the state. The City has long had a goal of reducing those rates through a number of comprehensive flood risk reduction programs, such as those identified in the City's Green Infrastructure Plan. The NFIP's Community Rating System (CRS) allows municipalities to reduce their flood insurance rates through implementation of comprehensive floodplain management. The Project will propose concepts and alternatives that are consistent with Hoboken's overall effort of reducing FEMA Flood Insurance Rates.

Goal: Delivery of Co-Benefits
Objective: Where possible, the Project will seek to integrate the flood hazard risk reduction strategy with civic, cultural and recreational values. The Project will look to incorporate active and passive recreational uses, multi-use facilities, and other design elements that integrate the Project into the fabric of the community. In this way, the Project will complement local strategies for future growth.

Goal: Connectivity to the Waterfront
Objective: The Study Area's waterfront is currently the location of a vast length of interconnected parks and public walkways which contribute to the vibrancy of the community. The Project will aim to incorporate features that do not restrict access to the waterfront. Where feasible, the Project will build on and enhance existing waterfront access points while providing flood risk reduction.

Goal: Activation of Public Space
Objective: The Project will develop concepts that reduce risks to private and public property from flood impacts while also incorporating design elements that activate public and recreational spaces, thereby enhancing quality of life for the community.

Goal: Consider Impacts from Climate Change
Objective: The Project will take into account the projected impacts from climate change, particularly as it relates to sea-level rise and its impacts on the frequency and degree of flooding.

ES 4.0 Development of Alternatives

In order to identify the alternatives to evaluate in this EIS, five project concepts were first developed. The concept development process used the general ideas identified in the RBD competition as a starting point (see description in Section ES-2.0), and preliminary engineering and environmental analysis to develop additional components that could be integrated into overall project concepts (see **Figure ES.3**). These project concepts were comprehensive in nature (including both Resist and DSD strategies). This preliminary concept development process also involved preliminary engineering and environmental coordination with key stakeholders to determine which actions were initially suggested in the RBD competition, but subsequently determined to not be feasible (such as the greenbelt CSO component). Therefore, these components would not be included as components of the Project's concepts.

During concept development, the project team used a toolkit to define the elements of the Project (including Resist, Delay, Store and Discharge components); conducted a suitability assessment; and organized the Project elements by theme. The project team then applied concept development principles to group these elements into five comprehensive concepts.

Following the concept development phase, the concepts underwent a public screening process. This

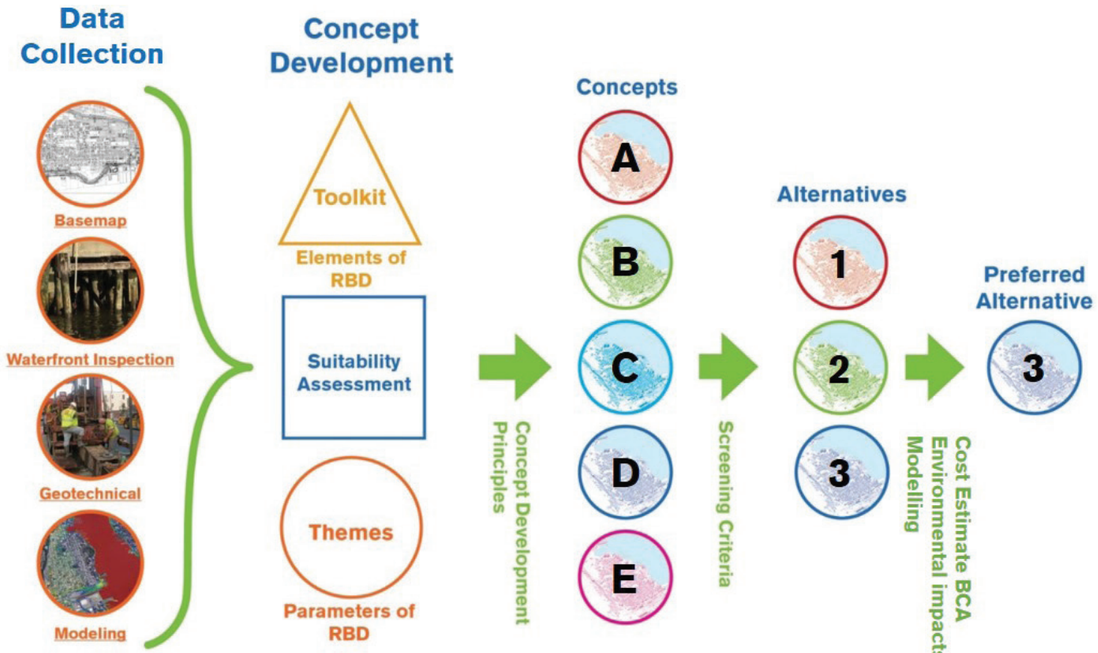

Figure ES.3 Roadmap to Preferred Alternative

involved an evaluation of the five concepts through the use of a screening matrix that evaluated the concepts based on 21 criteria. This concept screening process led to the elimination of two of the concepts from further study, and refinement of the remaining three concepts into the Build Alternatives to be analyzed in the EIS. The success of constructing a reliable and permanent comprehensive flood risk reduction system relies upon designing project approaches that consider existing infrastructure and environmental constraints, while also designing a flood risk reduction system in accordance with the regulatory standards (such as FEMA flood elevation standards, the NJDEP Flood Hazard Area Control Act, and local floodplain ordinances).

Three of the five design concepts progressed to the next step in the process, which was to further develop the concepts into Build Alternatives. These three Build Alternatives, along with the No Action Alternative, underwent an alternative analysis (see Section 6 of the FEIS) that was based on a refinement of the original screening criteria.

ES 5.0 Overview of Alternatives

Each of the three Build Alternatives represents a comprehensive urban stormwater management strategy to address coastal storm surge as well as systemic rainfall flooding. To accomplish this, each build alternative has two components: (1) construction of a Resist barrier to increase resilience and reduce the magnitude and frequency of future coastal storm surge impacts on the communities within the Study Area and (2) a DSD system that reduces the rainwater volume into the combined storm-sanitary sewer system by capturing, storing, and discharging rainwater.

ES 5.1 Preferred Alternative (Alternative 3)

Following is a description of Alternative 3, which is recommended as the project's Preferred Alternative. A Preferred Alternative is the alternative of a project that best meets the purpose and need of that project while avoiding, minimizing or mitigating impacts.

Resist Alignment

Alternative 3 locates portions of the Resist alignment to areas that would minimize impacts on the community. Specifically, the alternative utilizes a private alleyway that parallels 14th Street to extend to Washington Street. Washington Street was chosen due to the width of the street to accommodate the necessary structure and potential to blend structural amenities into the commercial nature of the area. This alternative provides coastal flood risk reduction to approximately 85 percent of the population residing within the Study Area's 100-year floodplain.

In the northern part of the Study Area, this alternative's Resist structure begins at 6.5 feet in height near the HBLR Lincoln Harbor station at Waterfront Terrace, traveling south along HBLR rising to about 11 feet in height and then continuing south along Weehawken Cove (nine feet high) towards Garden Street. (see **Figures ES.4 through ES.8**). Opportunities for urban

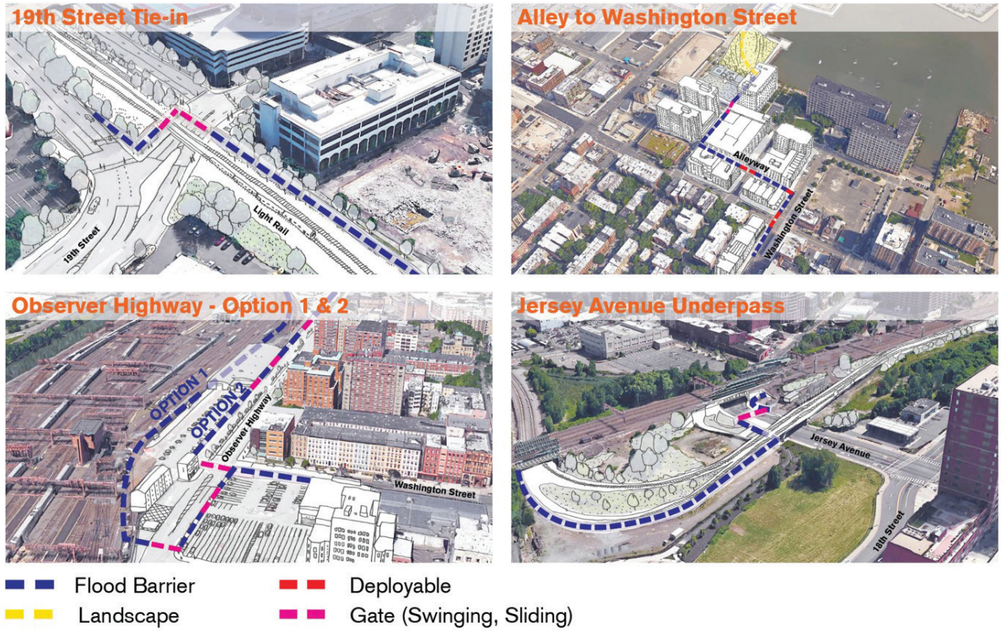

Figure ES.4 Alternative 3 - Resist alignment features

Figure ES.5 Alternative 3 - Resist alignment features

enhancement in the northern portion of the Study Area under Alternative 3 are limited due to siting conditions and include lighting, murals, and seating. It is envisioned that a boathouse will be incorporated into the structure. In addition, a bermed and terraced Cove Park will be incorporated into the southwest corner of the Weehawken Cove. This would include existing undeveloped land, as well as the currently-developed Cove Park (adjacent to Harborside Lofts at 1500 Garden Street). Potential amenities at this park may include playgrounds, lawn areas, game courts, and a viewing deck overlooking Weehawken Cove.

A structure would travel down the east side of Garden Street adjacent to the west of the Hudson Tea Parking Garage, starting at eight feet in height and tapering down to five feet in height. The structure along Garden Street may consist of an elevated planter with seating. The structure would then continue down the alleyway midway between 15th and 14th Streets from Garden to Washington Streets at four feet in height (see **Figure ES.6**). Urban amenities within the alleyway could include planters. The structure would then travel south along Washington Street at 3.5 feet in height, tapering down to the ground level at 13th Street. Street crossings will feature gates (see **Figure ES.7**) to allow for access during non-flood conditions. Consideration will be given to adapting the use of structures in a way to provide urban amenities such as seating and landscape enhancements.

In the southern part of the Study Area, there will then be two options: Option 1 will include an alignment south of Observer Highway within the rail yard (south of the proposed Hoboken Yard Redevelopment Area) at approximately five to 11 feet in height. Option 2 will feature an alignment along Observer Highway from Washington Street directly to Marin Boulevard. The alignment includes gates for access at various locations including at the Marin Boulevard, Grove Street, and Newark Avenue underpasses beneath the rail lines, as well as protection where HBLR tracks pass below the NJ TRANSIT overpass in the southwest corner of the Study Area. Urban amenities in these areas include lighting, murals, seating, plantings, and wayfinding/signage. Steel sheeting will also be installed along the NJ TRANSIT railroad embankment.

During a coastal storm surge event, water from the Hudson River is expected to inundate unprotected areas of the Hoboken waterfront. If the river water overtops the waterfront bulkhead during a storm event, water can enter into the storm sewer system through existing inlets and unsealed manhole covers. While Alternative 1 would prevent a storm surge from entering the city streets, Alternative 3 leaves portions of the city streets and sewer system unprotected. To prevent water intrusion into the existing sewers under Alternative 3, a separation of the sanitary/stormwater collection system is proposed by the construction of a "High Level" storm sewer collection system. In addition to the installation of this new storm sewer system, the existing NHSA combined sewer inlets and manholes would be sealed and lined. This proposed drainage would be designed to prevent additional sewer

Figure ES.6 Rendering of gate in open position, 14th Street and Washington Street

Figure ES.7 Rendering of urban amenities within the alleyway

Figure ES.8 Preferred Alternative

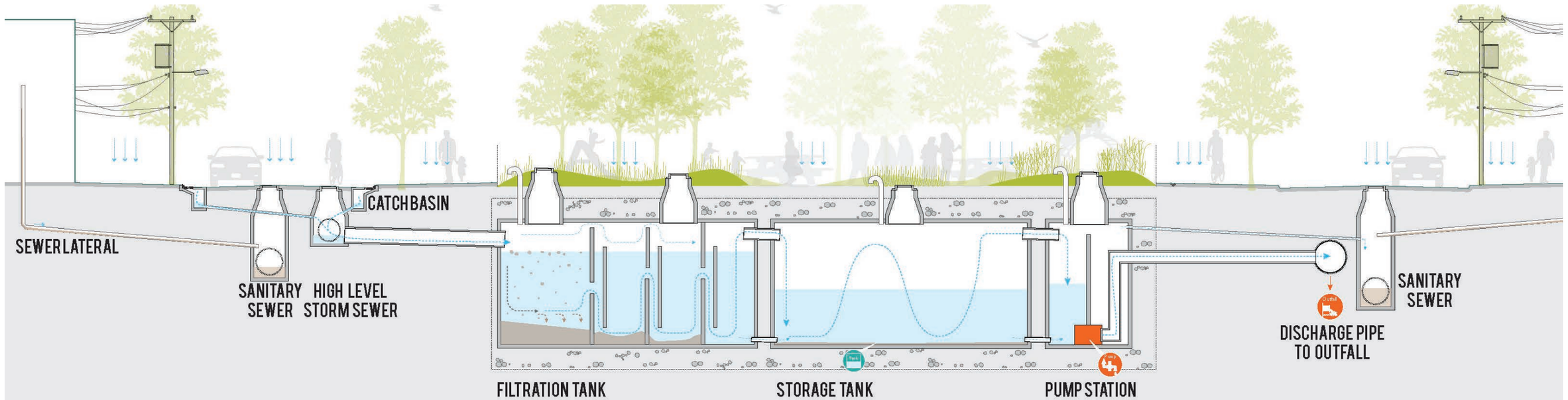

Figure ES.9 BASF Site depicting tanks and typical "High Level" Storm sewer system

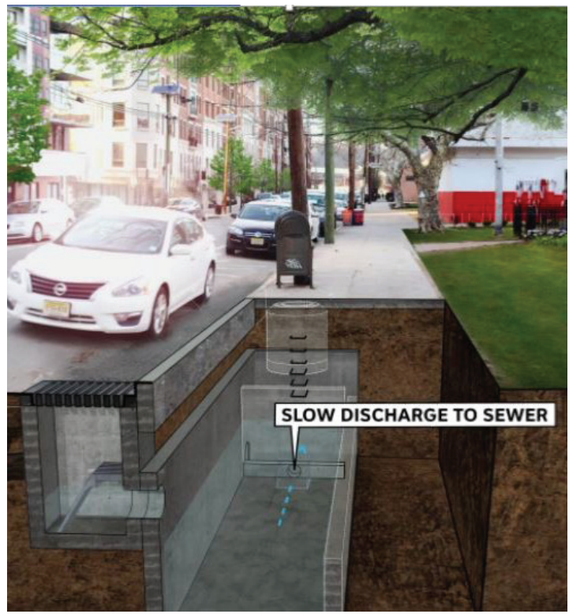

Figure ES.10 ROW Site depicting tanks

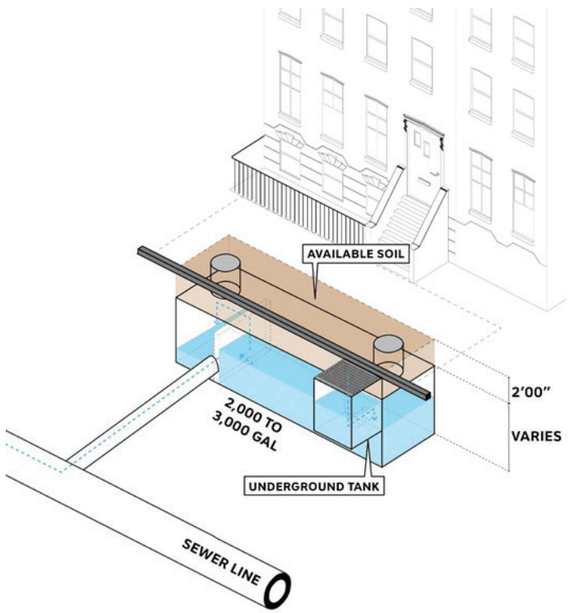

Figure ES.11 ROW Site depicting tanks

backflow that could cause major flooding issues within the Alternative 3 protected areas during a storm surge event. Stormwater collected in this "High Level" storm sewer system would gravity flow into the Hudson River (see **Figure ES.9**).

Delay, Store, Discharge

The DSD elements of the Project consist of three large stormwater detention facilities (the BASF/Northwest Resiliency Park, NJ TRANSIT and Block 10 sites) and approximately 61 small tank sites (ROW sites) (see **Figure ES.10 and ES.11**) that will include new and/or improved stormwater management techniques designed to complement other efforts by the City of Hoboken as part of the Green Infrastructure Strategic Plan and multiple redevelopment plans (discussed further under Land Use). Details on individual sites and specific plans have been developed as part of the feasibility design. The text below describes the major components that comprise this element of the Project. The location of the proposed DSD are based on studies of the existing flooding "hotspots" in Hoboken. The 61 small ROW sites would each hold between 1,500 and 7,000 gallons (depending on design) for a total of approximately 220,000 gallons in capacity.

BASF/Northwest Resiliency Site: The northwest corner of Hoboken south from the NHSA Treatment Plan is a natural topographical low point and catchment area where collection and delay/storage of stormwater can be enhanced by the development of the Northwest Park (BASF Property). The BASF/Northwest Park tank site has capacity for approximately 5.8 million gallons of stormwater. The

4.3-acre property was acquired by the City of Hoboken and includes the property at Block 107, Lot 1. Block 107, Lot 1 was assessed for the stormwater retention facility and proposed urban amenities in this EIS. The City conducted an Environmental Assessment for the acquisition of this property (see Attachment #9), which also included Block 103, Lot 7. The site, which is currently paved and impermeable, is planned for conversion to green park space with an underground stormwater storage/holding tank. A new pump and outfall would be linked to this facility to provide a discharge from the overall catchment area. Amenities under consideration for this park follow three themes: destination, recreational and ecological. A destination park provides trails and urban landscape features, a recreational park provides developed recreational uses such as ball fields and skateboard areas and an ecological park provides an opportunity for the public to engage with native vegetation and wildlife. For a cross-section of the tank system (see **Figure ES.9**).

NJ TRANSIT Site: The area surrounded by the HHA at Jackson and Harrison Streets from 2nd Street to 6th Street also serves as a natural low-lying catchment area. A high level storm sewer collection system will be added in this 17-acre development to support the discharge component of the Site and direct the stormwater overflow towards the west. On the west side of this neighborhood, a stormwater tank will be incorporated along the light rail line to provide storage of the water drained from the HHA area. The tank for the NJ TRANSIT site would have a capacity of approximately 1.4 million gallons of stormwater. A pump station would be incorporated to discharge overflows from the stormwater tank into the existing ditch located at the west side of the NJ TRANSIT Light Rail. NJ TRANSIT ditch currently conveys runoff from the Light Rail property and the Palisades Hill slope to an existing discharge at the Hudson River. Urban amenities under consideration include active and passive recreational options, such as playgrounds, green space and planted areas for a cross section of the tank system, see **Figure ES.12**.

Block 10 Site: The site is located in the southwestern corner of Hoboken adjacent to Academy Bus facility and south of Paterson Avenue. Portions of this currently-paved parcel will be converted to a permeable park space allowing water to infiltrate into the ground. The tank for the Block 10 site would have a capacity of approximately 0.6 million gallons of stormwater. A high level storm sewer collection system will be added to this 8.0 acre watershed and stormwater runoff will be conveyed to a proposed underground detention facility where peak flows will be controlled and delayed before discharging into the existing NHSA combined sewer. Urban amenities under consideration include active and passive recreational options such as playgrounds, green space and game courts. The City of Hoboken is looking to acquire the property. For a cross section of the tank system (see **Figure ES.13**).

Pump Stations: Three pump stations will be required

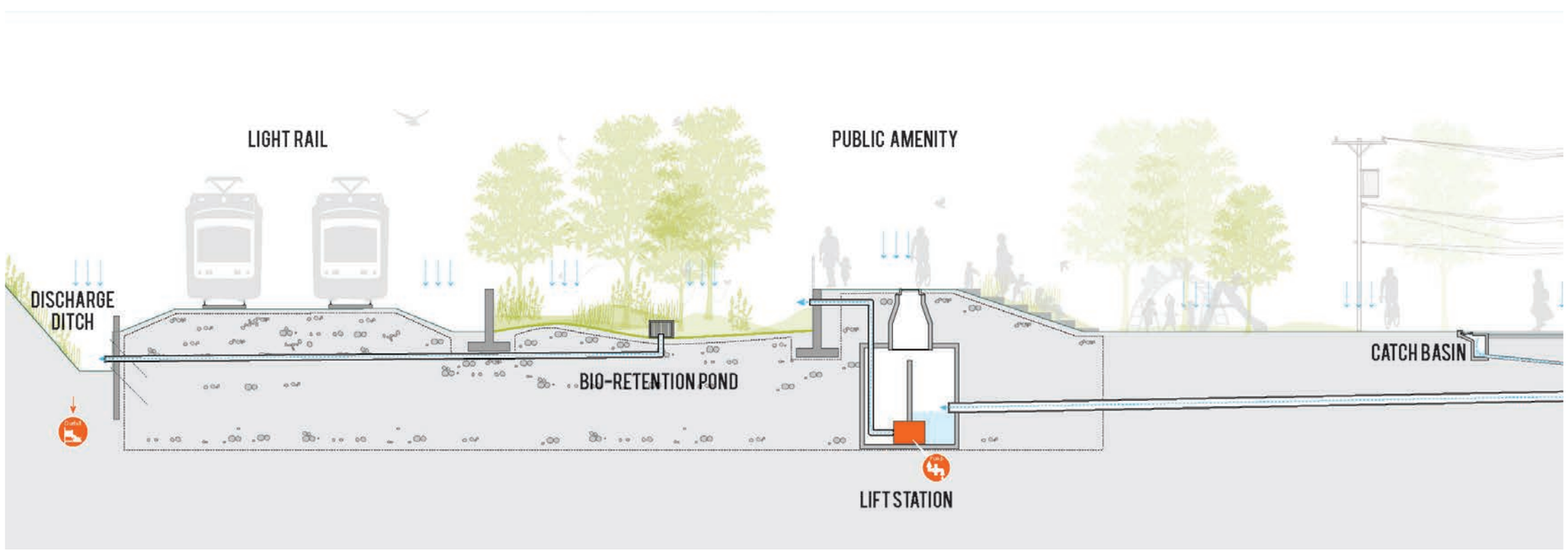

Figure ES.12 NJ TRANSIT Site Schematic

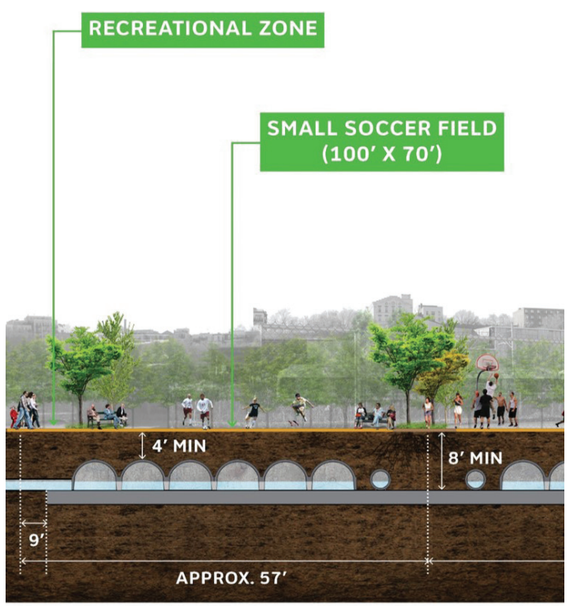

Figure ES.13 Block 10 Site, Underground tanks and urban amenities

as part of the discharge component. One pump station is proposed to discharge the overflow from the proposed NJ TRANSIT site detention facility. A force main from the pump station will cross under the HBLR and discharge to the existing ditch located at the west side of the HBLR tracks. A second pump station is required to discharge overflows from the BASF site detention tank. A 2,700 foot long force main will convey the runoff to a new discharge proposed at Weehawken Cove. A third pump is proposed to the north of Clinton Street (north end of the existing NJ TRANSIT ditch) in the vicinity of the NHSA treatment plant. The purpose of the Clinton Street pump station is to release flows from the ditch to compensate the additional flow discharged from the NJ TRANSIT site and to prevent surcharge of the existing ditch during backflow conditions. A 720-foot long force main will convey the runoff to a new discharge proposed at Weehawken Cove.

Two new outfall pipes in northern Weehawken Cove are proposed as the discharge component of the Project. One outfall would drain the flow of the existing ditch running along the western side of the HBLR line. This outfall is proposed to be located in the northern part of the Cove near Lincoln Harbor. The second outfall is proposed to be located north of Cove Park to drain the BASF site's catchment area via force main discharge.

Construction and Implementation

Construction for Resist infrastructure in Alternative 3 would last approximately 44 months and need to be completed by September 2022. The construction would occur concurrently for the northern and southern Resist features. Equipment required for this project includes dump trucks, back hoes, pile drivers, concrete trucks, and other assorted delivery trucks. Some street closures will be required, particularly for gate construction. A total of 6,000 crew days will be required to complete this construction.

Recognizing funding limitations, the DSD portion under Alternative 3 is anticipated to be constructed over the next 15 to 20 years. DSD represents the framework for a future storm water strategy that will need to be implemented by the City of Hoboken and other partners, and can be integrated into the city's existing plans. During this period, adaptive management techniques will be used to provide for effective implementation and allow for improvements and/or modifications based on lessons learned while implementing the DSD components.

Due to the project being in the early stages of planning and design, there are many unknown variables. Modifications to design may arise from obtaining more accurate existing information or other unforeseen deviations from the feasibility study brought about by outside sources (such as more accurate information regarding location of utilities). As a result, the contingency is approximately 25% of the engineering and construction costs.

The construction and final design costs of the Preferred Alternative's Resist and DSD components are estimated and shown in **Table ES.1**.

Table ES.1 Alternative 3 Construction Costs

	ESTIMATED COST (MILLIONS)
Estimated Resist Cost	$185.4 to $220.6
Estimated Resist Contingency Cost	$39.1 to $47.9
Estimated Total Resist Cost	$224.5 and $268.5
Estimated DSD Cost	$126.4 and $148

Source: Dewberry, 2015-2017

These amounts are estimates of the cost to construct Resist and DSD, as well as estimated cost factors for construction and engineering project contingencies. Alternative 3, including Resist and DSD is shown in **Figure ES.8**.

ES 5.2 Other Alternatives Considered

The following alternatives were also considered but are not recommended as the Preferred Alternative.

Alternative 1

Alternative 1 (which was developed from the earlier Concept B and components of the southern alignment of Concept E and is shown on **Figure ES.14**) provides coastal flood risk reduction to approximately 98 percent of the population within the Study Area 100-year floodplain. Alternative 1 provides the greatest level of flood risk reduction by locating the Resist structures primarily along the waterfront, from Lincoln Harbor in Weehawken to the intersection of Sinatra Drive North and Frank Sinatra Drive, just south of Maxwell Place Park. The Resist structure would range from between 8.5 and 15.5 feet in height along the waterfront in these locations. The Resist structure would incorporate urban design amenities such as a new Cove Park, park space at Shipyard Park and a new Lincoln Harbor ferry stop.

A Resist feature would also be incorporated along Sinatra Drive from 4th Street to 1st Street in South Hoboken, where the design may consist of an elevated walkway and park space (up to 2.5 feet in height along Sinatra Drive) that ties into a deployable system running east/west on 1st Street (up to six to nine feet high). Similar to the Preferred Alternative, Alternative 1 would also feature two options for Resist structures along/within the northern side of the Hoboken Terminal Rail Yard, as well as gates for access at the Marin Boulevard, Grove Street and Newark Avenue underpasses beneath the rail lines, as well as protection where HBLR tracks pass below the NJ TRANSIT overpass in the southwest corner of the Study Area (see **Figure ES.15**).

Alternative 1 would also incorporate the same DSD features present in the Preferred Alternative.

Figure ES.14 Alternative 1

Figure ES.15 Alternative 1 - Resist alignment features

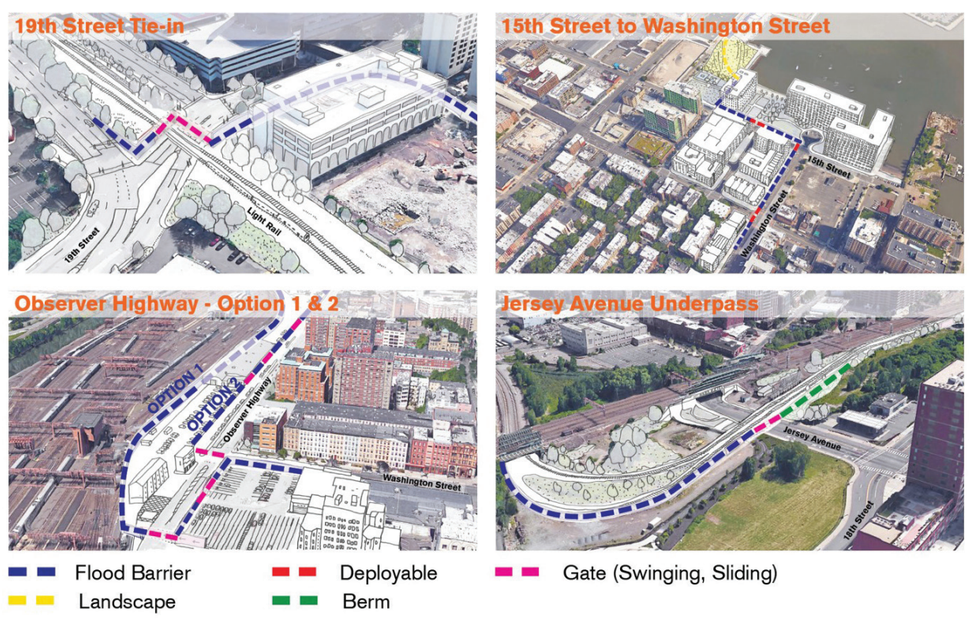

Figure ES.16 Alternative 2 - Resist alignment features

Table ES.2 Alternative 1 Construction Costs

	ESTIMATED COST (MILLIONS)
Estimated Resist Cost	$433.1 to $485.5
Estimated Resist Contingency Cost	$98.4 to $111.6
Estimated Total Resist Cost	$531.5 to $597.1
Estimated DSD Cost	$126.4 and $148

Source: Dewberry, 2015-2017

Table ES.3 Alternative 2 Construction Costs

	ESTIMATED COST (MILLIONS)
Estimated Resist Cost	$193.8 to $224.7
Estimated Resist Contingency Cost	$44.4 to $52.2
Estimated Total Resist Cost	$238.2 and $276.9
Estimated DSD Cost	$126.4 and $148

Source: Dewberry, 2015-2017

The construction and final design costs of Alternative 1's Resist and DSD components are shown in **Table ES.2**.

Alternative 2

Alternative 2 was developed from the earlier Concept E and is shown on **Figure ES.16 and ES.17**. This alternative's Resist structure begins near the HBLR Lincoln Harbor station at Waterfront Terrace at an initial height of about 6.5 feet, traveling along Weehawken Cove, where it would incorporate urban amenities and park spaces similar to that of the Preferred Alternative. The structure continues to 15th Street and travels east along 15th Street from the northern end of Garden to Washington Streets where it will be about seven to eight feet high. The Resist feature then continues south along Washington Street, tapering to ground level at 13th Street. Street crossings will feature gates to allow for access during non-flood conditions. Consideration will be given to adapting the use of structures in a way that provides urban amenities and landscape enhancements including elevated walkways and pocket parks, plantings, and/or seating areas along Washington Street. Similar to the Preferred Alternative, Alternative 2's southern portion includes two options along/within the northern side of Hoboken Terminal Rail Yard as well as gates for access at the Marin Boulevard, Grove Street and Newark Avenue underpasses beneath the rail lines, as well as protection where HBLR tracks pass below the NJ TRANSIT overpass in the southwest corner of the Study Area.

Figure ES.17 Alternative 2

Alternative 2 would also incorporate the same DSD features present in the Preferred Alternative.

The construction and final design costs of Alternative 2's Resist and DSD components are shown in **Table ES.3**.

No Action Alternative

The No Action Alternative provides a baseline condition that allows a comparison between proposed actions and the act of doing nothing. Under this alternative, no Resist structure would be constructed. While the City of Hoboken may continue with plans to develop the BASF and Block 10 sites, a comprehensive DSD system would not be built. The No Action Alternative also includes other ongoing or planned projects in the Study Area that are proposed to be completed by 2022. This included the following projects:

1. Long Slip Fill and Rail Enhancement Project (NJ TRANSIT)
2. Property Development between Long Slip Canal and 14th Street, Jersey City (Newport Associates)
3. H1 and H5 Wet Weather Pump Stations (NHSA)
4. Southwest Resiliency Park (City of Hoboken)
5. City Hall Green Infrastructure Improvements (City of Hoboken)
6. Washington Street Rain Gardens (City of Hoboken)

ES 6.0 Major Conclusions of the Environmental Analysis

Whereas the concept screening process discussed previously led to the identification of the three Build Alternatives to be evaluated in the DEIS, an Alternatives Analysis was conducted to guide the decision-making process that led to the selection of the Preferred Alternative. The criteria used in this evaluation reflect a refinement of the 21 criteria established in the concept screening process (see **Table ES.4**). A full discussion of the table can be found in Section 6 of the DEIS.

All three of the Build Alternatives considered would meet the purpose and need of the Project. In particular, all of the Build Alternatives Resist components would provide coastal storm surge flood risk reduction for a substantial portion of the population within the existing preliminary FEMA 100-year floodplain and the DSD strategy would eliminate rainfall flooding associated with a storm equal to or less than a 5-year rainfall event for approximately 8,000 people. In addition, the Project would provide socioeconomic benefits to minority and low-income populations as a result of reduced coastal storm surge and rainfall flooding frequency, to the overall economic condition of the Study Area as a result of reduced coastal storm flood damage, and to public health as a result of removal of contaminated soils and reduced frequency of combined sewer overflow events. None of the alternatives would result in a significant impact to the natural environment. No changes to land use or zoning are proposed under any of the three Build Alternatives, with exception of the DSD components, which would involve converting vacant land to recreational land.

Alternative 1's Resist component would have the greatest impact on viewsheds and waterfront access (approximately 7,950 feet of waterfront access impacted), both of which are highly valued by residents within the Study Area. By comparison, impacts on the viewsheds and waterfront access are minimal under both Alternatives 2 and 3 (approximately 150 feet of waterfront access impacted) because these alternatives are primarily located inland. In addition, Alternative 1's Resist feature would require the greatest number of gates (29 to 31), which increases operation and maintenance costs and increases the risk of failure due to operational error. Alternative 1 would also require more easements on private property (approximately 16 properties requiring easements), as compared to Alternatives 2 and 3 (approximately 6 properties requiring easements). The construction of Alternative 1's Resist feature would also entail the highest cost of all Build Alternatives.

In summary, for these reasons, Alternative 1 was not recommended as the Preferred Alternative.

Alternatives 2 and 3 were then considered comparatively. The two most important differences between Alternatives 2 and 3 are impacts in the area around 15th Street and Washington Street in Hoboken (both in terms of impacts to the community and in benefits from coastal surge reduction) as well as annual maintenance and operating costs. For Alternative 3, the routing of the Resist feature down the alleyway would reduce the impact of the Resist feature on the local community in the northern part of Hoboken by placing it behind structures and reducing impacts to the street grid. This is reflected in that only seven to 18 parking spaces would be removed under Alternative 3, compared to removal of 15 to 31 parking spaces in Alternative 2, which would involve routing the Resist feature along a longer stretch of Washington Street, as well as on 15th Street. The construction costs are also slightly lower under Alternative 3, which is reflected in a higher benefit-cost ratio for the Resist portion of Alternative 3 (5.05 for Alternative 3 vs. 4.83 for Alternative 2). The lower estimated annual maintenance and operating costs for Alternative 3 is the result of it requiring the least number of gates (19 to 23 gates) and having the shortest overall Resist feature length. For these reasons, Alternative 3 is recommended as the Preferred Alternative.

As with the other proposed alternatives, Alternative 3 would cause inconveniences to neighboring properties in the form of noise, dust, vibration, and restricted vehicular and pedestrian access during the approximate 44-month construction period for the Resist feature. Alternative 3 (and Alternative 2) would have a larger impact in terms of modeled increase in flood depths compared to Alternative 1, although this would be mitigated in accordance with N.J.A.C. 7:13

Table ES.4 Comparative Summary of Environmental Consequences on the Environment by Alternative

RESOURCE	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	NO ACTION ALTERNATIVE
Geology	Negligible Impact	Negligible Impact	Negligible Impact	No Impact
Soils	Short-term, minor impacts	Short-term, negligible impacts	Short-term, negligible impacts	No Impact
Groundwater	Short-term, minor impacts	Short-term, minor impacts	Short-term, minor impacts	No Impact
Surface Water	Minor, Short-term impacts during construction and negligible Long-term impacts from discharge	Negligible impacts during construction and negligible Long-term impacts from discharge	Negligible impacts during construction and negligible Long-term impacts from discharge	No Impact
Floodplains	Minor, Long-term adverse impacts resulting from 3.2 acres of permanent floodplain disturbance and 2 properties expected to receive minor increases in flooding	Minor, Long-term adverse impacts resulting from 2.8 acres of permanent floodplain disturbance and 5 properties expected to receive minor increases in flooding	Minor, Long-term adverse impacts resulting from 2.8 acres of permanent floodplain disturbance and 5 properties expected to receive minor increases in flooding	No Impact
Aquatic Ecology	Short-term, minor impacts	Short-term, negligible impacts	Short-term, negligible impacts	No Impact
Wetlands	Minor, Long-term loss of 230 square feet of marginal wetlands	Minor, Long-term loss of 230 square feet of marginal wetlands	Minor, Long-term loss of 230 square feet of marginal wetlands	No Impact
Upland Wildlife and Vegetation	Short-term, negligible to minor impacts	Short-term, negligible to minor impacts	Short-term, negligible to minor impacts	No Impact
Endangered Species	Short-term, minor impacts; Likely to Adversely Affect	Short-term, negligible impacts; Not likely to Adversely Affect	Short-term, negligible impacts; Not likely to Adversely Affect	No Impact
Archaeological Resources	Potential adverse impacts to an unknown number of significant archaeological sites	Potential adverse impacts to an unknown number of significant archaeological sites	Potential adverse impacts to an unknown number of significant archaeological sites	No Impact
Historic Architecture	Minor, long-term impacts on historic setting resulting in Adverse Effects on five historic properties for Option 1 and four historic properties for Option 2	Minor, long-term impacts on historic setting resulting in Adverse Effects on four historic properties for Option 1 and three historic properties for Option 2.	Minor, long-term impacts on historic setting resulting in Adverse Effects on three historic properties for Option 1 and two historic properties for Option 2	No Impact
Air Quality	Minor, Short-term impacts; meets general conformity requirements for all criteria pollutants	Minor, Short-term impacts; meets general conformity requirements for all criteria pollutants	Minor, Short-term impacts; meets general conformity requirements for all criteria pollutants	No Impact
Greenhouse Gas	Minor greenhouse gas emissions during construction and operations	Minor greenhouse gas emissions during construction and operations	Minor greenhouse gas emissions during construction and operations	No Impact
Noise	Adverse noise impacts to schools, recreational users and residents of moderate intensity over the duration of construction	Adverse noise impacts to schools, recreational users and residents of moderate intensity over the duration of construction	Adverse noise impacts to schools, recreational users and residents of moderate intensity over the duration of construction	No Impact
Vibration	Potential minor to severe short-term structural impacts on 56 to 94 buildings. No long-term impacts anticipated because contractor would be responsible for repairing damages.	Potential minor to severe short-term structural impacts to 61 to 104 buildings. No long-term impacts anticipated because contractor would be responsible for repairing damages.	Potential for minor to severe short-term structural impacts to 65 to 103 of buildings. No long-term impacts anticipated because contractor would be responsible for repairing damages.	No Impact
Hazardous Waste	Moderate, Long-term beneficial impacts	Moderate, Long-term beneficial impacts	Moderate, Long-term beneficial impacts	Hazardous soil and groundwater conditions with the Study Area would remain unchanged

Table ES.4 Comparative Summary of Environmental Consequences on the Environment by Alternative (continued)

RESOURCE	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	NO ACTION ALTERNATIVE
Population and Demographics	Major, Long-term beneficial impacts due to reduced flood risk from coastal storm surge and rainfall events	Major, Long-term beneficial impacts due to reduced flood risk from coastal storm surge and rainfall events	Major, Long-term beneficial impacts due to reduced flood risk from coastal storm surge and rainfall events	Risk of flooding impacts from coastal storm surge and rainfall events unchanged
Minority and Low Income Populations	Major, Long-term beneficial impact due to reduced flooding and minor adverse impacts during construction	Major, Long-term beneficial impact due to reduced flooding and minor adverse impacts during construction	Major, Long-term beneficial impact due to reduced flooding and minor adverse impacts during construction	Risk of flooding impacts from coastal storm surge and rainfall events unchanged
Public Health	Major, Long-term benefits to 7,870 residents whose homes will no longer be flooded during a rain storm equal to or less than a 5-year rain event	Major, Long-term benefits to 7,870 residents whose homes will no longer be flooded during a rain storm equal to or less than a 5-year rain event	Major, Long-term benefits to 7,870 residents whose homes will no longer be flooded during a rain storm equal to or less than a 5-year rain event	No change from current flooding frequency and associated risks to public health
Economic Conditions	Major, Long-term economic benefits totaling $1.675B, minor Short-term disruption to businesses during construction offset by local hiring and expenditures by construction crews	Major, Long-term economic benefits totaling $1.648B, minor Short-term disruption to businesses during construction offset by local hiring and expenditures by construction crews	Major, Long-term economic benefits totaling $1.648B, minor Short-term disruption to businesses during construction offset by local hiring and expenditures by construction crews	No Impact
Land Use and Zoning	No changes to Land Use and Zoning for Resist. Would require 14 permanent easements on 4.4 acres and permanent loss of zero to two parking spaces. DSD would result in long-term benefit to land use through changing vacant land to recreational uses	No changes to Land Use and Zoning for Resist. Would require7 permanent easements on 1.3 acres and permanent loss of 13 to 31 parking spaces. DSD would result in long-term benefit to land use through changing vacant land to recreational uses	No changes to Land Use and Zoning for Resist. Would require 7 permanent easements on 0.7 acres and permanent loss of seven to 18 parking spaces. DSD would result in long-term benefit to land use through changing vacant land to recreational uses	No Impact
Viewshed	Long-term, adverse impacts on 3 of 5 key viewpoints	Negligible effect	Negligible effect	No Impact
Open Space	Long-term, beneficial impact through creation or enhancement of 12.91 acres of open space/parkland (6.91 acres from Resist, six acres from DSD); however Hudson River Walkway would be elevated requiring access via ramps or steps	Long-term, beneficial impact through creation or enhancement of 9.53 acres of open space/parkland (3.53 acres from Resist, six acres from DSD)	Long-term, beneficial impact through creation or enhancement of 8.55 acres of open space/parkland (2.55 acres from Resist, six acres from DSD)	No Impact
Transportation	Moderate, short-term adverse impacts to traffic and circulation during construction	Moderate, short-term adverse impacts to traffic and circulation during construction	Moderate, short-term adverse impacts to traffic and circulation during construction	No Impact in the Short-term, but potentially long-term adverse impacts to transportation networks due to increased frequency and intensity of future storm events due to sea level rise and climate change
Infrastructure	Minor to moderate, Short-term disruption of service due to relocation of utilities for construction of project infrastructure	Minor, Short-term disruption of service due to relocation of utilities for construction of project infrastructure	Minor, Short-term disruption of service due to relocation of utilities for construction of project infrastructure	No Impact in the Short-term, but potentially long-term adverse impacts to transportation networks due to increased frequency and intensity of future storm events due to sea level rise and climate change

Source: Dewberry, 2015-2017

Photograph ES.2 Wildlife along the Hudson River

Photograph ES.3 Vibratory hammer - typical pile driving activity

(the New Jersey Flood Hazard Area Control Act Rules, which defines the state's requirements for actions within the floodplain).

In addition to the Build Alternatives, the No Action Alternative was also considered. While the City of Hoboken may continue to pursue the BASF site, no comprehensive DSD system or Resist structures would be built. Therefore, the No Action Alternative does not meet the purpose and need of the Project. Under this alternative, no Resist feature would be built; therefore, the community would not experience any of the construction-related impacts associated with the Build Alternatives, but the community (including critical facilities) would continue to be impacted during coastal storm surge events. In addition, the lack of a comprehensive DSD strategy would mean the Study Area would also continue to experience the impacts from rainfall flooding. Due to climate change and projected sea level rise, impacts associated with flooding would be expected to increase in frequency and intensity in the future. For these reasons, the No Action Alternative was dismissed.

ES 6.1 Environmental Consequences and Proposed Mitigation

Nearly all of the environmental impacts arising from implementation of the Preferred Alternative (both Resist and DSD features) are expected to be negligible to minor, Short-term in nature and confined primarily to the duration of construction activities. For example, impacts on urban wildlife will be limited to Short-term disturbance and displacement of urban species which are highly adaptable to the urban environment (see **Photograph ES.2**). Conversely, Long-term beneficial impacts are expected in the areas of public health, economic conditions, minority and low income populations, parks and contaminated sites. The most substantial impact from the Project will be construction noise. Other potentially substantial impacts include impacts to archaeological resources and above ground buildings (vibration). These impact areas are further discussed below. Mitigation requirements for all disciplines can be found in Chapter 4.0 of the DEIS.

Noise and Vibration

Based on data collected, current outdoor sound levels within the Study Area are typical of a noisy urban environment. In addition, construction noise generated by dump trucks, small cranes, excavators, etc., is typical in the Study Area and would be unlikely to generate significant noise concerns by the public. However, construction of the Resist feature and discharge outfalls at Weehawken Cove will require the use of heavy equipment across the 44-month Resist construction duration (see **Photograph ES.3**). The noise levels that will be generated by these construction techniques are anticipated to result in disturbance at schools, several parks, and residential areas throughout the Study Area. For example, daytime sound levels at residences are expected to reach 114 dBA for up to three months during construction of the northern Resist feature. While it might be possible to mitigate these noise levels in the most noise-sensitive areas through utilization of alternative construction techniques, however, due to construction deadlines and cost considerations, it will not be possible to utilize alternative construction techniques throughout the entire Study Area. Three schools would be temporarily be impacted by construction noise. Under final design, a building noise attenuation study for the three schools will be conducted to ensure that proper mitigation measures are instituted during the construction phase.

Based on an analysis of vibration arising from pile driving, the most structurally-sensitive buildings are at risk of potential damage up to 136 feet from pile driving activities. There are a total of 103 buildings in this area. The types of impacts that could occur at these buildings include loosening of paint and small plaster cracks, loosening and falling of plaster, cracks in masonry, structural weakening, and affected ability for load support. Until building-specific assessments have been completed, it is not possible to determine the number of buildings at risk or the level of risk. This building-specific assessment would be undertaken in advance of any construction activities and at-risk buildings would be monitored during construction activities. Vibration impacts would be Short-term in nature because damage to buildings arising from the Project would be repaired by the contractor.

Archaeological Resources

There is potential for significant historic and prehistoric archeological resources to be disturbed by construction activities on 8.24 to 8.36 acres

Photograph ES.4 Hoboken sewer monitoring with brick riser manhole

Photograph ES.5 Typical urban archaeological excavation

within the project construction footprint. Resources potentially found in this area include: mid to late 19th to early 20th Century DLWRR Railroad and Industrial Deposits, brick sewer deposits, 19th century sea walls, shipwrecks, and prehistoric deposits (see **Photograph ES.4**). These potentially significant historic and prehistoric resources occur at depths up to 35 feet below ground surface. Pre-construction testing of the Project will be undertaken. The nature of that testing protocol is currently in development and will be included within a Section 106 Programmatic Agreement (PA). A draft version of this is included in Appendix G of the FEIS. The signed and executed PA will be included as an Appendix to the ROD. A PA is a formal agreement document that sets out the measures that a federal agency will implement to resolve a project's adverse effects to historic properties through avoidance, minimization, or mitigation. The PA is used in situations when, prior to approving the undertaking, the federal agency cannot fully determine how a particular undertaking may affect historic properties given the Project's APE includes involves multiple actions that could adversely affect historic properties.

Excavation along the Resist structure will be approximately 6 feet deep. However, pile driving and installation of sheet piles between the 6-foot on center piles will occur along the entire length of the Resist structure and will continue to bedrock, which may be 40 or more feet below ground surface. While it will be possible to monitor excavation activities along the Resist structure so that potential impacts to significant archaeological resources can be identified and minimized, (see **Photograph ES.5**) any impacts to significant archeological resources below the depth of excavation are unknown. Impacts to archaeological resources will be addressed as part of the archaeological treatment plan within the PA.

Transportation

The construction of Resist infrastructure would have short-term moderate adverse impacts on traffic and circulation within the Study Area during construction. Construction of the Resist infrastructure may require temporary road and sidewalk closures. Temporary road closures would also be required for installation of the high level storm sewer collection system in the vicinity of each of the DSD large stormwater storage sites, as well as the high level storm system for Alternative 3's Resist infrastructure. These road closures could impact both vehicular and bus traffic and require relocation of all pedestrian and bicycle traffic to one side of the road. Depending on road widths, single-lane or full closures may be necessary during construction. In the event of a closure, traffic would need to be detoured. All closures for traffic and pedestrians, including temporary detour routes, would be coordinated well in advance with local jurisdictions.

ES 7.0 Known Areas of Ongoing Coordination

The CEQ regulations at 40 CFR 1502.12 require the EIS executive summary to identify areas of ongoing coordination and controversy in relation to the proposed action. The following is a list of topics that were identified as part of analysis of the alternatives that will require further coordination between agencies and the public as the project moves forward.

Modeled Increases in Flood Depths

N.J.A.C. 7:13 prohibits issuance of a permit for any project that may result in increased flooding of other properties in a floodplain. Current coastal surge modeling projects that five properties will experience increased floodwater depth during a 100-year storm as a result of the Project. The nature of development on these properties includes rail yards, parking lots, and residential structures. For the Project to be compliant with the state laws, if impacts cannot be minimized or avoided either an easement on these properties must be acquired, or written permission must be secured from the affected property owner to authorize the modeled increase in flooding. Additional flood modeling and outreach with impacted property owners during the final design phase of the project will enable site-specific mitigation measures to be developed for the impacted properties prior to the application for the Flood Hazard permit. A full discussion can be found in Section 4.1 of the DEIS.

DSD Funding

Current funding available to implement this project is $230 million. Based on current cost estimates, the available level of funding may be adequate to implement the Resist portion of the Project. However, funding for the DSD portion of the Project has not yet been identified. Funding for the DSD sites will

need to be sought. While the Resist portion of the Project is expected to be complete by 2022, the DSD portion is expected to be implemented over the course of the next 15-20 years, although the actual duration of construction activities for any given DSD site – including excavation, construction of tank infrastructure, and installation of park amenities – is not anticipated to exceed several weeks.

Operation and Maintenance

Recognizing the extensive coordination effort between the municipalities, agencies and the community an Operations and Maintenance (O&M) plan for the RBD-HR project will be prepared. The plan will describe the procedures and responsibilities for routine maintenance, communication and timing of activation in the event of an impending storm condition. The O&M plan will include the procedures to be followed by the system operator, so that the timing of gate closures and public transit service closures is coordinated with the various stakeholders, such as NJ TRANSIT, other public transit operators and local officials.

Closure of the gates, for both periodic maintenance and during an emergency event, will be closely coordinated with NJ TRANSIT operations, Hudson County, and municipal area emergency management operations and activities. The timing of gate closures will be incorporated into the NJ TRANSIT, Hudson County, and municipal revised emergency management plans. It is not anticipated that the gate closures for the project would impact NJ TRANSIT operations. It is anticipated that gate closures will be coordinated with NJ TRANSIT to occur after NJ TRANSIT has already ceased operations per their own emergency management operational procedures. This would reduce impacts to NJ TRANSIT service and emergency evacuation procedures.

The participants in the O&M planning and development currently include but are not limited to entities such as the NJDEP, the cities of Hoboken, Jersey City and Weehawken, NJ TRANSIT, Port Authority of New York & New Jersey, Hudson County, Jersey City Municipal Utilities Authority, North Hudson Sewerage Authority, and the New Jersey Office of Emergency Management.

Cost Estimate and Implementation

The estimated cost to construct the Preferred Alternative is $350.9 million to $416.5 million. Of this total cost, the estimated cost of the Resist infrastructure is between $184.5 million and $220.6 million, excluding project contingencies. Construction for Resist infrastructure would begin in 2019 and last 44 months. The construction would occur concurrently for the northern and southern Resist features. Equipment required for this project includes dump trucks, back hoes, pile drivers, concrete trucks, and other assorted delivery trucks. Pile driving will be required over nine work months. A total of 6,000 crew days will be required to complete this construction. The construction will be undertaken pursuant to a contract to be issued by the State of New Jersey. The authorizing statute requires that funding for the Project be expended by September 2022. Permitting requirements for the Preferred Alternative are identified in Table ES.2.

Cumulative Effects of Resiliency Projects Along the Hudson River

One of the most important cumulative impact considerations is how the actions of individual municipalities will impact neighboring communities and the overall subwatershed when each implements independent flood risk reduction projects. It is critical that resiliency efforts be coordinated between municipalities to implement projects that work together and complement other resiliency efforts. Mitigation of cumulative impacts includes continued identification and coordination of resiliency projects on the local and regional level. Coordination and communication with federal, state and local partners is critical in the implementation of this project. Recognizing the on-going resiliency work that is being conducted in the Lower Hudson River, NJDEP intends to continue the effort to develop this inventory of projects and coordinate project activities through participation at future Sandy Regional Infrastructure Resilience Coordination (SRIRC) Federal Review and Permitting (FRP) meetings and Coastal Hudson County Technical Coordination Team (TCT) meetings. NJDEP will provide project updates and will meet with these other teams as the project moves forward.

Short-term impacts may result from overlapping construction activities. While these impacts will be mitigated so as not to extend beyond the construction period of the Resist feature or the construction/ installation of a particular DSD element, there is always the potential for construction to overlap resulting in more significant short-term impacts. The construction of the Hudson Tunnel, which is expected to commence in mid-2019, may overlap with construction of RBD-HR elements, contributing to vehicular traffic, construction noise and vibration, pollutant and greenhouse gas emissions, and congestion to the surrounding communities, particularly in northern Hoboken. The focus of Hudson Tunnel activities in the cumulative impact study area will be at the proposed site of the vent shaft located in Northern Hoboken directly south of The Shades neighborhood in Weehawken. Coordination between the RBD-HR and Hudson Tunnel Project design teams is ongoing to make sure that the two projects can proceed without conflicts. If construction occurs concurrently, the contractors will coordinate to make sure that adverse traffic impacts are avoided or mitigated.

Urban Design

Building on the numerous urban design charrettes that have occurred thus far, various design considerations have been developed with the public. These design considerations which were presented during the design charrettes can be used to mitigate aesthetic impacts resulting from each alternative by applying placemaking and service based solutions. Depending on the location, design considerations can include shrub planters, art work and murals, vegetation and green walls, seating, bike racks, lighting and

Table ES.5 Summary of Mitigation Measures of On-Going Activities

RESOURCE	MITIGATION MEASURES RESIST	MITIGATION MEASURES DSD
Noise	• conduct a building noise attenuation study during final design for identified impacted schools to ensure that proper mitigation measures are instituted during the construction phase; • establish construction noise criteria; • require the contractor to develop a Noise Control and Mitigation Plan based on proposed equipment and methods to document expected noise levels and noise control measures that would be implemented; • require use of drilled piles and specify locations along Resist alignment where this requirement is applicable; • construct localized three-sided enclosures with roofs around stationary equipment such as compressors and generators; • require use of broadband alarms in lieu of pure tone alarms; • maintain equipment with effective mufflers; • require the use of silencers on combustion engines; • limit equipment and delivery/haul-away truck idle times in accordance with N.J.A.C. 7:27-14 and N.J.A.C. 7:27-15; line all truck beds and dumpsters with noise dampening material; • route truck traffic down streets with industrial and commercial land use to avoid excessive truck traffic down streets with residential land use; and, • require third-party compliance construction noise monitoring • construction activities should be limited to weekday (Monday – Friday) daytime hours (7:00 AM - 6:00 PM)	• establish construction noise criteria; • require the contractor to develop a Noise Control and Mitigation Plan based on proposed equipment and methods to document expected noise levels and noise control measures that would be implemented; • construct localized three-sided enclosures with roofs around stationary equipment such as compressors and generators; require use of broadband alarms in lieu of pure tone alarms; maintain equipment with effective mufflers; • require the use of silencers on combustion engines; • limit equipment and delivery/haul-away truck idle times in accordance with N.J.A.C. 7:27-14 and N.J.A.C. 7:27-15; • line all truck beds and dumpsters with noise dampening material; • route truck traffic down streets with industrial and commercial land use to avoid excessive truck traffic down streets with residential land use; and, • require third-party compliance construction noise monitoring • construction activities should be limited to weekday (Monday – Friday) daytime hours (7:00 AM - 6:00 PM)
Vibration	• establish construction vibration structural damage response action and stop-work levels; • conduct a pre-construction survey of all buildings within 136 feet of the Resist structure, appropriately classify as Category II or Category IV, and identify existing cracks and building conditions; • require use of drilled piles and specify locations along Resist alignment where this requirement is applicable; • require the development and implementation of a Vibration Control and Monitoring Plan, which documents expected vibration levels during driving activities and methods to control vibration; • require third-party compliance construction vibration monitoring; • and contractor will be responsible for damage to structures resulting from construction of this project.	• establish construction vibration structural damage response action and stop-work levels; • require the development and implementation of a Vibration Control and Monitoring Plan, which documents expected vibration levels during driving activities and methods to control vibration; • require third-party compliance construction vibration monitoring; and • contractor will be responsible for damage to structures resulting from construction of this project.
Archaeological Resources	• Prior to the onset of Project activities, mitigation measures for the Project will be developed in consultation with the Programmatic Agreement Signatories to the Project, resulting in the execution of the Project's Section 106 Programmatic Agreement. The Programmatic Agreement will contain elements that resolve the project's adverse effects to historic properties through avoidance, minimization or mitigation.	• Prior to the onset of Project activities, mitigation measures for the Project will be developed in consultation with the Programmatic Agreement Signatories to the Project, resulting in the execution of the Project's Section 106 Programmatic Agreement. The Programmatic Agreement will contain elements that resolve the project's adverse effects to historic properties through avoidance, minimization or mitigation.

Table ES.5 Summary of Mitigation Measures of On-Going Activities (continued)

RESOURCE	MITIGATION MEASURES RESIST	MITIGATION MEASURES DSD
Floodplains	• The project must obtain a permit pursuant to the New Jersey Flood Hazard Area Control Act rules at N.J.A.C. 7:13. These rules prohibits issuance of a permit for any project that may result in increased flooding of other properties in a floodplain. For the Project to be compliant with the state laws, if impacts cannot be minimized or avoided either an easement on these properties must be acquired or written permission must be secured from the affected property owner to authorize the modeled increase in flooding. During the design phase of the project additional flood modeling and outreach with impacted property owners will be performed which may enable site-specific mitigation measures to be developed for the impacted properties prior to the application for the Flood Hazard permit. • Vegetation removal would be minimized and all re-vegetation activities would be in accordance with accepted practices, including appropriate species selection; • Local jurisdictions will pursue opportunities to provide flood risk reduction for infrastructure and buildings that do not receive flood risk reduction benefits from the Project; • Public access to the urban waterfront would continue to be provided; and • The Project would be a constant and visible reminder to residents and visitors of the importance of proper floodplain management.	• Green infrastructure projects would be implemented in the DSD portion of the Project • Vegetation removal would be minimized and all re-vegetation activities would be in accordance with accepted practices, including appropriate species selection; • Local jurisdictions will pursue opportunities to provide flood risk reduction for infrastructure and buildings that do not receive flood risk reduction benefits from the Project; • Public access to the urban waterfront would continue to be provided; and • The Project would be a constant and visible reminder to residents and visitors of the importance of proper floodplain management.
Visual and Aesthetic Resources	• Design Resist structure with recreation trails on top so that the river corridor can be viewed by the recreating public, particularly for areas where access is currently available. • Provide amenities within the Resist feature such as seating and lighting • Incorporate form, line, color, and texture aspects of the existing landscape into the design of flood risk management elements to reduce the contrast effect. • Incorporate elements of existing and historical design. • Incorporate bioengineered bank stabilization methods where possible and allow for vegetation to grow amongst bank stabilization materials. • Include native plantings • For concrete structures, incorporate sealants that allow for effective removal of graffiti • Depending on the location, design considerations can include shrub planters, art work and murals, vegetation and green walls, seating, bike racks, lighting and wayfinding. A variety of materials, color treatments, textures and plantings can be utilized to incorporate the Resist structure into the surrounding environment. • Mitigation will be developed through continued coordination with the affected community including elected officials and will be on-going during final design as well as construction Additionally, context sensitive solutions will be incorporated into the final design of the resist features and final design will maintain bike and pedestrian path connectivity. Additionally, in order to address historic property or historic district impacts, consultation with the NJHPO will occur. The mitigation measures developed will need to be in keeping with the intent of The Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR Part 68). As the RBD-HR Project design advances, proposed plans will be submitted to the NJHPO for review.	• Continued coordination with the affected community including elected officials and will be on-going during final design as well as construction. Additionally, context sensitive solutions will be incorporated into the final design of the resist features and final design will maintain bike and pedestrian path connectivity.
Operations and Maintenance	• Recognizing the extensive coordination effort between the municipalities, agencies and the community an Operations and Maintenance (O&M) plan for the RBD-HR project is being prepared. The O&M plan will describe the procedures and responsibilities for routine maintenance, communication and timing of activation in the event of an impending storm condition. The O&M plan will include the procedures to be followed by the various stakeholders, such as NJ TRANSIT, other public transit operators and local officials so that the timing of gate closures and public transit service closures is coordinated. The participants in the O&M planning and development currently include but are not limited to entities such as the NJDEP, the cities of Hoboken, Jersey City and Weehawken, NJ TRANSIT, Port Authority of New York & New Jersey, Hudson County, Jersey City Municipal Utilities Authority, North Hudson Sewerage Authority, and the New Jersey Office of Emergency Management.	

Table ES.5 Summary of Mitigation Measures of On-Going Activities (continued)

RESOURCE	MITIGATION MEASURES RESIST	MITIGATION MEASURES DSD
Hazardous Waste	• A soil and groundwater Sampling, Analysis, and Monitoring Plan (SAMP), as well as a Health and Safety Plan (HASP), will be developed and implemented in the proposed construction areas in and adjacent to these RECs to assess the presence, type, and level of contamination. Sample locations would be biased toward the areas of proposed excavation, based on the engineering design, as well as towards locations adjacent to known or suspected contamination from RECs. All site investigation activities will be performed in accordance with the most current version of NJDEP Technical Requirements for Site Remediation, N.J.A.C. 7:26E and other applicable guidance documents. • Additionally, the Site Remediation Reform Act, N.J.S.A. 58:10C-1 et seq. establishes a program for the licensing of environmental professionals who have the responsibility for oversight of contaminated site investigation and cleanup. Since contamination has been identified or is suspected within the Analysis Area and over 200 cubic yards of soil will be disturbed under both the Resist and DSD portions of the Project, the Project will be required to enter the New Jersey Licensed Site Remediation Professional (LSRP) Program as a Linear Construction Project and comply with Chapter 16 of the NJDEP Administrative Requirements for the Remediation of Contaminated Sites, N.J.A.C. 7:26C • Alternate construction methods, such as installing casing around piles or using shallower depth structural supports, may be required in areas contaminated with chlorinated solvents to minimize the risk of cross contamination. • Health and safety precautions would be instituted for the protection of the construction personnel and the public. Methods may include dust control measures to prevent the accidental inhalation of contaminated soil. Any specific monitoring requirements will be outlined in the HASP. • Soil and groundwater sampling and site investigation activities intended to determine the presence, type, and level of contamination will be performed on any sites proposed for acquisition, prior to construction. Construction workers should wear personal protective equipment (PPE) to minimize exposure to any possible contamination and adhere to strict OSHA guidelines, as applicable. • Should contamination be detected, a Material Management Plan (MMP) would be prepared to address the remedial approach. An MMP typically includes management techniques for regulated material; standard operating procedures for the excavation, stockpiling, transporting, measurement, and disposal of regulated material; techniques for receiving facility certification and permits; qualifications of the licensed hauler; proposed routes to the receiving facilities; waste characterization forms; a sampling and analysis protocol for characterizing the regulated material; and requirements of the receiving facility to accept the regulated material. Sampling data would be used to develop health and safety specifications and environmental plans for the Project. Potential mitigation would include engineering controls. Due to the widespread occurrence of historic fill material within the Study Area and the abundance of RECs, it is anticipated that the majority of excavated soils that are not re-used on-site will need to be properly disposed off-site. • Potentially contaminated soils requiring excavation would be temporarily stockpiled pending waste characterization results. Excavation and staging will be performed using methods that minimize the disturbance of the soil. At a minimum, all potentially contaminated soil would be staged on an impervious surface and covered with plastic sheeting. If it is determined that soils contain hazardous waste, they should not be moved from one stockpile to another without prior approval from the NJDEP and/or necessary permits and approved remedial action plans. No excavation/movement of contaminated soil or hazardous waste may occur without prior NJDEP and/or EPA approval, as applicable.	• A soil and groundwater Sampling, Analysis, and Monitoring Plan (SAMP), as well as a Health and Safety Plan (HASP), will be developed and implemented in the proposed construction areas in and adjacent to these RECs to assess the presence, type, and level of contamination. Sample locations would be biased toward the areas of proposed excavation, based on the engineering design, as well as towards locations adjacent to known or suspected contamination from RECs. All site investigation activities will be performed in accordance with the most current version of NJDEP Technical Requirements for Site Remediation, N.J.A.C. 7:26E and other applicable guidance documents. • Additionally, the Site Remediation Reform Act, N.J.S.A. 58:10C-1 et seq. establishes a program for the licensing of environmental professionals who have the responsibility for oversight of contaminated site investigation and cleanup. Since contamination has been identified or is suspected within the Analysis Area and over 200 cubic yards of soil will be disturbed under both the Resist and DSD portions of the Project, the Project will be required to enter the New Jersey Licensed Site Remediation Professional (LSRP) Program as a Linear Construction Project and comply with Chapter 16 of the NJDEP Administrative Requirements for the Remediation of Contaminated Sites, N.J.A.C. 7:26C. • Alternate construction methods, such as installing casing around piles or using shallower depth structural supports, may be required in areas contaminated with chlorinated solvents to minimize the risk of cross contamination. • Health and safety precautions would be instituted for the protection of the construction personnel and the public. Methods may include dust control measures to prevent the accidental inhalation of contaminated soil. Any specific monitoring requirements will be outlined in the HASP. • Soil and groundwater sampling and site investigation activities intended to determine the presence, type, and level of contamination will be performed on any sites proposed for acquisition, prior to construction. Construction workers should wear personal protective equipment (PPE) to minimize exposure to any possible contamination and adhere to strict OSHA guidelines, as applicable. • Should contamination be detected, a Material Management Plan (MMP) would be prepared to address the remedial approach. An MMP typically includes management techniques for regulated material; standard operating procedures for the excavation, stockpiling, transporting, measurement, and disposal of regulated material; techniques for receiving facility certification and permits; qualifications of the licensed hauler; proposed routes to the receiving facilities; waste characterization forms; a sampling and analysis protocol for characterizing the regulated material; and requirements of the receiving facility to accept the regulated material. Sampling data would be used to develop health and safety specifications and environmental plans for the Project. • Potential mitigation would include engineering controls. Due to the widespread occurrence of historic fill material within the Study Area and the abundance of RECs, it is anticipated that the majority of excavated soils that are not re-used on-site will need to be properly disposed off-site.

Table ES.5 Summary of Mitigation Measures of On-Going Activities (continued)

RESOURCE	MITIGATION MEASURES RESIST	MITIGATION MEASURES DSD
Hazardous Waste	• Due to the high water table within the Study Area and the depth of the proposed improvements, contaminated groundwater is anticipated to be encountered during construction. Groundwater would be handled in an NJDEP-approved manner. Drainage measures including de-watering may be instituted to control groundwater levels within excavations. Contaminated groundwater will be pumped into tank trucks for off-site treatment and disposal. • At the completion of construction, a Linear Construction Report (LCR) would need to be prepared to document soil excavation activities and the management of contaminated soil and groundwater during construction. Additionally, the LCR would document the extent of contamination left in place or reused within the Project limits and the remedial activities completed on the Project. Although not required for Linear Construction Projects, a Response Action Outcome (RAO) may be issued by the LSRP in some cases. • All project activities must be performed in accordance with state and federal regulations, including all applicable Resource Conservation and Recovery Act (RCRA) standards. • Depending on funding sources and responsible parties involved in the development of the BASF, NJ Transit and Block 10 sites, applicable environmental compliance will be required related to contaminated materials. • Any in-water work will be executed in full compliance with applicable regulations and policies in recognition of the designation of the Hudson River as a superfund site.	• Potentially contaminated soils requiring excavation would be temporarily stockpiled pending waste characterization results. Excavation and staging will be performed using methods that minimize the disturbance of the soil. At a minimum, all potentially contaminated soil would be staged on an impervious surface and covered with plastic sheeting. If it is determined that soils contain hazardous waste, they should not be moved from one stockpile to another without prior approval from the NJDEP and/or necessary permits and approved remedial action plans. No excavation/movement of contaminated soil or hazardous waste may occur without prior NJDEP and/or EPA approval, as applicable. • Due to the high water table within the Study Area and the depth of the proposed improvements, contaminated groundwater is anticipated to be encountered during construction. Groundwater would be handled in an NJDEP-approved manner. Drainage measures including de-watering may be instituted to control groundwater levels within excavations. Contaminated groundwater will be pumped into tank trucks for off-site treatment and disposal. • At the completion of construction, a Linear Construction Report (LCR) would need to be prepared to document soil excavation activities and the management of contaminated soil and groundwater during construction. Additionally, the LCR would document the extent of contamination left in place or reused within the Project limits and the remedial activities completed on the Project. Although not required for Linear Construction Projects, a Response Action Outcome (RAO) may be issued by the LSRP in some cases. • All project activities must be performed in accordance with state and federal regulations, including all applicable Resource Conservation and Recovery Act (RCRA) standards. • Depending on funding sources and responsible parties involved in the development of the BASF, NJ Transit and Block 10 sites, applicable environmental compliance will be required related to contaminated materials. Any in-water work will be executed in full compliance with applicable regulations and policies in recognition of the designation of the Hudson River as a superfund site.

Source: Dewberry, 2015-2017

wayfinding. A variety of materials, color treatments, textures and plantings can be utilized to incorporate the Resist structure into the surrounding environment. Mitigation will be developed through continued coordination with the affected community including elected officials and will be on-going during final design as well as construction. Additionally, context sensitive solutions will be incorporated into the final design of the resist features and final design will maintain bike and pedestrian path connectivity.

Hazardous Materials

A soil and groundwater Sampling, Analysis, and Monitoring Plan (SAMP), as well as a Health and Safety Plan (HASP), will be developed and implemented in the proposed construction areas in and adjacent to these Recognized Environmental Conditions (RECs) to assess the presence, type, and level of contamination. Sample locations would be biased toward the areas of proposed excavation, based on the engineering design, as well as towards locations adjacent to known or suspected contamination from RECs. All site investigation activities will be performed in accordance with the most current version of NJDEP Technical Requirements for Site Remediation, N.J.A.C. 7:26E and other applicable guidance documents. Should contamination be detected, a Material Management Plan (MMP) would be prepared to address the remedial approach. An MMP typically includes management techniques for regulated material; standard operating procedures for the excavation, stockpiling, transporting, measurement, and disposal of regulated material; techniques for receiving facility certification and permits; qualifications of the licensed hauler; proposed routes to the receiving facilities; waste characterization forms; a sampling and analysis protocol for characterizing the regulated material; and requirements of the receiving facility to accept the regulated material. Sampling data would be used to develop health and safety specifications and environmental plans for the Project. Potential mitigation would include engineering controls. Due to the widespread occurrence of historic fill material within the Study Area and the abundance of RECs, it is anticipated that the majority of excavated soils that are not re-used on-site will need to be properly disposed off-site.

ES 8.0 Mitigation

Table ES.5 provides a list of mitigation measures that need to be implemented for the Project for those disciplines and resources identified in Sections ES 6 and ES 7. A full list of the remaining mitigation measures is located in the discussions of each discipline and resource in Section 4.0 of the DEIS.

ES 9.0 Irreversible and Irretrievable Commitment of Resources

CEQ states (40 CFR 1502.16) that a project should consider the irreversible and irretrievable commitment of resources. This refers to the usage or loss of resources in a way that cannot be recovered after the project is implemented. This can include the use of non-renewable energy (such as usage of fossil fuels to power construction equipment), commitment of land to alternative uses (such as taking productive agricultural land out of agricultural use and converting it to urban uses), or the extraction of mineral resources from the ground.

The Project is not anticipated to irreversibly utilize or commit a significant quantity of resources. Implementation of the Project would result in irreversible usage of resources in the forms of raw building materials for the construction of the Project features as well as consumption of non-renewable energy (such as fossil fuels) to power construction equipment, but given the overall size of the Project and duration of construction activities, these are not anticipated to substantially deplete available quantities of these resources. Construction would also involve usage of labor that could otherwise be made available to other projects. The construction of the Resist component is expected to permanently impact 230 square feet of wetlands, but as described in Section 4.1.3.8, this impact is considered minor because the wetland is a man-made drainage ditch with a concrete lining classified as having an Ordinary Resource Value. The Project will also involve permanent easements on private property, and implementation of Alternative 1 would result in adverse irreversible visual impacts to the waterfront.

Photograph ES.6 Community Meeting at multipurpose center

Table ES.6 Preferred Alternative Permitting Requirements

RESOURCE	PERMIT/APPROVAL	AGENCY
Soil	Soil Erosion and Sediment Control Plan	Hudson-Essex-Passaic Soil Conservation District
Surface Water	Nationwide Permit 7	USACE
Coastal	Individual Waterfront Development Permit	NJDEP
Floodplain	Individual Flood Hazard Area Permit	NJDEP
Wetlands	Letter of Interpretation (LOI) and Freshwater Wetland Permit GP-7 and GP-11	NJDEP
Water Quality	New Jersey Pollutant Discharge Elimination System (NJPDES) Individual Permit for Storm-water Pollution Prevention Plan (SWPPP)	NJDEP
Threatened and Endangered Species	Consultation pursuant to Section 7 of the Endangered Species Act	NOAA-NMFS
	Essential Fish Habitat consultation	NOAA-NMFS
Navigable Waterways	Review of navigation issues associated with in-water work	USCG
Coastal Resources/Tidelands	Construction in areas now or formerly flowed by the Mean High Tide, if not already granted, must be authorized by a grant, lease, or license.	NJDEP Bureau of Tidelands Management and Tidelands Resource Council
Air Quality	General Permit (GP-0005A) will need to be acquired for each of the emergency generators associated with DSD pump systems	NJDEP Air Quality Program
Cultural Resources	Section 106 concurrence	NJHPO
Easements	Short-term easements (for construction) and Long-term easements will be required	Local municipalities (Hoboken, Weehawken, Jersey City)

Source: Dewberry, 2015-2017

ES 10.0 Unavoidable Significant Adverse Impacts

The implementation of the Project will not result in significant adverse impacts, as summarized in Table ES.4. The impacts of consequence from the implementation of the Project will include moderate Short-term adverse impacts arising from construction activities. This is limited to noise, vibration, and transportation impacts to properties near areas of proposed construction. In addition, construction-related impacts to archaeological resources have the potential to be adverse, and further evaluation of these resources will be conducted during construction as part of the implementation of the project's Section 106 Programmatic Agreement. Flood model results also indicate the project may result in minor areas of additional flooding to five identified properties during a 100-year coastal storm surge event. Alternative 1 would also pose an adverse impact to viewsheds and accessibility to open space along the waterfront (Alternatives 2 and 3 have negligible impacts to viewsheds and accessibility to open space along the waterfront). In order for the Project to be compliant with applicable state laws, either an easement must be acquired, or written permission must be secured from the affected property owner(s) to authorize the modeled increase in flooding.

It should be noted that while no significant adverse impacts arise from the three Build Alternatives, implementation of the No Action Alternative would result in long-term adverse impacts to the community, through continued exposure to flood risks and extensive damage similar to what occurred during Superstorm Sandy could happen again.

ES 11.0 Growth Inducing Aspects of the Project

The Project is not anticipated to have growth-inducing aspects. The Study Area is currently built out and historically has shown continued development occurring. This continued development has occurred despite repeated storm events. Growth within the Study Area is managed by municipal zoning and approved redevelopment plans. The Project does not propose to directly or indirectly change zoning or approved redevelopment plans. While the Project will include the use of easements, the land use of individual properties will not be changed by the Resist component. The large DSD sites will involve changing land use (e.g., from vacant land to recreational) but growth in those areas is already guided by applicable redevelopment plans. No aspects of the project involve construction of additional residential, commercial or industrial space.

ES 12.0 Permits and Approvals

The Project's compliance with applicable environmental laws and authorities as stated in HUD regulations (24 CFR 58.5 and 58.6) will be demonstrated. This includes the federal laws and authorities identified in the HUD regulations, as well as state laws, regulations and statues. **Table ES.6** provides a list of local, state and federal approvals/permits that would be required to implement the Preferred Alternative.

ES 13.0 Public Participation

It is important to acknowledge the significant public outreach that occurred during the Rebuild by Design (RBD) competition in 2013 and 2014. The City of Hoboken partnered with neighboring communities to

hold community meetings, workshops, and charrettes that would help develop the project to recognize the need for flood resiliency, while considering the dense and diverse urban character of the community (see **Photograph ES.6**).

The extensive consultation and coordination that was undertaken as part of the project began with the National Environmental Policy Act (NEPA) process in June of 2015. The publication of the Draft Environmental Impact Statement (DEIS) on February 24, 2017 represented a substantial public outreach effort, with a public hearing (on March 16, 2017) and a 45-day public comment period that concluded on April 10, 2017. In addition to the 37 oral comments at the public hearing, 57 written comments were submitted through mail or email during the comment period. Substantive comments were incorporated into the FEIS. The Response to Comment document and copies of all comments received during the comment period are included in Appendix C. The Response to Comments provides answers to substantive questions and explains where updates where made to EIS text, as appropriate.

To date, the Project has involved significant local, state, and federal coordination, in collaboration with public participation, to build an understanding among stakeholders in the Study Area. This coordination took place to satisfy NEPA and agency regulatory requirements, as well as to make sure that the public was well informed and engaged throughout the Project. Public involvement occurred throughout the Project and focused on major milestones, which were:

- Purpose and need
- Scoping
- Concept development
- Concept screening
- Introduction of the Build Alternatives
- Urban design
- Coastal storm surge modeling
- Alternatives analysis
- Selection of the Preferred Alternative
- DEIS Public Hearing

In addition, the City of Hoboken also held 30 separate meetings from December 2015 through September 2016 with local stakeholder groups, property owners, homeowners associations, and community groups. The project's public participation was framed by the Citizen Outreach Plan (COP). The COP provides a transparent and inclusive community outreach and public participation plan allowing all citizens and stakeholders in the Project's Study Area and adjoining areas to participate in the planning, design, and implementation of the Project. The COP provided the framework for public outreach for the entire Project, including the current NEPA phase and future phases, as it moves through final design into construction. The COP established the framework for the interaction between the primary public and agency coordination groups that would meet throughout the project. These included the Citizen Advisory Group (CAG), the Technical Coordination Team (TCT), and the Executive Steering Committee (ESC). The CAG was established to be the primary link between the project team and the overall community; the TCT was established by HUD's Sandy Recovery Task Force to support regional resilience across federal infrastructure investments in the region impacted by Superstorm Sandy and to facilitate planning, development, and implementation of infrastructure projects funded through the Disaster Relief Appropriations Act of 2013; and the ESC was established as a project advisory committee. The coordination groups interacted with the project team throughout the project schedule in order to develop a project that met the overarching resiliency needs, while considering community and regulatory requirements.

Public feedback during key project milestones was critical to ensuring that a project would be developed that provides flood risk reduction and community amenities, while respecting the existing urban environment. A main goal of the community and public meetings was to provide updates on the status of the Project as it moved forward. Another primary goal was to seek active participation and solicit input from the public on their thoughts and opinions of the Project. Comments were accepted throughout the entire duration of the Project via the project website, but comments came primarily during the public outreach periods following major project milestones that involved meetings with the public.