8 Recommendation for the Preferred Alternative

8.1 Development and Comparison of Comprehensive Master Plan Alternatives

Each of the three “Resist” alternatives were combined with the “DSD” alternative to create comprehensive water management alternatives that would provide flood risk reduction benefits from coastal storm surge and rainfall events within the study area. Figure 8-1 shows the three comprehensive alternatives including the three “Resist” alignments and the various DSD components together. Table 8-1 summarizes the major features along with a comparison of qualitative assessment of benefits and impacts of these three comprehensive alternatives based on the feasibility assessment as discussed in Chapter 7. It should be noted that the based on conversations with NJDEP, the cost estimate for the “Resist” alignment alternative includes $5 million for the design and construction of any DSD component which is reflected in the range of costs for the “Resist” alignment in Table 8-1.

Table 8-1. Summary of the Three Comprehensive Master Plan Alternatives

<table>
<thead>
<tr>
<th>Features</th>
<th>Alternative 1 with DSD alternative (Waterfront)</th>
<th>Alternative 2 with DSD Alternative (15th Street)</th>
<th>Alternative 3 with DSD Alternative (Alleyway)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx. length of “Resist” alignment</td>
<td>3 miles</td>
<td>1.8 miles</td>
<td>1.7 miles</td>
</tr>
<tr>
<td>Potential no. of gates in “Resist” alignment</td>
<td>29-31</td>
<td>21-25</td>
<td>19-23</td>
</tr>
<tr>
<td>Coastal flood risk reduction benefits</td>
<td>Maximum among all three alternatives</td>
<td>Moderate among all three alternatives</td>
<td>Minimum among all three alternatives</td>
</tr>
<tr>
<td>Stormwater flood risk reduction benefits</td>
<td>Similar for all three alternatives</td>
<td>Similar for all three alternatives</td>
<td>Similar for all three alternatives</td>
</tr>
<tr>
<td>Cost estimate range of “Resist” alignment</td>
<td>$531.5 - $597.1 Million</td>
<td>$238.2 - $276.9 Million</td>
<td>$224.5 - $268.5M</td>
</tr>
<tr>
<td>Cost estimate range of all “DSD” components</td>
<td>$126.4 - $148 Million</td>
<td>$126.4 - $148 Million</td>
<td>$126.4 - $148 Million</td>
</tr>
<tr>
<td>Impacts to built environment</td>
<td>Highest impact among all three alternatives</td>
<td>Moderate impact among all three alternatives</td>
<td>Lowest impact among all three alternatives</td>
</tr>
<tr>
<td>Operation and Maintenance</td>
<td>Highest costs among all three alternatives</td>
<td>Moderate costs among all three alternatives</td>
<td>Lowest costs among all three alternatives</td>
</tr>
<tr>
<td>Benefit – Cost Ratio with “Resist” and “DSD” together</td>
<td>2.22</td>
<td>3.88</td>
<td>3.99</td>
</tr>
</tbody>
</table>
Figure 8-1. Map showing Three Comprehensive Master Plan Alternatives
The feasibility assessment criteria’s evaluated in Section 7 with additional criteria’s developed as part of the EIS process were used to compare the three comprehensive master plan alternatives. Table 8-2 provides the definition for various criteria and metrics used to compare the three alternatives whereas Table 8-3 compares all the three master plan alternatives with the No-Action Alternative (NAA). As seen from Table 8-3, all three master plan alternatives would meet the purpose and need of the project by reducing flood risk for a substantial majority of the population. None of the alternatives would result in a significant impact on the natural, cultural or built environments. In addition, the impacts to socioeconomics – notably to minority and low income populations – would be positive under all alternatives. As a result of implementing any of the three alternatives, these populations would receive substantial flood risk reduction benefits from both coastal surge as well as rainfall flooding.

Alternative 1 would have the greatest impact on viewsheds and waterfront access, both of which are highly valued by residents within the study area. By comparison, the impacts on viewsheds and waterfront access are minimal under both Alternative 2 and 3, because these alternatives are primarily located inland. In addition, Alternative 1’s “Resist” barrier would require the greatest number of gates, which increases operation and maintenance costs and increases the risk of failure due to operational error. The construction of Alternative 1’s “Resist” barrier also would require funding beyond the currently available $230 million. For these reasons, Alternative 1 was not selected as the recommended alternative for design and construction.

The remaining build alternatives, 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), and annual maintenance and operating costs. For Alternative 3, the routing of the “Resist” barrier down the alleyway will reduce the impact of the barrier on the local community in the northern part of Hoboken by placing it behind structures and reducing impacts to the street grid. Additionally, seven (7) to sixteen (16) existing parking spaces would be affected under Alternative 3 as compared to twenty three (23) to thirty-one (31) parking spaces in Alternative 2.

Due to the Alternative 3 alignments traveling through the alleyways between Washington and Garden Streets, the neighborhood impact would be less compared among all build alternatives. The existing terrain of the alleyways is higher in elevation and somewhat constant when compared to Alternative 2 which runs through Washington Street and turns west to 15th Street where the existing elevations start to decrease and negatively impact viewshed and result in additional parking losses. In addition, Alternative 3 contains the least number of gates between all alternatives and therefore is the least vulnerable to system failure during coastal storm surge events. Due to the least number of gates, the fully constructed “Resist” alignment will be least expensive to regularly maintain and operate. Alternative 3 will require the least amount of soils disposal and as well as least noise impacts during constructions among all alternatives. All critical facilities will be protected with the exception of the fire station located at 1313 Washington Street.
### Table 8-2. Definition of Metrics and Values

<table>
<thead>
<tr>
<th>Category</th>
<th>Criteria</th>
<th>Definition of Criteria and Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal Storm Surge Risk Reduction for Residents</td>
<td>Percentage of Population In Floodplain Receiving Risk Reduction (2010 Census)</td>
<td>This criterion measures the percentage of the population within the Study Area (based on 2010 census data) within FEMA 2015 preliminary 100-year floodplain that receives coastal storm surge flood risk reduction benefits from the “Resist” feature. Larger percentage of the Study Area population protected is considered better.</td>
</tr>
<tr>
<td>Flood Risk Reduction</td>
<td>Critical Facilities NOT Receiving Coastal Flood Risk Reduction</td>
<td>Federal Emergency Management Agency (FEMA) has identified a list of critical facilities (hospitals, fire stations, police stations and facilities that store critical records). The North Hudson Sewerage Authority Treatment Plant is critical facilities by the community. This criterion identifies critical facilities within the FEMA 2015 preliminary 100-year floodplain that would NOT receive coastal storm flood reduction benefits for each alternative.</td>
</tr>
<tr>
<td></td>
<td>Potential to Adapt to Higher Coastal Flood Events</td>
<td>This criterion considers whether the north and south ends of the “Resist” feature tie into landforms which could be used to support construction of a “Resist” barrier to handle a 500-year (0.2 percent annual chance) storm.</td>
</tr>
<tr>
<td>Built Environment</td>
<td>Location of Viewshed Impacts</td>
<td>This criterion identifies where Project infrastructure would potentially adversely affect the views of the New York City skyline based on an analysis at select viewpoints along the waterfront for residents, recreational users and business patrons compared to existing conditions.</td>
</tr>
<tr>
<td></td>
<td>Length of Waterfront Access Impacted (feet)</td>
<td>This criterion considers the linear length along the Hudson River shoreline where new “Resist” features would impact pedestrian access to the waterfront bulkhead. Within these locations, pedestrians would be required to access the new bulkhead by a series of steps or ramps. Shorter length of waterfront access impacted is considered better.</td>
</tr>
<tr>
<td></td>
<td>New or Improved Park Space (acres)</td>
<td>The criterion considers the net acreage of park space that is either created or improved upon. This takes into account that some areas of proposed park areas are located where a park already exists, such as portions of the Cove Park at Weehawken Cove. Greater acreage of new or improved park space is considered better.</td>
</tr>
<tr>
<td></td>
<td>Connectivity and Circulation</td>
<td>This criterion provides a tally of the on-street parking spaces that would be permanently removed by the “Resist” alignment. The variation depends on the design concept selected. Fewer parking spaces impacted is considered better.</td>
</tr>
<tr>
<td></td>
<td>Number of Gates Closed during Storm Conditions</td>
<td>This considers the number of gates that would be closed during storm surge events. Closure of these gates would impact vehicular and pedestrian access beginning in the hours prior to a storm event. Fewer number of gates is considered better.</td>
</tr>
<tr>
<td>Benefit Cost Analysis</td>
<td>Benefits for Resist</td>
<td>This criterion considers the benefit of the project, which includes the following: estimated value of avoided flood damages; avoided loss of function (residential displacement, non-residential business and/or service losses); socioeconomic benefits (mental stress and anxiety, lost productivity); and environmental benefits (open space acquisition). A higher benefit value is considered better.</td>
</tr>
<tr>
<td></td>
<td>Estimated “Resist” Cost</td>
<td>This is the estimated cost for the “Resist” feature. This includes final design, project management, engineering and construction costs. A lower cost is considered better.</td>
</tr>
<tr>
<td></td>
<td>Estimated “Resist” Cost Contingency</td>
<td>This criterion considers that based on the current design effort (feasibility stage) there are potential unforeseen costs for the next stage of the project. These costs are approximately 25% of the “Resist” construction cost.</td>
</tr>
<tr>
<td></td>
<td>Total “Resist” Cost</td>
<td>This criterion represents the overall cost of the “Resist” feature (including final design, project management, engineering, construction and project contingencies). A lower “Resist” cost is considered better.</td>
</tr>
<tr>
<td></td>
<td>Resist Benefit/Cost Ratio</td>
<td>This criterion is a number which is calculated by dividing benefits by total “Resist” cost as described above. A Benefit Cost Ratio above one means the project’s benefits outweigh its costs.</td>
</tr>
<tr>
<td>Construction/ Maintenance and Operations</td>
<td>Total Project Benefit/Cost Ratio (includes “Resist” and Delay, Store, Discharge)</td>
<td>This criterion is a number which is calculated by dividing benefits by “Resist” costs including Delay, Store and Discharge. A Benefit Cost Ratio above one means the project’s benefits outweigh its costs.</td>
</tr>
<tr>
<td></td>
<td>Constructability</td>
<td>The criterion considers three metrics. The first metric is the number of private parcels where temporary easements are required for construction access or where permanent easements are required for installation of “Resist” features. The second metric is the estimated linear feet of utilities which require relocation to enable “Resist” infrastructure construction. The third metric is the estimated number of utility crossing for “Resist” infrastructure. Fewer number of private parcels requiring easements and fewer utility impacts are considered better.</td>
</tr>
<tr>
<td></td>
<td>Number of private parcels requiring easements</td>
<td>This criterion provides a tally of the temporary construction areas that may be impacted through the construction of the project. It considers the overall estimated Limits of Disturbance (LOD) for the “Resist” and Delay, Store and Discharge features of the project. A smaller area of temporary construction impacts is considered better.</td>
</tr>
<tr>
<td></td>
<td>Potential Utility Relocation (linear feet)</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Criteria</td>
<td>Alternative 1 (Option 1)</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td>--------------------------</td>
</tr>
<tr>
<td><strong>Flood Risk Reduction</strong></td>
<td>Percentage of Population In Floodplain Receiving Risk Reduction (2010 Census)</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>Percentage of Study Area In Floodplain Receiving Flood Risk Reduction</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td>Critical Facilities NOT Receiving Coastal Flood Risk Reduction</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Potential to Adapt to Higher Coastal Flood Events</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Potential runoff to be managed by Delay, Store, Discharge components (gallons and persons receiving benefits)</td>
<td>Up to 7 million gallons/14,160 persons</td>
</tr>
<tr>
<td><strong>Socioeconomics and Built Environment</strong></td>
<td>Location of Viewshed Impacts (Residential)</td>
<td>1st/2nd floor of properties on N. side of 15th St from Garden St to Sinatra Dr. N. and first floor of properties along Sinatra Dr. N.</td>
</tr>
<tr>
<td></td>
<td>Recreational Users</td>
<td>1600 Park ballfields, Shipyard Park, and Hudson River walkway from Weehawken Cove to Sinatra Dr. N to 11th St</td>
</tr>
<tr>
<td></td>
<td>Retail/Dining Patrons</td>
<td>1st floor businesses: Shops at Lincoln Harbor. 1st floor businesses along Sinatra Dr. N. and Sinatra Dr. (south)</td>
</tr>
<tr>
<td></td>
<td>Length of Waterfront Access Impacted (feet)</td>
<td>7,950</td>
</tr>
<tr>
<td></td>
<td>New or Improved Park Space (acres)</td>
<td>11.3</td>
</tr>
<tr>
<td></td>
<td>Number of Parking Spaces Removed</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Number of Gate Closed during Storm Conditions</td>
<td>29</td>
</tr>
<tr>
<td><strong>Benefit Cost Analysis</strong></td>
<td>Benefits for “Resist” (in millions)</td>
<td>$433-$475</td>
</tr>
<tr>
<td></td>
<td>Estimated “Resist” Cost Contingency (in millions)</td>
<td>$52-$584</td>
</tr>
<tr>
<td></td>
<td>Total “Resist” Cost (in millions)</td>
<td>$591-$693</td>
</tr>
<tr>
<td></td>
<td>Resist Benefit/Cost Ratio</td>
<td>2.26</td>
</tr>
<tr>
<td></td>
<td>Total Project Benefit/Cost Ratio (includes “Resist” and Delay, Store, Discharge)</td>
<td>2.22</td>
</tr>
<tr>
<td><strong>Construction/ Maintenance and Operations</strong></td>
<td>Number of private parcels requiring easements</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Potential Utility Relocation (for Resist, linear feet)</td>
<td>4,860</td>
</tr>
<tr>
<td></td>
<td>Potential Utility Crossings (Resist)</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>Temporary Construction Impacts (acres)</td>
<td>29.4</td>
</tr>
<tr>
<td></td>
<td>Estimated Annual Maintenance Cost (for Resist, millions)</td>
<td>$3.6-$3.9</td>
</tr>
</tbody>
</table>
8.2 Recommended Preferred Alternative for Design and Construction

Based on public input collected from multiple public meetings conducted during the entire duration of the study and analysis of various metrics, Alternative 3 known as the “Alleyway” Alternative was selected as the recommended preferred master plan alternative with consent of various stakeholders. The DSD component of this comprehensive master plan Alternative 3 would include three large stormwater detention tank sites located at the BASF, Block 10 and the NJ Transit adjacent to Hoboken Housing Authority, along with 61 smaller stormwater collection sites located along the Right-of-Way (ROW) within the study area. The BASF, NJ Transit, Block 10 and ROW sites will manage rainfall runoff for approximately 55 acres, 15 acres, 8 acres, and 13 acres respectively.

Part of Alternative 3 includes the construction of a high level storm sewer system to address local drainage and separate the unprotected area from the combined existing sewer system. The new high level storm sewer system would reduce the inflow of coastal storm surge from the unprotected side into the protected interior area during a coastal storm surge event. The proposed high level storm system includes approximately 10,500 linear feet of pipe with sizes varying from 15 inches to 36 inches, 36 manholes, 100 inlets, and 1 new outfall located east of 14th Street.

As with all of the other proposed alternatives, Alternative 3 will cause inconveniences to neighboring properties in the form of noise, dust, and restricted vehicular and pedestrian access during the 40-month construction period for the “Resist” barrier. An approach to address minor increases in flood depths to the five properties during the 1% annual-chance coastal storm surge event as a result of the proposed Alternative 3 “Resist” barrier construction will be developed in partnership with the State (NJDEP), the municipal governments of Hoboken, Weehawken and Jersey City, and local property owners, as the project moves into final design.

Under Alternative 3, 85 percent of the persons residing within the FEMA preliminary 1% annual chance (100-year) floodplain would receive coastal storm flood risk reduction benefits. Total cost of the comprehensive master plan Alternative 3 is $351 to $417 million and the highest benefit/cost ratio among all alternatives at 3.99. However, the estimated cost of the “Resist” barrier, including cost contingencies is $225 to $269 million which is lower than Alternatives 1 and 2 and suggests the entire “Resist” barrier may be constructed with the available funds. The preliminary cost estimate to implement the DSD portion in addition to the “Resist” portion of the Alternative 3 would exceed the total available funds for design and construction. The benefit-cost ratio (BCR) provided by the “Resist” alternative outweighs the DSD alternative’s BCR. Additionally, the HUD funding requirements indicates that reducing flood risk vulnerabilities from coastal storm surge within the study area should be prioritized first. As a result, the “Resist” portion of the comprehensive master plan Alternative 3 is recommended to move into final design and construction.

It should be noted that if funds are available after the construction of the Alternative 3’s “Resist” barrier, then these remaining funds can be used to design and construct feasible stormwater management portions of the DSD alternative. Based on the preliminary cost estimate, there is a potential for that up to 5 million dollars could be available to construct portions of the DSD alternative. Based on the preliminary cost estimates and
the qualitative assessment of the flood risk reduction benefits provided by various components of the DSD alternative, it is recommended to design and construct the sixty one (61) Right-of-Way (ROW) green/gray infrastructure sites with any remaining funds after the construction of the “Resist” barrier. These ROW sites are located on public property and have lower construction costs and less complexity as compared to the three large parcel based sites. However, the design and construction of these ROW sites would require close coordination and review by NHSA. It is anticipated that the time-frame to fully design and construct the three parcel DSD components would extend well beyond September 2022. Hence, due to the construction costs and complexity involved with the components of the DSD alternative, it is recommended that the City of Hoboken and NHSA adopt the entire DSD alternative as part of their master plan and/or long-term control plans.

In summary, the “Resist” portion of Alternative 3 is a technically feasible cost effective project that was recommended through the screening analysis, and is supported by both the community and Executive Steering Committee. Such alternative will provide flood risk reduction benefits for 85% of the project area, reduce flood insurance premiums, and improve public health by increasing green space such as Cove Park which activates two acres of previously undeveloped waterfront land. The design flood elevation meets FEMA levee certification requirements and also considers potential to adapt to 2075 sea level rise.

8.3 Design Considerations for the Recommended Preferred “Resist” Alternative

There are several constraints and opportunities associated with the recommended preferred “Resist” alternative alignment. A list of potential major constraints are as follows –

- Location of subsurface utilities such as existing interceptors, air vent pipes, major electric conduits and others that can be costly and difficult to relocate
- Existing soil conditions and presence of high groundwater
- Integrity of existing embankments that are part of the “Resist” alignment
- Limited available area for construction (such as alleyway and sidewalks)
- Building openings such as entrance to businesses, building, garages and others
- Vehicular and pedestrian circulation during normal and storm conditions
- Proximity to existing building’s foundation
- Need for on-going operations during construction phase (such as sewer, rail and businesses)

Additionally, it is community’s desire that the proposed “Resist” barrier structure should provide amenities to enhance quality of life without jeopardizing the overall integrity of the “Resist” barrier structure. The design phase would require an optimization of the potential amenities that can be provided with the structural core of “Resist” barrier structure by considering community’s preference and available budget for construction. This feasibility study shows conceptual techniques to blend amenities with the “Resist” structures; however a detailed analysis would be required during the design phase to ensure that these amenities would be cost effective and possibly with low maintenance costs. Figure 8-2 shows a map of the recommended preferred “Resist” alternative with the proposed high level storm sewer system. Figures 8-3 to 8-21 show the breakdown of the various segments and potential design constraints associated with that segment.
Figure 8-2. Recommended Preferred “Resist” Alternative
**Design Considerations:**
- Existing drainage line crossing near the eastern side of the berm
- Minimize impact to exiting landscaping
- Sheet ing required under berm to prevent seepage
- Interface with existing elevated road structure
- Perform seepage and stability analysis of the existing elevated roadway during coastal storm surge conditions

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**Plan View**

**Photo Showing Location of Proposed Berm (Facing West)**

**Proposed Typical Cross Section (S-1)**

Figure 8-3 Conceptual Plan, Photo, and Cross Section of Proposed Earthen Berm in Weehawken Portion of Study Area
Design Considerations:
- High tension overhead wires
- Rolling gate crossing at HBLR rails
- 90+ foot rolling gate crossing at 19th St.
- Traffic Signals
- Drainage ditch parallel to the Light Rail Tracks
- Potential for temporary outage of HBLR services during construction
- Limited space available for construction

Figure 8-4 Conceptual Plan, Photo, and Cross Section of 19th Street NJ Transit Light Rail Crossing in Northern Portion of the Study Area
**Design Considerations:**
- High tension overhead wires
- 48” NHSA outfall pipe crossing “Resist” barrier
- 24” NHSA sewer pipe crossing “Resist” barrier
- NHSA’s air vent system crossing “Resist” barrier
- Resist barrier to replace existing chain link fence that may be on private property
- No negative impact on track operation during construction; however potential closure or temporary rerouting of existing walkway would be required during construction phase

Figure 8-5 Conceptual Plan, Photo, and Collages along NJ Transit Light Rail Property near Harbor Boulevard in Northern Portion of the Study Area
Design Considerations:

- Resist barrier can potentially tie in to proposed boathouse by City of Hoboken (not part of RBDH project) and is located on the backside of proposed Boathouse
- Ensure “Resist” barrier footprint does not interfere with the adjacent Park Avenue bridge structure
- Coordination will be required between the boathouse and RBDH project
- Private property easement would be required for construction and maintenance at north end

Figure 8-6 Conceptual Plan, Photo, and Collages of “Resist” Barrier near Cove Park in the Northern Portion of the Study Area
Design Considerations:
- Existing underground electrical conduits
- Contaminated capped site
- Existing monitoring wells
- 95'+ long gate for 15th Street crossing to be enclosed and stored within the Cove Park
- Settlement may occur with proposed Cove Park
- Existing recreational facilities will be affected during construction

Figure 8-7 Alternative 3 Conceptual Plan, Photo, and Collage of Proposed Cove Park with “Resist” Barrier located in the Northern Portion of the Study Area
Design Considerations:
- Parking garage footings may interfere with barrier foundation
- Parking garage wall openings may be required for air circulation
- Flood logs or a similar deployable system would be required to access the existing utility entrance
- Potential for impacts to existing sidewalk width
- Gate storage near alleyway required which may necessitate the need for additional sidewalk width
- Major NHSA utilities located on 15th Street
- Potential impacts to existing trees and plantings

Figure 8-8 Alternative 3 Conceptual Plan, Photo, Collage, and Cross Section along Garden Street in the Northern Portion of the Study Area
Design Considerations:
- Extent of parking garage footings may interfere with barrier foundations
- Extensive geotechnical investigation is required to determine the exact location of building footprint
- Existing entrance for the southern side of the entrance which would have to relocated
- Existing drainage line running center of alleyway
- No seating is preferred through the alleyway
- Drainage modifications will be required
- Construction with tight clearance between buildings
Design Considerations:

- Extensive geotechnical investigation required to assess the existing building and brick wall footprint
- Existing decorative brick wall to be replaced with “Resist” barrier
- Utilities and transformers would need to relocated
- Existing drainage line running center of alleyway which would have to relocated
- No seating is preferred through the alleyway
- Drainage modifications will be required
- Rolling gate storage at east end
Design Considerations:

- Impacts to existing sidewalk
- ADA access required at the northern end
- Coordination required with the on-going Washington Street Redesign Project
- Potential conflicts with underground utility and lateral crossing lines
- Potential for parking space losses
- Roadway drainage and grading modifications required with the proposed barrier in place
- Impacts to existing sidewalk infrastructure

Figure 8-11 Alternative 3 Conceptual Plan, Photo, and Collages along Washington Street between Alleyway and 14th Street in the Northern Portion of the Study Area
Design Considerations:

- Coordination required with the on-going Washington Street Redesign Project
- Potential conflicts with underground utility and lateral crossing lines
- Flood gate for 14th street crossing can be enclosed but would require additional width
- Intersection grading to ensure gate functionality and ADA compliance at ramps
- Parking space losses and impacts to sidewalk
- Roadway Drainage and Grading Modifications

Figure 8-12 Alternative 3 Conceptual Plan, Photo, Collage, and Cross Section along Washington Street between 14th and 13th Streets in the Northern Portion of the Study Area
Design Considerations:

- Potential loss of parking spaces
- Impacts to existing sidewalk width
- May require additional deployable system to maintain ingress and egress
- Resist barrier structure may require use of existing private parking lot space
- Roadway drainage and grading modifications required
- Potential conflicts with underground utilities and lateral connections
Design Considerations:

- Existing sidewalk space is narrow and may require additional sidewalk to store and conceal gate
- Impacts to existing sidewalk infrastructure such as traffic lights and utility poles.
- Major conflict with existing PATH tube
- Major conflict with existing NHSA pump station and storm sewer infrastructure
- Extensive geotechnical investigation required
- Roadway drainage and grading modifications required

Figure 8-14 Alternative 3 Conceptual Plan, Photo, Collage, and Cross Section of Observer Highway Crossing in the Southern Portion of the Study Area
Design Considerations:

- Flood logs or similar deployable required at parking lot entrance due to limited sidewalk width and overhead utility conflicts
- Barrier located at edge of foundation to minimize sidewalk interference
- Storage and concealment of Observer Hwy rolling gate on sidewalk along Hudson Street
- High tension overhead wires
- Portions of “Resist” barrier structure may require use of privately owned parking lot
Design Considerations:

- Rolling gates required for Option 2 at NJ Transit building entrances along Observer Highway
- Major conflict with existing PATH tube
- Extensive geotechnical and utility mapping required
- Relocation of existing NJ Transit infrastructure required for Option 1 alignment
Design Considerations:
- Concealment and storage of rolling gate crossing required at Marin Blvd
- Construction near NJ Transit rail overpasses
- Extensive geotechnical investigation required to ensure stability of NJ Transit’s embankment
- Termination of barrier in existing rail embankment
- High tension overhead wires
- Utility conflicts with JCMUA system
- Roadway and drainage modification required

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**Plan View**

Photo Showing Location of Flood Gate Crossing Marin Blvd. (Facing West)

**Cross Section Showing Proposed Marin Boulevard Flood Gate Crossing**

**Rolling Gate Thickness Summary Table**

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Figure 8-17 Alternative 3 Conceptual Plan, Photo, and Gate Detail of Marin Boulevard Crossing in Southern Portion of Study Area
Design Considerations:

- Combination of gates and barrier structures required at NJ Transit property entrances
- Extensive coordination required to incorporate proposed re-grading of NJ Transit property from the Long Slip Canal project
- Major construction challenges
- Construction near NJ Transit rail structure
- Requires use of Jersey City’s ROW along 18th Street to construct the proposed "Resist" structure
- Extensive geotechnical investigation required
**Design Considerations:**

- Concealment and storage of rolling gate crossing at Grove St
- Construction near NJ Transit rail overpasses can be challenging
- Termination of barrier in existing rail embankment
- Requires extensive geotechnical and structural assessment of existing NJ Transit embankment and bridge support structures
- High tension overhead wires

Figure 8-19 Alternative 3 Conceptual Plan, Photo, and Cross Sections of Grove Street Crossing in the Southern Portion of the Study Area
Design Considerations:

- Existing embankment fortification required to prevent seepage
- Membrane required above grade on “wet” side of embankment
- Sheet piles required below grade on dry side of embankment
- Sheet pile location selected to avoid private property easements
- Concealment and storage of rolling gate crossing at Jersey Ave amid an existing electrical substation
- High tension overhead wires
- Construction near NJ Transit rail overpasses
- Close proximity of existing electrical substation

Figure 8-20. Alternative 3 Conceptual Plan, Photo, and Cross Section of Jersey Avenue Crossing in the Southern Portion of Study Area
Design Considerations:

- Rerouting of bike path within limits of rolling gate opening
- Construction under HBLR overpass can be challenging
- Roadway and drainage modifications with JCMUA coordination
- Termination of barrier in existing rail embankment
- Requires extensive geotechnical and structural assessment of existing NJ Transit embankment
- May require additional gate structure to allow for NJ Transit and HBLR’s operations

Figure 8-21. Alternative 3 Conceptual Plan, Photo, and Collages of NJ Transit Yard near Jersey Avenue in Southern Portion of Study Area