

### A. PROJECT DESCRIPTION

#### PROJECT IDENTIFICATION

The New York City Department of Environmental Protection (DEP), on behalf of the City of New York, is proposing three amended drainage plans on the East Shore of Staten Island (the “proposed project”). These three amended drainage plans are for the Oakwood Beach, New Creek and South Beach watersheds, which cover a total area of about 5,000 acres. The proposed project area, referred to as Mid-Island, is generally bounded on the west by Great Kills Park (within the Gateway National Recreation Area [GNRA]) and the mapped but unbuilt Willowbrook Parkway right-of-way, and by the Staten Island Expressway to the east. The northern boundary extends along a number of Staten Island Greenbelt parks including LaTourette Park, Richmond County Country Club and Reeds Basket Willow Swamp Park. The southern boundary is Lower Bay. The Mid-Island watersheds are located within Staten Island Community Boards 2 and 3.

The primary objective of the proposed project is to provide comprehensive stormwater management and reduce chronic street and property flooding while preserving and enhancing wetlands under DEP’s Bluebelt Program. The proposed project would be implemented as a comprehensive program with multiple capital projects over a number of decades. Construction is expected to begin in 2014 and continue through 2043.

Drainage plans are developed based on established drainage plan criteria for the collection, conveyance, and management of stormwater and sanitary wastewater. The current drainage plans for these three watersheds date from the 1960s and call for a full network of storm and sanitary sewers in all mapped streets. The proposed project would amend these drainage plans for the purposes of managing stormwater through a combination of collection sewers, best management practices (BMPs), restored wetlands and new or enlarged outfalls to the Lower Bay. The proposed project includes sanitary sewer system construction and upgrades, where needed. All sewer installation would involve street reconstruction once sewers are installed.

Under the proposed project, existing wetlands comprised of surface water features such as streams, ponds, and emergent and wooded wetlands would be preserved and enhanced to provide natural hydrologic functions in addition to pollutant filtration, flood control and diversified habitats. BMPs attenuate the impacts of urban stormwater discharges on wetlands by reducing erosive runoff velocities, intercepting contaminants and providing stormwater storage. The proposed BMPs would include extended detention wetlands and other natural features (green infrastructure) that would capture stormwater from each storm sewer outlet (grey infrastructure).

The proposed project would result in the implementation of the Mid-Island Bluebelt, a comprehensive stormwater program that includes:

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- Oakwood Beach watershed: approximately 44 miles of new storm sewers, five proposed BMPs, one new outfall and two enlarged outfalls;
- New Creek watershed: approximately 57 miles of new storm sewers, 19 proposed BMPs, one new outfall and one enlarged outfall; and
- South Beach watershed: approximately 36 miles of new storm sewers, with seven proposed BMPs, one new outfall and two enlarged outfalls.

Detailed descriptions of the overall proposed program and each watershed, under existing and future conditions (i.e., with the proposed action conditions), are provided in this document. Each of the Mid-Island watersheds is challenging for drainage planning because of extreme topographic conditions. The lower watersheds are extremely flat whereas the upper watersheds have hilly terrain with steep slopes, which produce high runoff velocities and difficult conditions for stormwater conveyance and treatment. In addition, the three Mid-Island watersheds are largely developed with the exception of parklands and Bluebelt properties. The potential significant adverse impacts identified for tidal wetlands, vegetation, trees and endangered, threatened and special concern species and communities are largely related to these drainage planning challenges and existing conditions. Therefore, mitigation measures would be implemented as part of the proposed project.

### ENVIRONMENTAL REVIEW AND APPROVALS

Adoption and implementation of the proposed amended drainage plans would require a number of City, State, and Federal discretionary approvals for which environmental review is necessary. As lead agency pursuant to *City Environmental Quality Review (CEQR)* and *State Environmental Quality Review Act (SEQRA)*, DEP determined that a programmatic environmental review would be appropriate to identify the range of impacts that may occur under the proposed program, build the appropriate mitigation into the proposed project, and to ensure that future actions related to the proposed project do not have the potential for significant impact.

This Final Generic Environmental Impact Statement (FGEIS) presents the Reasonable Worst Case Scenario (RWCS) for the proposed project and was prepared well in advance of project build-out to inform the amended drainage plan approval process and to provide support for the necessary permits and approvals. For example, activities in navigable waters, freshwater and tidal wetlands and coastal erosion hazard areas, as well as new outlets to surface waterways, require Federal and State permits. Specifically, DEP is actively coordinating with the United States Army Corps of Engineers (USACE), the United States Environmental Protection Agency (USEPA) and New York State Department of Environmental Conservation (NYSDEC) as part of the permitting process, whose input is reflected in this FGEIS. DEP has also initiated coordination with other agencies for proposed activities on publicly-owned properties including the New York City Department of Parks & Recreation (DPR) and the New York State Department of Transportation (NYSDOT). A complete list of required permits and approvals is included in Chapter 1, "Overall Project Description."

DEP issued a positive declaration on April 12, 2010 and initiated a public process to disclose the potential environmental impacts of the proposed project, mitigation of significant impacts, and alternatives considered. A public scoping meeting was held on May 12, 2010 at the offices of Staten Island Community Board 2 and a Final Scope of Work was issued on September 30, 2010. A DGEIS was certified as complete and circulated for public review and comment on September 23, 2011. A public hearing was conducted on October 27, 2011 at Staten Island

Community Board 2 offices to receive spoken and written comments on the DGEIS. The period for submitting written comments on the DGEIS remained open until December 16, 2011. An additional public meeting was held at Community Board 2 on February 27, 2013, at which time residents had an opportunity to discuss the proposed plans described in the DGEIS.

## **PURPOSE AND NEED**

DEP is proposing amended drainage plans to provide a comprehensive stormwater management network that includes storm sewers, BMPs, Bluebelt wetlands and outfalls within the Mid-Island watersheds. The primary drainage plan objective is to reduce flooding on local streets and properties as well as erosion and sedimentation of natural surface water features. BMPs, proposed where storm sewers end and Bluebelt wetlands begin, would be located on public lands for the purposes of conveying runoff, reducing flooding and treating stormwater.

The proposed BMPs utilize existing surface water features such as streams, ponds and other wetlands to attenuate stormwater discharges that would otherwise cause unstable stream channels and elevated pollutant loadings. The Bluebelt planting program would enhance and restore wetland functions at previously disturbed wetlands, thereby creating an integrated, ecological system that is self-sustaining. The proposed project would also remove vegetative non-native monocultures, such as common reed, that are prone to brushfires.

## **COMPONENTS OF PROPOSED AMENDED DRAINAGE PLANS**

### *STORMWATER DRAINAGE PLAN OBJECTIVES*

The proposed project was developed based on specific drainage plan objectives to support the overall purpose and need described above. During combined rainfall and high-tide events, the tide gates at the outfalls close to prevent tidal water from flowing into the system. Outflow from the trunk sewers is also prevented, causing sewers to surcharge onto streets and adjacent properties. The proposed amended drainage plans include BMPs in the lower watersheds to store floodwaters including trunk sewer overflow, until the tide recedes and the outfalls can once again drain to the Lower Bay. This reduced street flooding would diminish storm event infiltration into sanitary sewers in the lower watershed.

In the lower portion of the New Creek watershed, several stream channels in close proximity to residential areas are filled with sediment which constricts flow and reduces conveyance capacity. The proposed project would relocate these streams onto Bluebelt properties, away from residential uses, and improve their hydrologic functions. In the New Creek upper watershed, another objective is to reduce intensive stream velocities in the areas of steep topography which currently causes streambank destabilization, erosion, and downstream sedimentation.

### *STORM SEWER DESIGN CRITERIA*

Conveyance capacity for City storm sewers is designed for the 5-year storm (4.5 inches of rain over 24 hours), which handles about 95 percent of the City's rain events. For these proposed amended drainage plans, this standard is used in calculating sizes for all storm sewers draining into existing trunk sewers. However, in locations where the storm sewer outfalls are partially submerged, the 10-year design storm was used (about 5 inches of rain over the same 24-hour period) to size the portion of pipes that would be impacted by the water surface elevation in the BMP to provide a greater margin of safety given the tidal influence. The proposed amended drainage plans also assume full build-out of lots under current zoning with the associated increases in runoff and impervious surfaces (e.g., rooftops, driveways, and parking lots).

With the proposed amended drainage plans, the grades of certain streets would need to be elevated to ensure positive drainage flow toward the BMPs and provide adequate cover over storm sewers in accordance with City street design standards. Street elevations would remain as close as possible to the existing street grade and all efforts would be made to ensure that private properties fronting raised streets are protected from street runoff and yard flooding. Detailed street surveys would be completed as part of each capital project design and necessary street elevations would be identified.

### *BMP DESIGN CRITERIA*

Thirty-one BMPs are proposed under the amended drainage plans. The proposed BMP sites were selected with the goals of maximizing flood control benefits, minimizing impacts to natural resources and providing amenities to the surrounding community. The majority of the proposed BMPs are located on City-owned land (or lands to be acquired by the City), and some are on State lands. City lands include Bluebelt properties, City parkland, and lands within mapped, but unbuilt, street right-of-ways. State lands proposed for BMPs include the Richmond County Country Club under the jurisdiction of NYSDEC and an unbuilt section of the Willowbrook Parkway right-of-way, under the jurisdiction of NYSDOT and managed as open space by DPR.

BMPs are designed to safely manage full flow from tributary storm sewers. Extended detention BMPs were also sized to hold the 2-year storm (3.5 inches of rain over 24 hours), and provide water quality treatment benefits and controlled release for downstream stabilization. Forebays, outlet stilling basins, and extended detention wetlands encourage settling of sediments and pollutants with reduced flow velocities. Nutrients such as phosphorous can be reduced when attached to settling solids or by vegetative uptake. Coliform is also reduced through natural die-off when stormwater is detained.

The larger proposed BMPs in the lower watersheds would be designed with a mix of open water and emergent wetlands. Overall, BMP designs would enhance habitats through irregularly shaped and sized wetland pools, coves, islands, or increased shoreline edges that are preferred by various waterfowl species. The proposed BMP planting program would support a broader wetland restoration effort while creating a natural, integrated ecological system that is self-sustaining. The proposed project would transform existing monocultures of common reed into diverse wetland habitats with enhanced ecological functions. BMP plantings would be tailored for the existing native vegetative community at each site and native species would be proposed. Opportunities to increase species diversity, within the context of the native community, would be utilized where feasible.

Several BMP conceptual designs include low, landscaped perimeter berms at heights between six and 36 inches to provide additional flood protection during storm events. Berms would be proposed for BMPs where the adjoining property elevations are lower than the peak water surface elevations within the BMPs during the design storm. The need for these berms would be determined as part of final BMP design and based on site-specific topography. Where berms are needed, they would be covered with slope stabilization matting to protect against erosion. The proposed berms would be designed to maintain existing drainage patterns on adjacent properties to the greatest extent practicable, and would incorporate a variety of techniques such as drain tiles, French drains (perforated pipes), swales, and inlets to avoid effects on local hydrology. These systems would be constructed on City property and maintained by DEP.

### *MONITORING AND MAINTENANCE*

DEP's Bluebelt Program has an established monitoring and maintenance program. Based on experiences in the South Richmond Bluebelt, many previously disturbed lands have been restored and transformed into contributing natural and diverse landscapes. However, invasive exotic plants continually pose a threat to BMP landscaping and, consequently, DEP has an active monitoring and maintenance program for constructed BMPs that includes debris removal, especially from all drainage structures, monitoring of new plantings, and replacement of vegetation, as necessary.

### *SANITARY NETWORK*

The majority of the three watersheds have existing sanitary sewer service. However, the proposed amended drainage plans show a completed sanitary system with an increase in size of some existing sanitary sewers from eight inches to the current standard of 10 inches, or relocation of existing sanitary sewers. All collected sanitary wastewater would then be provided secondary treatment at the Oakwood Beach WWTP prior to discharge to Lower Bay.

## **B. IMPACT ANALYSES**

### **INTRODUCTION**

Based on the *CEQR Technical Manual*, DEP's previous reviews of existing Bluebelt projects and the nature of the proposed project, a screening level of analysis was completed for a number of environmental impact technical areas including socioeconomic conditions, community facilities, shadows, solid waste and sanitation services, energy, air quality, greenhouse gases, noise, public health, and neighborhood character. Provided below is a summary of the impact analyses for the other technical areas.

### **LAND USE, ZONING AND PUBLIC POLICY**

The proposed amended drainage plans would not conflict with existing land uses or zoning. Rather, the proposed project would maximize the preservation and restoration of existing natural areas, wetlands and Bluebelt properties while providing stormwater conveyance, flood control and water quality improvements. Segments of mapped but unbuilt streets would need to be demapped in each watershed to accommodate the proposed BMPs. This demapping would support the permanent protection of wetlands and the BMPs. DEP would meet all Uniform Land Use Review Procedure (ULURP) requirements for the proposed demappings, which would also not conflict with local land uses. The zoning map would also be amended to reflect the changes in the City map. Any necessary zoning approvals such as the Special Natural Area District (SNAD), or the Special South Richmond Development District (SSRDD) would also be obtained prior to construction. The proposed project would advance several policies of the City's Waterfront Revitalization Program (WRP) and would be consistent with the City's Comprehensive Waterfront Plan (2011).

Therefore, the proposed project would not result in potential significant adverse impacts to land use, zoning and public policy.

### **OPEN SPACE**

The proposed project requires the construction of BMPs within a number of City and State parklands (see **Table S-1**). Therefore, clearing and grading would be necessary within these parks and all affected areas would be restored as part of the proposed BMP designs. The

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proposed BMPs would also require approvals from DPR and NYSDEC, thus the designs of the proposed BMPs would be coordinated with these agencies for sites located within their respective jurisdictions. DEP would also coordinate with DPR on mitigation plans for all necessary tree removals that would be developed based on final BMP designs, tree surveys and the extent of clearing. DEP would obtain the necessary permits from DPR and NYSDEC for all construction and operational activities within their respective properties.

**Table S-1**  
**Proposed BMPs and Outfalls within Publicly Owned Open Spaces**

<b>BMP or Outfall</b>	<b>Park</b>	<b>BMP Design in Parkland</b>
<b>Oakwood Beach Watershed</b>		
BMP OB-1	Great Kills Park (DPR)	Extended detention wetland
BMP OB-2	Great Kills Park(DPR)	Extended detention wetland
BMP OB-5	Willowbrook Parkway <u>right-of-way</u> (DPR/NYSDOT)	Detention basin and intermittent stream restoration
New Outfall (from BMP OB-1)	Great Kills Park (DPR)	Outfall
Expanded Outfall (adjacent to existing Tysens Street outfall)	Great Kills Park(DPR)	Outfall
Expanded Outfall (adjacent to existing Ebbitts Street outfall)	Great Kills Park(DPR)	Outfall
<b>New Creek Watershed</b>		
BMP NC-1	Reeds Basket Willow Swamp Park (DPR)	Potential streambank stabilization
BMP NC-2	Reeds Basket Willow Swamp Park (DPR)	Velocity attenuator and potential streambank stabilization
BMP NC-3	Reeds Basket Willow Swamp Park(DPR)	Extended detention wetland and potential streambank stabilization
BMP NC-4	Richmond County Country Club (NYSDEC)	Extended detention wetland and potential streambank stabilization
BMP NC-5	Richmond County Country Club (NYSDEC)	Extended detention wetland and potential streambank stabilization
BMP NC-6	Boundary Avenue Parkland (DPR)	Extended detention wetlands
BMP NC-11	Last Chance Pond Park (DPR)	Extended detention wetlands
New Outfall (from BMP NC-10)	FDR Boardwalk and Beach Park (DPR)	Outfall
Expanded Outfall (adjacent to existing Seaview Avenue outfall)	FDR Boardwalk and Beach Park(DPR)	Outfall
<b>South Beach Watershed</b>		
BMP SBE-1A	South Beach Wetlands (DPR)	Extended detention wetlands
BMP SBE-1C	South Beach Wetlands (DPR)	Extended detention wetlands
New Outfall (from BMP SBE-1C)	FDR Boardwalk and Beach Park(DPR)	Outfall
Expanded Outfall (adjacent to existing Quintard Street outfall)	FDR Boardwalk and Beach Park(DPR)	Outfall
Expanded Outfall (adjacent to existing Sand Lane outfall)	FDR Boardwalk and Beach Park(DPR)	Outfall

DEP would coordinate with DPR on the alignment of the “White Trail,” which is a public trail in the vicinity of the proposed BMP OB-5 in the Willowbrook Parkway. If necessary, trail relocation would be incorporated into the final BMP design for OB-5.

The proposed BMPs NC-6: Boundary Avenue and NC-11: Last Chance Pond would be developed within these natural area parks and would modify the habitat cover at these sites (e.g., increasing open water and emergent wetlands), but would not displace any DPR facilities. Finally, the principal park use at both locations (natural area with wetlands) would remain unchanged. Neither BMP would modify any public access or trails or affect any open space user activities at these sites.

No recreational (e.g., golf course) facilities would be impacted at BMPs NC-4 and NC-5, which are proposed in the Richmond County Country Club (NYSDEC property). DEP would coordinate the design of these two BMPs and the associated streambank stabilization with NYSDEC and the operators of the golf course such that the proposed BMP designs support the golf course landscaping (as well as any proposed improvements) and would not conflict with recreational or operational activities at the course.

The proposed project would also install several new and expanded outfalls to the Lower Bay. These outfalls would be below grade and the only above-grade structure at the shoreline edge would not impact public access along the beach nor would they impact public swimming beaches. Installation of the outfalls would require crossing the sandy beach and recreational facilities such as the boardwalk in the FDR Boardwalk and Beach Park. Similar to the proposed BMPs, outfalls across parkland would require a permit from DPR prior to construction and DEP would also need to restore all affected DPR facilities and lands.

Therefore, the proposed project would not result in potential significant adverse impacts to open space.

#### **URBAN DESIGN AND VISUAL RESOURCES**

The proposed BMPs would transform existing views of large common reed monocultures into more visually diverse landscaped settings that would combine open water features with new ecologically valuable landscapes. Views from adjacent streets and private homes would potentially be opened up at street ends where common reed currently obscures views into these sites.

To protect existing trees and woodland stands, final BMP designs would include detailed tree surveys to minimize tree impacts, particularly at those BMP sites where wooded borders are part of the local visual landscape or could potentially screen the BMP site during the early years after initial planting. Most structures at the BMPs would be at or below grade and not be visible. In addition, the proposed lower watershed berms would be landscaped, low-rise features and not visible in views from public streets or private views from adjoining properties. DEP would also develop a tree mitigation plan in coordination with DPR with appropriate locations as close as possible to the proposed BMP sites. Any visually prominent structures within the BMPs would be stone-faced, similar to existing Staten Island Bluebelt designs in South Richmond. Final landscape design objectives for the BMPs would be made to enhance natural features and aesthetics through a diverse planting program. The BMPs would be regularly maintained including the removal of debris and the maintenance of vegetation which would contribute to the local streetscape and visual setting. Brush fires would also be controlled, thereby limiting potential scarring of the landscape typically caused by such events.

The proposed sewers would be below grade with the exception of the outfall headwalls that would be visible only at the shoreline and into the Lower Bay. Thus, the proposed outfalls would not significantly impact views along the public beach.

The proposed modified street grades would not impact view corridors or streetscapes along the affected streets. In addition, the final design of the street cross-sections would be based on site-specific topographic information that would minimize transitions between adjacent private properties and the public street.

Therefore, the proposed project would not result in potential significant adverse impacts to urban design and visual resources.

## NATURAL RESOURCES

### *SURFACE AND GROUNDWATER HYDROLOGY*

The proposed project is expected to reduce local stream flooding that currently adversely impacts local streets and properties. Based on hydrologic and hydraulic mathematical modeling of storm events, the proposed project would not adversely impact the 100-year floodplain, nor would it have any adverse impacts on local surface drainage due to the proposed berms or modified street grades. The proposed project would also not result in any erosive stream velocities downstream of the BMPs nor would it impact the hydrology of Priory Pond, which is located within a NYSDEC preserve (St. Francis Woodlands) in the upper New Creek watershed. While the proposed project is not expected to adversely impact local groundwater flows or the local water table, additional groundwater data would be collected to inform the design of the lower watershed BMPs (see “Mitigation,” below). As part of the proposed amended drainage plans, a DEP drain and portion of overland flow would be eliminated from Brady’s Pond and a new outlet structure would be installed at Cameron’s Lake. Both of these modifications are not expected to change water surface elevations. However, any proposal to remove the existing outfall to Brady’s Pond would not progress without first undertaking a thorough analysis of the potential impacts on the pond hydrology and, as necessary, providing stormwater flows that support the surface water elevations of the pond.

Therefore, the proposed project would not result in potential significant adverse impacts on surface or groundwater hydrology.

### *WATER QUALITY*

The proposed project would not result in potential significant adverse water quality impacts, but would provide pollutant removal through the proposed BMPs by allowing for settling of sediment with some associated reduction in phosphorous loadings from runoff. Reductions in stream velocity and uncontrolled runoff attributable to the proposed BMPs would reduce erosion and sedimentation in local water bodies. In the South Beach watershed, the potential for water quality impacts on Brady’s Pond and Cameron’s Lake were analyzed. The proposed project would not adversely impact these water bodies. At Cameron’s Lake, the proposed outlet stilling basins would have a positive impact on water quality since sediments would be intercepted and the proposed riser box outlet at the south end of the lake would improve circulation in the lake. At Brady’s Pond, outlet stilling basins or infiltration systems are proposed to handle stormwater at the ends of three short streets upgradient from the pond. Both of these alternative designs would remove sediments and the proposed project would not result in any negative impacts on the water quality of Brady’s Pond. However, any proposal to remove the existing outfall to that pond would not progress without first undertaking a thorough analysis of the potential impacts on the pond water quality and, as necessary, providing stormwater flows that support the water quality of the pond.

Therefore, the proposed project would not result in potential significant adverse impacts to surface water quality of the three watersheds or the Lower Bay.

### *WETLANDS*

The proposed project, particularly in the lower elevations of the three watersheds, would substantially enhance and diversify existing wetlands by creating more open water, improving and realigning stream corridors, and creating new ecologically valuable landscapes. The proposed project would also expand the acreage of freshwater wetlands in each watershed through the removal of fill and grading to create extended detention wetlands and new stream corridors (see **Tables S-2a, S-2b, S-3a, S-3b, S-4a and S-4b**). The proposed BMPs would also

provide substantially improved wetlands through improved hydrology, diversified planting programs and new ecological landscapes at each BMP including expanded open water and island habitats in the lower watershed BMPs.

**Table S-2a  
Freshwater Wetland Habitat Impacts: Oakwood Beach Watershed (in acres)**

BMP	Name/ Location	BMP Type	BMP Size (Acres)	Existing Conditions				Conditions with Proposed BMP					Wetland Impacts
				Open Water (ponded or stream corridor)	Common Reed Dominated Wetlands (or previously disturbed)	Wooded Wetlands (a)	Wooded Island/ Upland Edge (a)	Open Water <sup>1</sup>	Permanent Pool <sup>2</sup>	Extended Detention Wetland <sup>3</sup>		Upland Buffers <sup>4</sup>	
										Wooded Wetlands	Emergent Wetlands		
OB-1	Kissam Avenue	Extended Detention Wetland	28.2	1.2	20.3	2.5	4.2	4.5	10.7	2.5	8.0	2.5	+6.38 acres (NYSDEC)/habitat improvements
OB-2	Tysens Lane	Extended Detention Wetland	27.9	0.2	24.0	0.0	3.7	2.6	11.1	0.0	12.0	2.2	-1.68 acres (NYSDEC)/ habitat improvements
OB-3	Riga Street	Extended Detention Wetland; Forebays at storm Sewer outlets	29.0	1.0	22.3	0.0	5.7	4.5	9.7	0.0	11.8	2.3	+4.44 acres (NYSDEC)/habitat improvements
OB-4	Ithaca Street	Pocket Wetland at Hylan Blvd Outfall and Forebays at Other storm sewer outlets with Stream Stabilization	1.4	0.5	0.0	0.0	0.9	0.7	0.3	0.0	0.2	0.2	+0.73 acres (NYSDEC)/ habitat improvements
OB-5	North Railroad Avenue	Stormwater Basin Retrofit and Channel Restoration	3.2	0.0	1.1	0.0	2.1	0.1	0.0	0.0	1.0	2.1	+0.33 acres (NYSDEC)/ habitat improvements
<b>Total</b>												<b>+10.20 acres (NYSDEC) with habitat improvements (</b>	

**Notes:** This table presents the created and enhanced wetlands and upland habitats at each BMP site with the proposed project, as follows:  
(a) Wooded wetlands are palustrine forested wetlands. Wooded islands are elevated islands that rise in elevation above an otherwise Phragmites dominated marsh where the dominant trees species are sumac, oak, black cherry and birch. Upland edge is where the wetlands have transitioned to upland, which at many BMP sites is identifiable by changes in grade and vegetation such as filling at street edges and yards.  
 (1) Open water includes low-flow channels and ponds that would be permanently inundated with no vegetation.  
 (2) Permanent pool habitats are always inundated and have emergent wetland vegetation.  
 (3) Extended detention wetlands are the zones that are flooded in storms and would be occasionally inundated and planted with species that can tolerate periodic inundation/saturation.  
 (4) Upland buffers are defined as the upland perimeters of the BMP sites. Upland buffer zones have trees and shrubs and are typically drier than the extended detention zone.  
**Assumptions made when calculating potential DEC wetland impacts include the net effects of installing the proposed BMPs and the berms at OB-1 and OB-2. The net increase shown above is conservative in that the assumed dimensions for the proposed berms is based on the worst case largest berm in all cases, when there are three possible berm types, two of which would be smaller in size than that assumed in determining these impacts (see also Chapter 1.1. for a description of the proposed berms).**  
**Source:** Hazen and Sawyer, AKRF and DEP, July, 2013.

**Table S-2b**  
**Freshwater Wetland Acreage Impacts: Oakwood Beach Watershed**

<u>BMP</u>	<u>BMP type</u>	<u>Total BMP Size</u>	<u>Portion of BMP within DEC Mapped Wetlands (existing conditions)</u>	<u>Wetland Reductions for Proposed BMP Berms and Structures</u>	<u>Wetland Expansion with Proposed BMP (fill removal or conversion of upland)</u>	<u>Net change in Wetland Acreage (1)</u>	<u>Acreage of Existing Wetlands to be Enhanced with BMP (2)</u>
<u>OB-1: Kissam Avenue</u>	<u>Extended Detention Wetland</u>	<u>28.2</u>	<u>21.82</u>	<u>-0.69</u>	<u>+7.07</u>	<u>+6.38</u>	<u>21.13</u>
<u>OB-2: Tysens Lane</u>	<u>Extended Detention Wetland</u>	<u>27.9</u>	<u>27.9</u>	<u>-1.68</u>	<u>N.A.</u>	<u>-1.68</u>	<u>26.22</u>
<u>OB-3: Riga Street</u>	<u>Extended Detention Wetland; Forebays at Sewer Discharges</u>	<u>29.0</u>	<u>24.31</u>	<u>-0.25</u>	<u>+4.69</u>	<u>+4.44</u>	<u>24.06</u>
<u>OB-4: Ithaca Street</u>	<u>Pocket Wetland at Hylan Blvd Outfall and Forebays at Other Sewer Discharges with Stream Stabilization</u>	<u>1.4</u>	<u>0.7</u>	<u>0</u>	<u>+0.73</u>	<u>+0.73</u>	<u>0.7</u>
<u>OB-5: North Railroad Avenue</u>	<u>Stormwater Basin Retrofit and Channel Restoration</u>	<u>3.2</u>	<u>2.86</u>	<u>-0.01</u>	<u>+0.34</u>	<u>+0.33</u>	<u>2.85</u>
<b><u>Total</u></b>						<b><u>+10.20 acres (NYSDEC wetlands)</u></b>	
<p><b><u>Notes:</u></b> (1) Quantification does not take into account the qualitative wetland enhancement. (2) Improvements in common reed dominated (<i>phragmites</i>) or otherwise degraded wetlands and exclusive of berms and structures.</p> <p><b><u>Sources:</u></b> Hazen and Sawyer, AKRF, DEP, April, 2013.</p>							

**Table S-3a**  
**Freshwater Wetland Habitat Impacts: New Creek Watershed**  
**(in acres)**

BMP	Name/ Location	BMP Type	BMP Size (Acres)	Existing Conditions				Conditions with Proposed BMP					Wetland Acreage Impacts
				Water Area (ponded or stream corridor)	Emergent Common Reed wetlands or previously disturbed	Wooded Wetlands (a)	Upland edge (a)	Open Water <sup>1</sup>	Permanent Pool <sup>2</sup>	Extended Detention <sup>3</sup>		Buffers <sup>4</sup>	
										Wooded wetlands	Emergent Wetlands		
NC-1	Merrick Avenue	Velocity attenuator and drop pipe	0.1	0.0	0.0	0.1	-	0.1	0.0	0.0	0.0	0.0	No change in wetland acreage or habitat quality
NC-2	Ocean Terrace	Velocity attenuator and drop pipe	0.1	0.0	0.0	0.1	-	0.1	0.0	0.0	0.0	0.0	No change in wetland acreage or habitat quality
NC-3	Annfield Court	Extended detention wetland and stream stabilization	0.3	0.0	0.0	0.3	-	0.1	0.1	0.0	0.1	0.0	-0.01 wetland acres/No change in wetland quality
NC-4	Whitlock Avenue	Extended detention wetland and detention chamber	0.3	0.0	0.16	0.0	-	0.1	0.1	0.0	0.1	0.0	+0.12 acres NYSDEC wetlands (+.04 acres for NWI wetlands) with redirection of stormwater from existing drainage swale)
NC-5	Todt Hill Road	Extended detention wetland	0.8	0.0	0.1	0.0	0.7	0.1	0.1	0.0	0.3	0.2	+0.72 acres NYSDEC wetlands (+.67 acres for NWI wetlands) with redirection of stormwater from existing drainage swale
NC-6	Boundary Avenue	Extended detention wetland	3.0	0.2	0.0	1.6	1.6	0.9	0.3	0.0	1.1	0.7	+3.0 acres NYSDEC wetlands (+1.6 acres for NWI wetlands)
NC-7	Nugent Street	Extended detention wetland, flood plain creation and stream realignment	4.7	0.1	3.5	0.0	1.1	0.5	1.0	0.0	2.7	0.5	Stream relocation (-0.54 existing NYSDEC wetland acreage)/wetland habitat improvements
NC-8	Freeborn Street	Extended detention wetland, flood plain creation and stream realignment	0.7	0.0	0.2	0.0	0.5	0.1	0.2	0.0	0.3	0.1	Stream relocation (-0.34 NYSDEC wetland acreage)/wetland habitat improvements
NC-9	Graham Boulevard	Extended detention wetland, flood plain creation and stream realignment	4.4	0.1	3.5	0.0	0.8	0.5	1.3	0.0	2.2	0.4	Stream relocation (-1.08 NYSDEC wetland acreage)/wetland habitat improvements
NC-10	Jefferson Ave	Extended detention wetland and new ocean outfall	4.5	0.2	2.3	0.0	2.0	0.4	1.0	0.0	2.5	0.6	Stream relocation (-0.84 NYSDEC wetlands acreage)/wetland habitat improvements

**Table S-3a (cont'd)**  
**Freshwater Wetland Habitat Impacts: New Creek Watershed**  
**(in acres)**

BMP	Name/ Location	BMP Type	BMP Size (Acres)	Existing Conditions				Conditions with Proposed BMP					Wetland Acreage Impacts
				Open Water (ponded or stream corridor)	Emergent Common Reed wetlands or previously disturbed	Wooded Wetlands (a)	Upland edge (a)	Open Water <sup>1</sup>	Permanent Pool <sup>2</sup>	Extended Detention <sup>3</sup>		Buffers <sup>4</sup>	
										Wooded Wetlands	Emergent Wetlands		
NC-11	Last Chance Pond	Extended detention wetland	10.0	1.3	2.3	3.75	2.65	3.2	1.4	0.53	2.8	2.07	Modification of existing wetland/No change in existing NYSDEC or NWI wetland acreage
NC-12	Joyce Street	Outlet stilling basin	0.1	0.0	-0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	-0.01 wetland acres/No change in wetland quality
NC-13	Hylan Boulevard	Extended detention wetland	2.9	0.2	1.35	0.0	1.35	0.4	0.7	0.0	1.0	0.8	Stream relocation (-0.10 wetland acreage)/ wetland habitat improvements
NC-14	Meadow Place	Outlet stilling basins	0.2	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	No change in acreage or habitat
NC-15	Laconia Avenue	Outlet stilling basin	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	No change in acreage or habitat
NC-16	Olympia Boulevard	Extended detention wetland	12.0	0.7	8.3	0.0	3.0	1.1	3.4	0.0	5.9	1.6	Stream relocation -0.02 wetland acres/ wetland habitat improvements
NC-17	Slater Boulevard	Extended detention wetland flood plain creation and stream realignment	9.7	0.6	6.7	0.0	2.4	1.0	2.9	0.0	4.4	1.4	Stream relocation (-0.42 wetland acreage)/ wetland habitat improvements
NC-18	Patterson Avenue	Extended detention wetland	8.4	0.1	5.6	1.0	1.7	0.6	1.3	1.0	3.9	1.6	Stream relocation (+3.82 NYSDEC and NWI wetlands) with habitat improvements
NC-19	Buel Avenue	Outlet Stilling Basin	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	No change in acreage or habitat
N/A	Mason Avenue Stream Segment (to be replaced by storm sewer)	Piping of existing stream flow	N/A	0.2				--	--		N/A	--	-0.2 acres (NYSDEC) and -0.2 (NWI)
<b>Total</b>												<b>+4.10 acres (NYSDEC) with habitat improvements</b>	

**Notes:** This table presents the existing conditions as well as the created and enhanced wetlands and upland habitats at each proposed BMP sites. Definitions include the following:  
 (a) Wooded wetlands are palustrine forested wetlands. Upland edge is where the wetlands have transitioned to upland, which at many BMP sites is identifiable by changes in grade and vegetation such as filling at street edges and yards.  
 (1) Open water includes low-flow channels and ponds that would be permanently inundated with no vegetation.  
 (2) Permanent pool habitats are always inundated and have emergent wetland vegetation.  
 (3) Extended detention wetlands are the zones that are flooded in storms and would be occasionally inundated and planted with species that can tolerate periodic inundation/saturation.  
 (4) Buffers are defined as the upland perimeters of the BMP sites. Upland buffer zones have trees and shrubs and are typically drier than the extended detention zone.  
**Assumptions made when calculating potential DEC wetland impacts include the net effects of installing berms at the proposed BMPs NC-7, NC-8, NC-9, NC-10, NC-13, and NC-17. The net increase shown above is conservative in that the assumed dimensions for the proposed berms is based on the worst case largest berm in all cases, when there are three possible berm types, two of which would be smaller in size than that assumed in determining these impacts (see also Chapter 1.1. for a description of the proposed berms).**  
**Source:** Hazen and Sawyer and AKRF, DEP July 2013.

**Table S-3b**  
**Freshwater Wetland Acreage Impacts: New Creek Watershed**

<b>BMP</b>	<b>BMP type</b>	<b>Total BMP Size</b>	<b>Portion of BMP within DEC Mapped Wetlands (existing conditions)</b>	<b>Wetland Reductions for Proposed BMP Berms and Structures</b>	<b>Wetland Expansion with Proposed BMP (fill removal or conversion of upland)</b>	<b>Net change in Wetland Acreage (1)</b>	<b>Acreage of Existing Wetlands to be Enhanced with BMP (2)</b>
NC-1: Merrick Avenue	Velocity attenuator and drop pipe	0.1	0.1	N.A.	N.A.	0.0	0.0
NC-2: Ocean Terrace	Velocity attenuator and drop pipe	0.1	0.1	N.A.	N.A.	0.0	0.0
NC-3: Annfield Court	Extended detention wetland and stream stabilization	0.3	0.3	-0.01	N.A.	-0.01	0.0
NC-4: Whitlock Avenue	Extended detention wetland and detention chamber	0.3	0.16	0.0	+0.12	+0.12	0.16
NC-5: Todd Hill Road	Extended detention wetland	0.8	0.03	N.A.	+0.75	+0.72	0.0
NC-6: Boundary Avenue	Extended detention wetland	3.0	0.0	N.A.	+3.0	+3.0	0.0
NC-7: Nugent Street	Extended detention wetland, flood plain creation and stream realignment	4.7	4.7	-0.54	N.A.	-0.54	4.2
NC-8: Freeborn Street	Extended detention wetland, flood plain creation and stream realignment	0.7	0.7	-0.34	N.A.	-0.34	0.36
NC-9: Graham Boulevard	Extended detention wetland, flood plain creation and stream realignment	4.4	4.4	-1.08	N.A.	-1.08	3.3
NC-10: Jefferson Avenue	Extended detention wetland and new ocean outfall	4.5	4.5	-0.84	N.A.	-0.84	3.6
NC-11: Last Chance Pond	Extended detention wetland	10.0	10.0	0.0	N.A.	0.0	+6.22
NC-12: Joyce Street	Outlet stilling basin	0.1	0.1	-0.01	N.A.	-0.01	0.0
NC-13: Hylan Boulevard	Extended detention wetland	2.9	2.65	-0.35	+0.25	-0.10	2.5
NC-14: Meadow Place	Outlet stilling basins	0.2	0.2	N.A.	N.A.	0.0	0.0
NC-15: Laconia Avenue	Outlet stilling basin	0.1	0.1	N.A.	N.A.	0.0	0.0
NC-16: Olympia Boulevard	Extended detention wetland	12.0	12.0	-0.02	N.A.	-0.02	11.3
NC-17: Slater Boulevard	Extended detention wetland flood plain creation and stream realignment	9.7	9.7	-0.42	N.A.	-0.42	9.1
NC-18: Patterson Avenue	Extended detention wetland	8.4	4.6	-0.01	+3.83	+3.82	4.4
NC-19: Buel Avenue	Outlet Stilling Basin	0.1	0.1	N.A.	N.A.	0.0	0.0
Mason Avenue Stream Segment (to be replaced by storm sewer)	Piping of existing stream flow	N/A	Stream Corridor	-0.20	N.A.	-0.20	N.A.
<b>Total</b>						<b>+4.10 acres (NYSDEC)</b>	
<b>Notes:</b> (1) Quantification does not take into account the qualitative wetland enhancement. (2) Improvements in common reed dominated ( <i>phragmites</i> ) or otherwise degraded wetlands and exclusive of berms and structures. Does not include portion of BMP currently occupied by stream channel.							
<b>Sources:</b> Hazen and Sawyer_AKRF_DEP_April_2013.							

**Table S-4a**  
**Freshwater Wetland Habitat Impacts: South Beach Watershed**  
**(in acres)**

BMP	Name/ Location	BMP Type	BMP Size (Acres)	Existing Conditions				Conditions with Proposed BMP					Wetland Acreage Impacts
				Water Area (ponded or stream corridor)	Emergent Common Reed wetlands or previously disturbed	Wooded Wetlands (a)	Upland edge (a)	Open Water <sup>1</sup>	Permanent Pool <sup>2</sup>	Extended Detention Wetland		Buffers <sup>4</sup>	
										Wooded wetlands	Emergent Wetlands		
SBE-1A	Quintard Street	Extended Detention Wetland	18.6	0.2	13.9	0.0	4.5	1.7	6.5	0.0	8.1	2.3	+4.08 acres with habitat improvements
SBE-1B	Sand Lane	Extended Detention Wetland	23.2	2.1	11.6	2.0	7.5	2.3	9.3	2.0	9.2	2.4	+3.59 acres with habitat improvements
SBE-1C	McLaughlin Street	Extended Detention Wetland	0.6	0.0	0.3	0.0	0.3	0.1	0.1	0.0	0.3	0.1	-.02 wetland acres with habitat improvements
SBE-2A	Windermere Road	Forebay	0.2	0.1	0.0	0.0	0.1	N/A	N/A	0.0	N/A	N/A	No change in wetland acreage (removal of fill)
SBE-2B	Allendale Road	Forebay	0.2	0.1	0.0	0.0	0.1	N/A	N/A	0.0	N/A	N/A	No change in wetland acreage
SBE-2C	Normalee Road	Forebay	0.2	0.1	0.0	0.0	0.1	N/A	N/A	0.0	N/A	N/A	-.02 wetland acres
SBE-3	Whitney Woods	Extended detention and perimeter treatment	1.2	0.0	0.0	0.0	1.2	0.1	0.1	0.5	0.0	0.5	-.02 wetland acres with habitat improvements
<b>Total</b>												<b>+7.61 acres (DEC Wetlands) with habitat Improvements</b>	

**Notes:** This table presents the existing conditions as well as the created and enhanced wetlands and upland habitats at each proposed BMP sites. Definitions include the following:

(a) Wooded wetlands are palustrine forested wetlands. Upland edge is where the wetlands have transitioned to upland, which at many BMP sites is identifiable by changes in grade and vegetation such as filling at street edges and yards.

(1) Open water includes low-flow channels and ponds that would be permanently inundated with no vegetation.

(2) Permanent pool habitats are always inundated and have emergent wetland vegetation.

(3) Extended detention wetlands are the zones that are flooded in storms and would be occasionally inundated and planted with species that can tolerate periodic inundation/saturation.

(4) Buffers are defined as the upland perimeters of the BMP sites. Upland buffer zones have trees and shrubs and are typically drier than the extended detention zone.

**Assumptions made when calculating potential DEC wetland impacts include the net effects of installing the proposed BMPs SBE-1A and 1C and the berms. The net increase shown above is conservative in that the assumed dimensions for the proposed berms is based on the worst case largest berm in all cases, when there are three possible berm types, two of which would be smaller in size than that assumed in determining these impacts (see also Chapter 1.1. for a description of the proposed berms).**

**Source:** Hazen and Sawyer and AKRF, DEP, July 2013.

**Table S-4b**

**Freshwater Wetland Acreage Impacts: South Beach Watershed**

BMP	BMP type	Total BMP Size	Portion of BMP within DEC Mapped Wetlands (existing conditions)	Wetland Reductions for Proposed BMP Berms and Structures	Wetland Expansion with Proposed BMP (fill removal or conversion of upland)	Net change in Wetland Acreage (1)	Acreage of Existing Wetlands to be Enhanced with BMP (2)
SBE-1A: Quintard Street	Extended Detention Wetland	18.6	14.0	-0.58	+4.66	+4.08	13.42
SBE-1B: Sand Land	Extended Detention Wetland	23.2	19.03	-0.58	+4.17	+3.59	16.45
SBE-1C: McLaughlin Street	Extended Detention Wetland	0.6	0.6	-0.02	N.A.	-0.02	0.58
SBE-2A: Windmere Road	Forebay	0.2	0.2	0.0	N.A.	0.0	0.0
SBE-2B: Allendale Road	Forebay	0.2	0.2	0.0	N/A	0.0	0.0
SBE-2C: Normalee Road	Forebay	0.2	0.2	-0.02	N/A	-0.02	0.0
SBE-3: Whitney Woods	Extended detention and perimeter treatment	1.2	1.2	-0.02	N.A.	-0.02	0.5
<b>Total</b>						<b>+7.61 acres (DEC Wetlands)</b>	
<b>Notes:</b> (1) Quantification does not take into account the qualitative wetland enhancement. (2) Improvements in common reed dominated ( <i>phragmites</i> ) or otherwise degraded wetlands and exclusive of berms and structures. Does not include portion of BMP currently occupied by open water and ponds.							
<b>Sources:</b> Hazen and Sawyer, AKRF, DEP, April, 2013.							

In some cases, existing wetlands are impacted through the added fill of the proposed berm. However, in all watersheds, the proposed BMPs would increase wetland acreage at a watershed level, expand water area and improve and diversify habitats. Final BMP designs would also incorporate existing high value habitats (such as small ponds, existing wooded edges and secluded hummocks, stands of native wetland vegetation) and would minimize or avoid impacts to these habitats while integrating them into the proposed BMP designs. The proposed project would require the conversions of about 5.46 acres of wooded wetlands to open water wetlands. This wooded wetland loss would be mitigated through the creation of forested wetlands (see the discussion below).

#### VEGETATION AND TREES

The lower watersheds are characterized by small woodland stands and individual, stand-alone trees that may be cleared by the proposed project, particularly where some proposed BMP sites have wooded borders and hummocks (e.g., OB-1, NC-16). To avoid and protect these existing trees to the greatest extent possible final BMP designs would include site-specific survey details for the purposes of minimizing tree clearing, particularly at sites where wooded borders could potentially provide ecological benefits and support the diversity of the proposed BMP habitats. DEP would also develop a mitigation plan for all necessary tree removals that would be necessary to install the BMPs (see also “Mitigation,” below). Although the habitats are more wooded in the upper watersheds, the proposed project would have a minimal impact on woodlands and trees. BMPs in the upper watershed are smaller and sited primarily outside of wooded areas; thus, clearing impacts on woodlands and trees would be limited. In addition, final BMP designs would be developed in conjunction with DPR and NYSDEC for BMPs that are

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proposed on lands within the jurisdiction of these agencies. Final BMP designs would also seek to avoid specimen trees as well as important woodland habitats.

The two largest areas of woodlands that would have to be removed for the proposed project are at BMPs: NC-6: Boundary Avenue and NC-11: Last Chance Pond. At these sites, based on preliminary design and detailed site survey with a tree inventory, the clearing and grading of approximately nine acres of upland and wet woods would be necessary in order to create the proposed BMPs and to provide the upstream detention of stormwater that would, in turn, reduce flooding in the lower watershed. A total of 856 trees with a caliper of four inches or greater (617 at NC-11 and 239 at NC-6) would have to be removed. Given that a sizable area of woodland and trees would need to be cleared on these parklands, DEP would coordinate with DPR during design phases to minimize the total extent of tree impacts and develop a tree mitigation plan under Local Law 3 of 2010, concerning replacement or payment for any and all trees removed from City property. (see also “Mitigation,” below). In, addition, the proposed BMP planting programs include ongoing maintenance and monitoring by DEP.

### *WILDLIFE*

The proposed project is expected to have beneficial impacts for wildlife including avian and water-dependent species through the expanded wetlands and improved habitats of the BMPs. Regarding any protected wildlife or plant species that have been identified at the BMP sites, the proposed project would include a number of mitigation measures to avoid impacts to protected species (see also “Mitigation,” below).

The proposed project would widen and improve the overall hydrologic functions of the streams in each watershed and would also improve water quality and aquatic habitats because of increased stormwater inputs that would be filtered by the proposed BMPs. The proposed project would also provide a greater variety of aquatic habitats, including lengthened shorelines and deep pools that would support fish that have been reported in Mid-Island. This would in turn support foraging wading birds. Therefore, the proposed project would provide multiple benefits for aquatic resources in the Mid-Island watersheds by converting degraded wetlands and highly stressed streams into enhanced habitats for aquatic resources. In addition, to avoid any potential impacts on fishery resources, the proposed project would incorporate design features that allow for fish passage and movement along the channels of the lower watershed (see also “Mitigation,” below).

In the absence of the proposed project, hydrology and water quality conditions in the Mid-island watersheds would be expected to further decline due to uncontrolled runoff and the absence of habitat restoration.

By providing open water, removing common reed and installing maintenance access ways, the proposed project would also reduce potential for brush fires and provide firebreaks against the spread of brushfires that effect wildlife habitat.

### *TIDAL WETLANDS*

The proposed project includes a tidal wetland restoration plan due to the impacts that would occur as a result of the proposed new and expanded outfalls. Table S-5 summarizes the potential impacts on tidal wetlands due to the proposed project. Assuming two acres of replacement wetlands for every acre of wetland lost, the total tidal wetland mitigation area needed for the proposed project is 1.2 acres. For the purposes of offsetting this wetland loss, DEP has identified potential wetland restoration sites for expanded tidal wetlands in Crescent Beach Park and at the

mouth of the Oakwood Beach stream system next to the Oakwood Beach Wastewater Treatment Plant on property owned by the National Park Service (NPS) as part of the GNRA (see “Mitigation,” below). Therefore, the proposed project would mitigate the potential significant adverse impacts to tidal wetlands.

**Table S-5  
Areas of Tidal Wetland Impacts with Proposed Outfalls**

Outfall	Linear Feet Below the Water Line	Width of Pipe (feet)	Estimated Area of Permanent Impact From Outfall Structure (square feet)	Width of Outfall Corridor (feet)
<b>Oakwood Beach Watershed</b>				
BMP OB-2 outfall (new outfall)	800	10	8,000	40
Ebbitts Avenue (expanded outfall)	175	5	875	Within existing outfall corridor
Tysens Lane (expanded outfall)	510	8	4,080	Within existing outfall corridor
<b>New Creek Watershed</b>				
BMP NC-10 outfall (new outfall)	50	8	400	40
Seaview Avenue (expanded outfall)	250	14	3,500	Within existing outfall corridor
<b>South Beach Watershed</b>				
SBE-1C	50	2	100	35
Quintard Street/Ocean Breeze Park (expanded outfall)	340	15	5,100	Within existing outfall corridor
Sand Lane (expanded outfall)	320	13	4,160	Within existing outfall corridor
<b>Total</b>			<u>26,215 sq.ft. (0.60 acres)</u>	
<b>Notes:</b> Areas determined based on proposed drainage plan designs and aerial photographs for the watershed with new outfalls extended to bulkhead line and supplemental outfalls extended to length of existing outfall. Area of wetland impact not adjusted for depth of water greater than six feet. For work within existing outfall corridors the work area is assumed to be 20 feet wide.				

## WATER AND SEWER INFRASTRUCTURE

### SANITARY SEWERS

With the proposed project, all wastewater generated in the three watersheds would be conveyed to the Oakwood Beach WWTP for treatment prior to discharge. This added flow would not adversely impact the WWTP. In order to avoid impacts to sanitary sewers, the proposed project would relocate two segments of sanitary sewers that currently extend across the site of the proposed BMP SBE-1A. With this relocation, the sanitary sewer system would not be adversely impacted by the proposed stormwater detention at the proposed BMP SBE-1A.

### STORMWATER MANAGEMENT

The proposed project would not introduce any new development or impervious surface coverage that would generate runoff. Rather, it would improve local stormwater management through the installation of stormwater collection sewers, BMPs and new or enlarged outfalls. The proposed BMPs would be designed to handle the City’s design storm for stormwater management. They

would be important elements of the City's drainage system and, in conjunction with the storm sewers, key elements in the City's infrastructure. Therefore, the proposed project would not result in potential significant adverse impacts to storm sewer infrastructure.

## **TRANSPORTATION**

### *TRAFFIC*

The proposed project would not impact traffic conditions. With the proposed street demappings, site access would be maintained to all privately held properties. The proposed BMPs would not eliminate the potential completion of any major east and west collector streets should that need arise in the future, but would affect only limited segments of local collector streets that would no longer be necessary since the adjoining lands would be preserved under the Bluebelt Program. Thus, the proposed project would not adversely impact any through or local traffic circulation, but would preserve the lightly traveled local streets that characterize the lower watershed. In addition, the mapped but unbuilt Willowbrook Parkway is not expected to be constructed in the future and, therefore, the proposed BMP at this site would not conflict with State plans to develop the parkway. Therefore, the proposed project would not result in potential significant impacts to traffic.

### *PARKING, TRANSIT AND PEDESTRIANS*

The proposed project would not modify any local parking regulations, nor would it eliminate any existing on-street parking or generate new added parking demand. The proposed project would not place any added demands on transit facilities in the proposed project area as it would not generate any transit trips. It would also not result in any long term (operational) impacts on transit facilities, as the proposed project would not permanently impact any local streets served by these facilities. The proposed project would not affect any pedestrian facilities such as sidewalks or crosswalks. Therefore, the proposed project would not result in potential significant adverse impacts to parking, transit and pedestrians.

## **GROWTH INDUCING ASPECTS**

The three watersheds are, for the most part, fully developed with very little vacant land; thus, no significant additional growth is projected in the future without the proposed project. Moreover, the potential for future development is constrained due to limitations on vacant land and the presence of wetlands. Therefore, the proposed project would not result in any potential significant adverse impacts related to growth inducing impacts.

## **CONSTRUCTION IMPACTS**

### *LAND USE, ZONING, AND PUBLIC POLICY*

Any potential disruptions due to construction would be temporary and would not result in any land use impacts. Construction would also not conflict with local zoning or public policies nor would it displace any existing uses. Therefore, the proposed project would not result in potential significant adverse impacts to land use, zoning or public policy during construction.

### *OPEN SPACE*

Temporary disruptions in parks are expected due to construction-period activities such as clearing and grading and the associated vehicular traffic and noise. During construction, public access would be limited in the affected natural area parks. These disruptions would be temporary and short-term (9 to 18 months) and similar to park reconstruction projects with the affected

areas restored by DEP, as part of the final stage of construction. The proposed project would also implement a noise control plan and air quality protection measures so that park users in the vicinity of the construction area are not impacted. A permit would be obtained from DPR for activities in City parklands and from NYSDEC for activities in state parklands, which would require the implementation of measures to minimize park disruptions along with tree protection and replacement. In areas with recreational facilities (such as in FDR Boardwalk and Beach Park) that may be affected by proposed construction, the proposed project would need to restore all structures to pre-construction conditions. With these measures in place, the proposed project would not result in potential significant adverse impacts to open space due to construction.

#### *HISTORIC AND CULTURAL RESOURCES*

A Phase IA archaeology study was conducted for each watershed to determine if the proposed project would potentially impact any archaeological resources. Based on a review by the Landmarks Preservation Commission (LPC), portions of several proposed BMPs (OB-2, NC-4 NC-6, and SBE-2C) contain discrete areas of precontact archaeological sensitivity. Therefore, Phase IB archaeological testing would be performed at these sites and the Phase IB report would be submitted to LPC for review and approval. Recommendations from the Phase IB report would be incorporated into the proposed final BMP designs, as necessary, and implemented as part of project construction. Therefore, the proposed project would not result in potential significant adverse impacts to archaeological resources.

With respect to historic architectural resources, the proposed BMPs would not have any adverse impacts. DEP would coordinate with DPR in the design of the proposed expanded outfalls across the site of the Cedar Grove Beach Club to avoid any impacts on any potential historic features at this location. Therefore, the proposed project would not result in potential significant adverse impacts to historic and cultural resources.

#### *NATURAL RESOURCES*

##### *Surface Water Hydrology*

Certain BMPs would require temporary stream diversions during construction. To minimize or avoid hydrology impacts during construction, stream diversion strategies would be implemented and, in all cases, stream flow capacity would be maintained. Therefore, the proposed project would not result in potential significant adverse impacts on hydrology during construction.

##### *Groundwater*

Storm sewer construction may require dewatering in areas of shallow groundwater, particularly in the lower watersheds. Should dewatering be necessary, pumped groundwater would be discharged to surface waters or a City sewer line only after collection and treatment. The volume of pumped groundwater would vary depending upon the location. However, in all cases, pumping would be contained. Therefore, the proposed project would not result in potential significant adverse impacts to groundwater during construction.

##### *Water Quality*

Standard Bluebelt practice is to implement a range of water quality protection measures during construction including construction-limiting fencing, portable sediment tanks during dewatering, temporary sediment traps and/or basins to capture sediment from runoff, and dewatering operations along with any site-specific additional measures that may arise during the State Pollutant Discharge Elimination System (SPDES) permitting process. These protection measures are

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typically incorporated into the specifications of the construction documents. Therefore, the proposed project would not result in potential significant adverse impacts to water quality during construction.

### *Wetlands*

Nearly all BMP sites would involve activities within or adjacent to wetlands. Construction activities would, therefore, be required to meet wetland and buffer area protection regulatory requirements. Construction activities would be contained within a delineated area of disturbance at each BMP site. After the final stage of construction, all disturbed areas would be restored based on the proposed BMP designs. Wetlands adjacent to the area of disturbance would also be protected during construction. Any construction staging areas not located within a BMP footprint would also need to be restored to pre-construction conditions. These staging areas would only be located in upland areas and not sited in wetlands. Therefore, the proposed project would not result in potential significant adverse impacts to wetlands or adjacent areas during construction.

### *Vegetation and Trees*

Most proposed BMP sites, with the exception of BMP NC-6 and BMP NC-11, would require only minor tree clearing in either Bluebelt property or City parkland. To avoid indirect or unintended tree damage, a number of protection measures would be applied during staging and construction. DPR permits for activities in parklands would include standard tree protection measures. With these measures in place, the proposed project would not result in potential significant adverse impacts to trees during construction.

### *Wildlife*

Temporary construction-period impacts are expected for wildlife that would abandon or avoid construction areas. Because the proposed BMPs would be implemented over many years with multiple capital projects, these disruptions would be incremental in each watershed, as each BMP is constructed. In addition, project phasing would allow for new BMPs to become established as wildlife havens before others enter construction. Therefore, temporary displacement of wildlife would not be simultaneous and would instead occur over decades, with habitat benefits accruing after construction. Therefore, the proposed project would not result in potential significant adverse impacts to wildlife during construction.

### *Fisheries and Other Aquatic Biota*

The proposed project would involve in-water activities at the BMP and outfall sites. This would result in limited, short-term, construction related disturbances to aquatic biota such as fish and other aquatic resources. Construction areas for outfalls would be limited so as to reduce disturbance to benthic communities. In all cases, disturbance to these habitats would be temporary, contained within the immediate area of the proposed construction activity, and protection measures would be implemented as part of the proposed project (e.g., silt curtains and erosion control). The proposed project would also incorporate, as necessary, additional measures that may be identified during the permitting process for each capital project to protect aquatic habitats during construction. DEP's Staten Island Bluebelt Program also has construction specifications for the rescue of wildlife, including fish, that may be necessary to avoid impacts or that may be required during the project permitting process. Therefore, the proposed project would not result in potential significant adverse impacts to aquatic resources during construction.

### *HAZARDOUS MATERIALS*

The proposed project would involve disturbing soil and groundwater at sites where prior uses or testing have indicated the potential presence of hazardous materials. At all of these sites, the proposed project would implement additional site testing as needed along with a Construction Health and Safety Program (CHASP) and Remedial Action Plan (RAP). In addition, all excavated soil would need to be handled, managed and disposed of in accordance with all City, state, and federal regulations. If any dewatering is necessary during construction and discharge to sanitary sewers is proposed, the residual water would need to meet DEP standards for discharge to a City sanitary line and pretreatment would need to be performed as necessary. If residual water is proposed to be discharged to a stream or waterway, it would need to meet NYSDEC SPDES standards for such discharges. Therefore, the proposed project would not result in potential significant adverse impacts with respect to hazardous materials during construction.

### *SOLID WASTE AND SANITATION SERVICES*

The proposed construction activities would generate minimal solid waste. Cut trees and vegetation would be mulched and may be reused on Bluebelt properties. Boulders unearthed during excavation would be used by DEP for perimeter security at Bluebelt sites. Vegetative waste, including logs and shrubs, would be recycled or disposed of in accordance with City regulations. Therefore, the proposed project would not result in potential significant adverse impacts to solid waste and sanitation services during construction.

### *TRANSPORTATION*

#### *Traffic*

The proposed project would generate trips from workers traveling to and from the site and from the movement of goods and equipment. The estimated average number of construction workers at any one time would vary, depending on the stage of construction with more intensive periods averaging 20 to 25 individuals. Given the limited number of employee trips and that the typical construction workday begins and ends during off-peak travel times, no traffic impacts from worker vehicles are expected. Temporary increases in vehicular traffic during construction would not be expected to exceed the *CEQR Technical Manual* thresholds. Therefore, the proposed project would not result in potential significant adverse traffic impacts from worker vehicles during construction.

Truck traffic would also be dispersed throughout the weekday and generally between the hours of 7:30 AM and 3:30 PM with only a limited number of trips during traditional peak traffic hours. As stated above, sewer installation, BMP, and outfall work would be the more truck intensive phases of construction and would generate 15-25 truck trips per day. Any potential truck traffic increases associated with construction would be temporary and of short duration. Therefore, the proposed project would not result in potential significant adverse impacts from truck traffic generated during construction.

Sewer installation would require work in local streets during which traffic patterns would be temporarily affected. Sewer installation would proceed along various segments throughout the proposed project area and the contractor would be required to restore the street to full use at the end of each day to allow for free flow of traffic. All construction activities would require an open traffic lane for the maintenance and protection of traffic as well as a plan for the safe movement of traffic through the construction zone. These activities would also be subject to

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DOT approval under a street and sidewalk construction permit. Therefore, the proposed project would not result in potential significant adverse impacts to traffic during construction.

### *Parking*

On-street parking would be temporarily affected along streets under construction, but would not result in displacement of large numbers of on-street parking spaces. Typically no more than 20 to 30 on-street parking spaces would be affected during the intensive sewer construction activities. Construction workers may park on the local streets; however, the limited number of workers would not result in a shortfall of on-street parking. Therefore, the proposed project would not result in potential significant adverse impacts to parking during construction.

### *Transit*

Certain phases of construction may temporarily affect local bus service during in-street work. To the extent that any bus stops need to be temporarily relocated, this would be coordinated with DOT and the MTA. Proposed BMP OB-5 would involve construction beneath the Staten Island Railway overpass and would not result in any disruptions to rail service. Therefore, the proposed project would not result in potential significant adverse impacts to transit during construction.

### *Pedestrians*

The proposed project would require temporary sidewalk closures and diversions would be provided as necessary along with the appropriate protection measures and signage. All sidewalks and pedestrian paths would be restored post-construction and sidewalk closures would be subject to DOT approval. Therefore, the proposed project would not result in potential significant adverse impacts to pedestrian traffic during construction.

## **AIR QUALITY**

### *Mobile Source Emissions*

Any localized increases in mobile source emissions due to construction would not be significant. Construction activities would be subject to New York City Local Law 77, which requires the use of Best Available Technology (BAT) for equipment at the time of construction.

### *Fugitive Dust*

Most fugitive construction dust is comprised of large-sized particles that settle a short distance from the source. Fugitive dust is also regulated under the City code which requires all appropriate control measures be used in accordance with Section 1402.2-9.11 of the New York City Air Pollution Code. These measures include, but are not limited to: use of water to suppress dust; covering open-body trucks transporting materials; and prompt removal of earth or other material from paved streets. Therefore, the proposed project would not result in potential significant adverse impacts to air quality during construction.

## **NOISE AND VIBRATIONS**

Construction activities would result in localized temporary noise increases due to equipment and vehicles. Noise levels at a given receptor would depend on the number and types of construction equipment being operated, distance from the construction site and any attenuation effects. Construction noise is regulated by the City's Noise Control Code (Local Law 113) and the EPA noise emission standards for construction equipment. These requirements mandate that certain classifications of construction equipment and vehicles meet specified noise emissions standards. In addition, except under exceptional circumstances, construction activities must be limited to

weekdays between the hours of 7:00 AM and 6:00 PM. All noise control measures and a noise control plan would be included in the contract documents as contractor requirements. During more intensive vibration activities such as pile driving, monitoring may be used to determine if vibration levels are potentially damaging to nearby structures. Therefore, the proposed project would not result in potential significant adverse noise or vibration impacts during construction.

### **C. ALTERNATIVES**

Five alternatives to the proposed project were examined: a No Action Alternative, which assumes none of the Mid-Island proposed amended drainage plans move forward; a Conventional Piped Sewer System Alternative, which assumes full implementation of the current drainage plan (the Potter Plan); an amended drainage plan alternative that eliminates upstream extended detention at BMPs NC-6 and NC-11; an amended drainage plan alternative that assumes green infrastructure techniques are used to reduce the size of the proposed BMPs; and alternative designs that reduce flow to Last Chance Pond. A summary of each alternative follows.

#### **NO ACTION ALTERNATIVE**

Under the No Action Alternative, there would be no land use changes at the proposed BMP locations and the City's WRP goals for improving watershed water quality and reducing flooding and erosion would not be advanced. Under this alternative, there would also be no wetland restoration on Bluebelt properties. Without the proposed BMPs and maintenance program, common reed would continue to dominate the habitat of the lower watersheds and brush fires would remain a concern. The removal of dense common reed that currently limits public views from local streets and views of wetlands would also not be provided. The proposed project requires raising some local street grades which would not be necessary under this No Action Alternative. However, neither scenario results in significant adverse impacts on urban design or visual character.

Under the proposed amended drainage plans, BMPs, storm sewers and outfalls would be installed to provide a comprehensive stormwater management system that reduces flooding and manages runoff. Under the No Action Alternative, there would be no such improvements in Mid-Island. Rather, flooding would continue unabated, street runoff would remain uncontrolled and stream banks would continue to erode. Thus, the hydrology and water quality benefits of the proposed project would be foregone under this alternative.

The clearing of vegetation and mitigation would not be necessary under this alternative. However, under the No Action Alternative, habitat restoration and maintenance would not be provided since no construction would occur. Thus, none of the habitat benefits of the proposed project would be provided including the removal of fill and landscaping of existing freshwater wetlands. The No Action Alternative would not include new outfalls to the Lower Bay that would impact tidal wetlands. However, the proposed project includes a tidal restoration plan to mitigate this impact.

#### **CONVENTIONAL PIPED STORM SEWER SYSTEM (THE POTTER PLAN ALTERNATIVE)**

While the Potter Plan would relieve flooding and erosion, it would include installation of traditional or "gray" infrastructure in all mapped streets in Mid-Island and substantially impact streams and wetlands. (Gray infrastructure generally refers to a system of conventional sub-surface storm sewer pipes to convey stormwater.) Conversely, under the proposed project,

wetlands are used for the conveyance and storage of stormwater including stormwater that is detained in extended detention BMPs as a way to reduce local flooding.

By eliminating wetlands, this alternative potentially allows adjacent lots to be cleared and developed. Therefore, this alternative could also have secondary impacts from added residential and commercial development. This alternative would also be inconsistent with the City's WRP policies that encourage the protection of natural resources, open space and water quality.

This alternative would substantially impact woodlands and trees, as all mapped streets would be built. In contrast, the proposed project has limited tree impacts with the exception of proposed BMPs NC-6: Boundary Avenue and BMP NC-11: Last Chance Pond. In addition, the proposed plan would preserve and restore existing wetlands and watercourses, and would provide a tree mitigation plan for tree removals.

Under this alternative, the widespread construction of streets and sewers through natural features would substantially alter the visual character of Mid-Island. The Potter Plan also calls for many streets to be substantially raised above the current street grade, some by as much as seven feet, which would leave many houses and yards at elevations well below streets. Thus, this alternative would have a potential significant adverse impact on visual character and urban design—specifically streetscapes and views. Widespread street raisings under this alternative would also create localized flooding of private properties that would be below the street grade with this alternative. In contrast, the proposed plan would improve visual character by transforming existing views of large common reed monocultures into more visually diverse landscaped settings that would combine open water features with new ecologically valuable landscapes. Additionally, the BMPs under the proposed plan would alleviate, rather than exacerbate, localized flooding.

Additionally, building out the storm sewer system under the Potter Plan would not relieve flooding when the high tide coincides with a rain event preventing stormwater from draining into the ocean. At such times, the stormwater would back up into the storm sewer system, surcharging into the streets. Under the proposed plan, extended detention is provided where stormwater is stored in BMPs during high tide, thereby preventing street flooding.

Under this alternative, there would be significant adverse natural resources impacts on wetlands, aquatic wildlife and woodlands. Moreover, surface water flows would be directed away from those wetlands not directly impacted under the Potter Plan. In contrast, the proposed project protects, enhances, and expands freshwater wetlands.

**ALTERNATIVE DRAINAGE PLAN DESIGN: ELIMINATION OF UPSTREAM DETENTION AT BMPS NC-6: BOUNDARY AVENUE AND NC-11: LAST CHANCE POND**

Under the proposed project, the extended detention provided at these two proposed BMPs reduces the potential for downstream flooding. Under this alternative, this benefit is lost, thereby increasing the downstream peak stage water surface elevations by 12-20 percent along with the potential for street and property flooding. As a result, downstream berm heights and lengths would need to be increased under this alternative in order to protect adjacent properties. In addition, without extended detention provided upstream, storm flows would reach Midland Avenue and Hylan Boulevard much more rapidly.

Extended detention with the proposed BMPs improves runoff storage and delay, thereby decreasing the likelihood of downstream flood surges. Moreover, upstream flows would have

higher velocities under this alternative resulting in stream bank scour, erosion and increased sedimentation in the water column. This is of particular concern for the New Creek West Branch where parks and homes are in close proximity to the stream channel. These uses are currently outside of the area of flood concern but could be at risk if the stream banks became destabilized and widened due to the increased flows and scouring under this alternative.

Increased sediment loads downstream of BMPs NC-6 and NC-11 would also cause water quality degradation along the West Branch and Main Channel, respectively. Outlets to the lower watershed BMPs could also remain submerged for a longer duration, thereby inhibiting pipe capacity and increasing potential for street flooding. To restore this lost capacity, pipes and streets would need to be raised to greater elevations than currently planned under the proposed project.

Under this alternative, the wetland expansion at BMP NC-6 would be limited to the channelized streams from the proposed stormwater outlets across the Boundary Avenue site, yielding a much smaller increase in wetland acreage as compared with the proposed project. Under this alternative, there would be wetland disturbance at Last Chance Pond, though the area of disturbance would be reduced compared to the proposed project. Thus, the extent of vegetation and tree clearing would be less under this alternative. However, in both this alternative and in the proposed project, tree clearing and changes to existing habitats would be necessary as would an appropriate mitigation plan for all tree removals.

#### **EXPANDED GREEN INFRASTRUCTURE ALTERNATIVE**

This alternative examines the potential to incorporate elements of the NYC Green Infrastructure Plan into the Mid-Island proposed amended drainage plan designs. The objective of this alternative is to determine if this approach could reduce the limits of clearing and the size of BMPs, such as the proposed BMPs NC-6 and BMP NC-11.

In September 2010, New York City released the NYC Green Infrastructure Plan, which presents an alternative approach for improving harbor water quality by integrating green infrastructure practices (such as rain gardens and green roofs) with investments that optimize existing sewer systems by building targeted cost-effective “gray” or traditional infrastructure.

DEP is currently implementing green infrastructure in combined sewer areas primarily to achieve combined sewer overflow (CSO) reductions in New York City waterways. Green infrastructure can store and slow the runoff contribution to the combined sewer, thereby freeing up capacity in the system during rain events. Under the City’s plan, green infrastructure has been utilized as a CSO reduction tool and thus would not be suitable for Staten Island, which is largely separately sewerred. Additionally, Bluebelt BMPs would achieve similar benefits as the BMPs installed under the Green Infrastructure Plan while also reducing flooding and erosive velocities, and improving water quality. Therefore, incorporating elements of New York City’s Green Infrastructure Plan would not be a viable alternative to the proposed project.

#### **BMP NC-11: LAST CHANCE POND FLOW DIVERSION ALTERNATIVES**

Two flow diversion alternatives were examined for the drainage area of BMP NC-11: Last Chance Pond. Both alternatives were designed with the assumption that the proposed drainage plan could potentially be modified to divert some storm flow away from the proposed BMP, thereby achieving a smaller BMP footprint and reducing wetland disturbance. The first alternative assumes a flow splitter is installed at the intersection of Zoe Street and Stobe Avenue that redirects flow towards Naughton Avenue and also eliminates the outfall at Cletus Street and

Naughton Avenue. The second alternative would divert the majority of the BMP NC-11 Stobe Avenue outfall flow to the East Branch of the New Creek Watershed via the proposed BMP NC-18: Patterson Avenue.

Hydrologic mathematical modeling predicted that with the first alternative there would only be a minor (2-inch) reduction in the peak surface water elevation at BMP NC-11. With such a small decrease, the footprint of BMP NC-11 would not be reduced, but would remain nearly identical to the proposed BMP. Thus, the natural resource impacts would be the same under this alternative as with the proposed project.

For the second alternative, the hydrologic model disclosed the peak vertical surface water surface elevation at BMP NC-11 would be reduced by approximately one foot. This alternative would, therefore, reduce the BMP footprint by approximately one acre from the proposed 8.8 acre design. While this would potentially reduce habitat impacts, it would still require clearing and grading of 7.8 acres including the important wetlands that are in the middle of the Last Chance Pond site. Moreover, the flow diversion under this alternative would require the installation of over 4,600 linear feet of double-barrel 8-foot by 6-foot box sewer along Dongan Hills Avenue, a siphon under an existing water main in Hylan Boulevard, and the excavation of approximately two additional acres at BMP NC-18, all of which would add significant costs. Additionally, there would be significant construction challenges as Dongan Hills Avenue is a narrow street, which may preclude installation of a large double-barrel storm sewer. The existing street elevations also may not allow the required distance between the top of the pipe and the street. Installation of a large 8-foot-wide double barrel storm sewer in Dongan Hills Avenue may also require installation of a parallel sanitary sewer, with the potential for conflicts with other utilities, such as water, gas and electric lines, all of which decrease the engineering feasibility of this alternative while substantially increasing project costs.

In summary, these two alternatives represent efforts to reduce the footprint and natural resources impacts at the proposed BMP NC-11: Last Chance Pond by reconfiguring the drainage plan. Neither alternative, however, would allow for a sizable reduction in the proposed BMP size. In addition, the second alternative is not viable from an engineering or cost perspective.

## **D. MITIGATION**

### **INTRODUCTION**

Potential significant adverse impacts have been identified in the area of natural resources, based on reasonable worst-case development scenarios that were used for the purposes of programmatic impact analyses in this FGEIS. Provided below are programmatic mitigation measures that would minimize or eliminate the anticipated impacts. As lead agency, DEP will ensure that this mitigation, which includes the development of additional information and studies, is incorporated into capital projects as the amended drainage plans are implemented.

### **NATURAL RESOURCES MITIGATION**

#### *VEGETATION AND TREES*

Under the proposed amended drainage plans, BMPs are designed to preserve upland wooded forested areas as well as higher quality wetland habitats (i.e., wetlands predominantly comprised of contiguous stands of native vegetation) to the extent possible. However, for certain BMPs, despite design modifications and other measures to preserve and enhance natural resources, significant tree removal is expected, particularly at proposed BMP NC-6: Boundary Avenue and

proposed BMP NC-11: Last Chance Pond (about 239 trees with four inch caliper or greater at NC-6 and 617 such trees at NC-11). In addition, other BMP sites in City parkland would require tree clearing, but to a much lesser extent. To mitigate this potential impact, a detailed tree survey would be conducted for each BMP to determine the actual number of trees to be removed and the area of affected habitat. Survey results would then be reviewed along with other collected natural resources data for the purposes of identifying opportunities to further avoid large trees, dense stands, and important wooded and wetland habitats.

Proposed final BMP designs at all sites would also maintain perimeter trees and include tree plantings to recreate and preserve wooded habitat and woodlands to the extent feasible. Detailed surveys and designs would be developed for each BMP. All final BMP designs and tree replacement plans would also be coordinated with DPR for BMPs in parklands. The Bluebelt Program also includes monitoring to ensure tree and plant establishment and growth. In addition, several measures would be implemented during construction to protect existing trees.

#### *ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES AND COMMUNITIES*

Based on published information, database searches and site investigations, endangered, threatened or special concern plant and wildlife species may be present at a number of proposed BMP sites. To mitigate the potential for impacts, pre-construction investigations would be completed at each proposed BMP site where these species may be present. These pre-design investigations would be performed during the appropriate season or time of year and specific to the nesting, foraging or breeding characteristics of the species of concern. The investigations would then be used to inform BMP designs. If protected species are observed, design modifications, construction-period limitations and other protective measures would be implemented to avoid and minimize impacts. In addition, DEP would coordinate with NYSDEC as necessary to obtain necessary incidental take permits for endangered and threatened wildlife species in accordance with Environmental Conservation Law 11-0535 Part 182. For vegetation, avoidance of habitat or plant salvage would be performed.

#### *TIDAL WETLAND RESTORATION*

The added and expanded outfalls of the proposed amended drainage plans would partially extend out into tidal wetlands. A preliminary analysis of a reasonable worst case scenario indicates that approximately 1.22 acres of tidal wetland creation is necessary to compensate for the tidal wetland area that would be permanently occupied by the proposed outfall structure. DEP intends to minimize structural impacts as much as possible during the final design, such that some outfall expansions currently planned may not be necessary. In addition, Crescent Beach Park, which is City parkland under the jurisdiction of DPR, provides an opportunity for cumulative wetland restoration. Preliminary coordination between DEP and DPR has identified areas for potential tidal wetland creation at this site that would support the restoration necessary for the proposed project as well as a DPR-proposed restoration. A preliminary conceptual design involves re-grading the tidal edge and stabilizing it with the planting of *Spartina alterniflora*. With this restoration proposal, DEP would maximize the natural resources benefits associated with wetland creation by restoring one larger tidal wetland where greater compensatory ecological benefits could be realized rather than addressing restoration at each drainage plan outfall as it is constructed. Another potential tidal wetland mitigation site is at the outlet of the Oakwood Beach creek system at the confluence of the east and west branches. This land is under the jurisdiction of the NPS (as part of the GNRA). As in the case of Crescent Beach, this work would have to be coordinated with any shoreline protection measures proposed by the USACE.

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### *FORESTED WETLAND RESTORATION*

DEP has been coordinating with USACE and USEPA on a Regional General Permit that would authorize a number of Bluebelt projects on Staten Island. A requirement of that permit is a wetland mitigation plan that ensures there would be no net loss of forested wetlands within Richmond County due to activities authorized by the permit. The proposed project involves the conversion of a total of 5.46 acres of forested wetlands into other wetland types (open water). All these impacts are located in the New Creek watershed. Based on discussions with USACE and USEPA, the proposed mitigation for this wetland loss can be located anywhere on Staten Island, does not need to be on DEP property, and can be provided at the ratio of one acre of new wetland to one acre of lost wetland.

In coordination with USACE and USEPA, DEP has developed a forested wetland mitigation plan for the proposed project which identifies a number of potential mitigation sites in the Mid-Island Bluebelt. This includes, for example, Bluebelt property situated between BMPs NC-15 and NC-16 and the proposed islands in the South Beach SBE-1A, -1B, -1C complex. Another potential site is on Bluebelt property in the Mill Creek Watershed near BMP MC-1 where DEP has already done some forested wetland creation as mitigation for project impacts. Another possible mitigation site could be Long Pond Park in South Richmond where City streets were graded, but never paved, in what was once a large, continuous forested wetland. A mitigation project here could remove some of the filling and reconnect the wetland fragments.

DEP will continue to work with USACE and USEPA on this forested wetland mitigation plan. DEP will also coordinate with other government agencies such as DPR, NYSDEC, and the New York State Office of Parks, Recreation and Historic Preservation in identifying natural areas where this mitigation would provide the greatest benefit.

### *PRE-DESIGN PROTOCOL FOR MITIGATION IMPLEMENTATION*

As described above, the proposed project may potentially result in impacts to natural resources such as vegetation and trees, plants and animals that may be endangered, threatened, or species of concern, and tidal wetlands. Therefore, DEP has incorporated several mitigation measures into a pre-design protocol that would be implemented with the proposed project. The objective of the protocol is to obtain timely, meaningful and relevant data about existing natural resources conditions prior to final designs. Table S-6, below, summarizes that protocol. Appendix E provides the data inventory that has been performed for the first Mid-Island capital project: restoration of the West Branch in the New Creek Bluebelt.

**Table S-6**  
**Pre-Design Protocol for Mitigation Implementation**

Technical Area	BMPs	Mitigating Protocol
Groundwater	All lower watershed BMPs	Perform additional groundwater monitoring and submit results to NYSDEC as seasonal averages for spring (March 1 to June 1), summer (June 1 to August 31) and fall (September 1 to November 30) periods. Verify water levels prior to construction. Utilize data in refining BMP designs.
Trees	All BMPs	Develop site-specific tree and topographic survey maps as the first step in the final design process for the purposes of further minimizing potential clearing impacts, protecting large trees, and determining the minimum necessary tree clearing. Develop a tree replacement plan for trees that could not be avoided and would need to be cleared. Coordinate final designs with DPR and NYSDEC for BMPs sited on City or State parklands. Coordinate with NYSDEC on tree clearing as part of the freshwater wetland permit process.
Key Habitats	Last Chance Pond and Boundary Avenue	Gather additional natural resources data (e.g., fish or avian habitat, reptile and amphibians, macroinvertebrate surveys) that would inform the final design process. Using this data and site-specific survey maps with tree, water line, and topographic information, delineate habitats and refine BMP designs to further minimize impacts and to identify areas for habitat enhancement at Last Chance Pond and Boundary Avenue. Coordinate with DPR and NYSDEC in developing the final design.
Fisheries	Lower Watershed BMPs	Perform supplemental fisheries surveys as part of the final design process to determine if fish may be present at BMP sites. Determine any needs for fish passage along the channel. Create BMP design details for in-stream structures that would be necessary to allow continued fish movement along the channel and between the BMPs. Identify construction period protection measures and include them in project design specifications with respect to fish rescue or seasonal restrictions on construction.
Rare, Threatened, Endangered and Special Concern Wildlife	See Table 8.1-1 (Chapter 8.1, "Mitigation") for species potentially at BMP sites	Perform site investigations in the appropriate season to determine nesting or foraging at BMP sites as the initial step in the final design process. Perform the work within approximately <u>1-3 years in advance</u> of finalizing the capital project design in order to make a final determination about the potential use of a BMP site by protected species. Provide inventory data to DPR and NYSDEC as appropriate. If species protected under Environmental Conservation Law 11-0535, Part 182 are identified, apply to NYSDEC for incidental takings permit. Implementation of mitigation measures could involve modifications to BMP design or seasonal restrictions on construction.
Rare, Threatened, Endangered and Exploitably Vulnerable Plants	See Table 8.1-1 (Chapter 8.1, "Mitigation") for species potentially at BMP sites	Perform a site investigation in sensitive areas (e.g., wooded hummocks) in the appropriate season for confirming the presence or absence of plants as the initial step in final design. Perform this work within <u>1-3 years in advance</u> of capital project final design. Provide inventory data to NYSDEC and DPR as appropriate. Incorporate information into the final BMP design to avoid sensitive areas and plant locations, and/or incorporate additional impact avoidance measures into the proposed capital project, including plant salvage, in order to mitigate impacts.

## E. UNAVOIDABLE ADVERSE IMPACTS

As stated above, potential adverse significant impacts to natural resources were reduced to the greatest extent possible as part of the development of the proposed BMP amended drainage plan designs. Moreover, as multiple capital projects are initiated to implement the Mid-Island Bluebelt Program, the pre-design protocol summarized above would ensure the mitigation identified in this FGEIS minimizes potential significant adverse impacts to the greatest extent feasible and eliminates any potential significant unavoidable adverse impacts.

## F. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

There are several resources, both natural and built, that are considered irretrievably committed to the proposed project because their reuse for some other purpose would be highly unlikely. This commitment of resources and materials is not considered to be a significant impact of the proposed project. \*