Chapter 5.1: Project Description for the South Beach Drainage Plan

A. WATERSHED DESCRIPTION

South Beach Watershed is the easternmost of the three Mid-Island watersheds. It is east of and adjacent to the New Creek watershed and is generally bounded by Medford, Fingerboard, Narrows Roads, and the Staten Island Expressway to the north, Lily Pond Road to the east, Burgher and Seaview Avenues to the west and Lower Bay to the south (see **Figure 5.1-1**). The watershed covers about 1,267 acres (2.1 square miles) of which about 40 acres is Bluebelt property (including lands that have been acquired or to be acquired), the majority of which is in the lower watershed including a large wetland and pond in the area bounded by Quintard Street on the west, Father Capodanno Boulevard on the south, Sand Lane on the east, and various streets on the north.

The South Beach watershed is mostly developed and the predominant land uses and zoning districts are residential with commercial uses and districts concentrated along Hylan Boulevard. The current development pattern results in an impervious coverage over about 33 percent of the watershed. The Staten Island Railway runs east to west across the northern portion of the watershed. Parkland is primarily in the lower watershed and includes portions of Ocean Breeze Park and the Franklin Delano Roosevelt (FDR) Boardwalk and Beach Park along the Lower Bay. In the upper watershed there is City parkland on the northeast side of Brady's Pond.

The topography of the watershed causes stormwater to flow from north to south. The upper watershed is characterized by Staten Island's terminal moraine, with elevations well over 100 feet above sea level. There are no remaining open stream corridors in the upper watershed, though remnant channels exist in a few locations. Existing surface water features of the upper watershed are Brady's Pond and Cameron's Lake. Brady's Pond is privately owned while Cameron's Lake is DEP Bluebelt property. Also in the upper watershed is Whitney Woods, which is a small, wooded site, located west of Cameron's Lake, where stormwater collects. This property is in the process of being acquired with funds from elected officials for inclusion in the Bluebelt.

The lower watershed is generally flat and at very low elevation—within five feet or less of sea level.

B. PROPOSED AMENDED DRAINAGE PLAN

STORMWATER MANAGEMENT PLAN

PROPOSED STORM WATER MANAGEMENT PLAN BUILD-OUT

The proposed amended drainage plan includes storm sewers to collect runoff with BMPs at the points of discharge, with one new outfall to the Lower Bay from SBE-1C is proposed while two outfalls, one at Sand Lane and the other at Quintard Street, would have added barrels to accommodate projected increased flows under the proposed amended drainage plan (see **Figure 5.1-2b**). Total length of the proposed storm sewers is approximately 177,500 linear feet (about 33.6 miles). In addition, the proposed project calls for the continued operation of approximately

52,800 linear feet (about 10 miles) of existing storm sewers including three existing outfalls to the Lower Bay. These existing outfalls would remain under the proposed amended drainage plan with tide-gate controlled outlets from Sand Lane, Lily Pond Road, and Quintard Street. One-way-flap tide gates in these outfalls allow discharge from the trunks to the Lower Bay when the water surface elevation in the sewers is above the tide. However, to prevent tidal inflow to the sewers, these gates close shut during high tide events.

STORMWATER DRAINAGE PLAN OBJECTIVES

As described in greater detail in Chapter 1.1, 'Project Description of the Overall Program," there are a number of objectives to the proposed project including: to provide a comprehensive stormwater management plan that reduces local flooding through the installation of stormwater collection sewers and BMPs in a watershed that is largely unsewered; to reduce local flooding through lower watershed BMPs that are designed to detain storm flows that otherwise cannot drain to the Lower Bay during high tide events when the outfall tide gates are closed; to amend the current drainage plan so that street elevations remain as close to the existing street grade as possible; and to provide ecological enhancements in Bluebelt wetlands that are used for BMPs.

PROPOSED BEST MANAGEMENT PRACTICES

The proposed watershed BMPs are listed in **Table 5.1-1** and the locations are shown on **Figure 5.1-1**. A more detailed description of the proposed BMPs is provided below.

Table 5.1-1
Proposed BMPs in the South Beach Watershed

BMP Number	Size (ac)	Location	Drainage Area (ac)	Description	Function/Objective	Ownership/ Jurisdiction
SBE-1A: Quintard Street	18.6	Northeast of Quintard Avenue ROW, between Father Capodanno Boulevard and Patterson Avenue	586.0	Extended Detention Wetland	Stormwater detention and water quality enhancement	DEP Bluebelt/ DPR
SBE-1B: Sand Lane	23.2	Northwest of Father Capodanno Boulevard, between Sand Lane and McLaughlin Street	384.0	Extended Detention Wetland	Stormwater detention and water quality enhancement	DEP Bluebelt
SBE-1C: McLaughlin Street	0.6	Southeast of end of McLaughlin Street	1.5	Extended Detention Wetland	Stormwater detention, water quality enhancement and new ocean outfall	DEP Bluebelt, DPR
Proposed Lower Bay Outfall	±0.6	Between SBE-1c and the Bulkhead Line	1.5	Outfall to Lower Bay	Convey stormwater from the watershed to Lower Bay	DEP/NYCDOT/ DPR
SBE-2A: Windermere Road	0.2	East of Windermere Road, between West Fingerboard Road and Clove Road	60.0	Outfall and Forebay (Cameron's Lake)	Velocity attenuation and sediment capture	DEP Bluebelt
SBE-2B: Allendale Road	0.2	West of Allendale Road, between West Fingerboard Road and Beverly Road	1.3	Outfall and Forebay (Cameron's Lake)	Velocity attenuation and sediment capture	DEP Bluebelt
SBE-2C: Normalee Road	0.2	Normalee Road ROW, between end of Normalee Road and Allendale Road	65.0	Micropool Outlet/Riser Box (Cameron's Lake)	Improved conveyance and sediment capture	DEP Bluebelt
SBE-3: Whitney Woods	1.2	Intersection of Whitney Avenue and Woodlawn Avenue ROW's	10.8	Extended Detention Wetland	Stormwater detention and perimeter treatment	DEP Bluebelt

Note: DEP Bluebelt includes lands acquired by DEP or to be acquired.
Source: DEP, Hazen and Sawyer, January 2011.

BMP SBE-1A: Quintard Street

BMP SBE-1A would be primarily located on Bluebelt property (lands acquired or to be acquired), with a few parcels also under the jurisdiction of DPR. This site is bounded by Quintard Street and Ocean Breeze Park to the southwest, Father Capodanno Boulevard (and BMP SBE-1C) to the southeast by McLaughlin and Vulcan Streets to the northeast (as well as the rear yard of residential properties fronting on Pearsall Street, and Patterson Avenue), and Lava Street and Agnes Place to the northwest (see **Figure 5.1-3** and **Figure 5.1-3b**). The principal objectives for this BMP are to provide some relief storage for high level flows from the Quintard Street trunk sewer and to provide a receiving area for drainage from local streets. The BMP consists principally of a large extended detention wetland that would be inundated during storm events thereby providing stormwater management, water quality and ecological benefits. The BMP would occupy about 18.6 acres and would handle storm flow inputs from a drainage area of about 586 acres (including the drainage area served by the Quintard Street trunk sewer) with drainage outlets proposed from Quintard, Lava, and Pearsall Streets. The outlet from Quintard Street trunk sewer would be created by installing a flow splitter in the existing Quintard Street trunk sewer that would divert stormwater to the proposed BMP. From that flow splitter, high-level flows in the trunk sewer would be diverted during extreme storm events into the BMP, thus preventing surcharging of storm sewers when the tide gates are closed. Thus, the storage volume to be provided at this BMP is critical to reducing local flooding.

Forebays, a key design feature of BMP SBE-1A, would be installed at each of the three proposed storm sewer outlets to the BMP. They would attenuate the incoming stormwater flows from the local sewers and capture sediment. The proposed BMP would also feature a permanent pool with extended detention (providing about 30 acre-feet of detention to a depth of 4.25 feet during large storm events) with a low flow channel to provide the conveyance function between the forebays and the BMP outlet. The outlet for BMP SBE-1A would be via a micropool and outlet pipe into the existing Quintard Street trunk sewer and would have a 200-foot-long weir and micropool to allow debris to settle out. A low-flow orifice would establish the permanent pool elevation for the BMP. The ultimate outlet for this BMP is the Lower Bay via the existing trunk sewer, which runs through Ocean Breeze Park and across Father Capodanno Boulevard. In addition, a low landscaped berm would be constructed around the northern border of the BMP to a height of approximately 6 to 36 inches above existing grade for the purposes of hydraulically separating this BMP from BMP SBE-1C, while containing storm flows within the BMP and protecting adjacent properties. Because of the lower elevations of McLaughlin Street, the berm along the northern perimeter of BMP SBE-1A is essential to hydraulically separate BMP SBE-1A from BMP SBE-1C (see the description below).

Maintenance access for the forebays at Mallory Avenue and Vulcan Street would be from the adjacent paved streets. Access to the forebay and micropool, both off of the mapped but unbuilt right-of-way of Quintard Street, would be via an existing dirt road that begins where the paved portion of Quintard Street ends at Patterson Avenue.

Currently the site of the proposed BMP is largely dominated by a common reed monoculture. It is proposed to improve the ecological and habitat values at this site through the proposed BMP landscaping that would increase wetland acreage (by about 4.6 acres) through the removal of fill as well as expand the open water system and create a improved wetland habitat by introducing a wide range of wetland plants for the purposes of diversifying and enhancing natural resource values and reducing the dominance of common reed monocultures at this site. Chapter 1.1, "Project Description of the Overall Program," provides a description of the ecological design

objectives that are common to the proposed lower watershed BMPs. The proposed BMP would also reduce the potential spread of brush fires that occur periodically in the common reed monoculture.

BMP SBE-1B: Sand Lane

BMP SBE-1B would be located entirely on DEP Bluebelt property (lands that have been acquired or to be acquired). The proposed BMP site is bounded by McLaughlin Street to the southwest and Father Capodanno Boulevard to the southeast. To the northeast, the site is bounded by rear yards of residential properties fronting on Quincy and Oceanside Avenues and Sand Lane. To the northwest, the site is adjacent to residential rear yards and Lansing Place, Wentworth Avenue and Andrews Street (see **Figures 5.1-3** and **Figure 5.1-3b**). This proposed BMP would occupy about 23 acres and would handle storm flow inputs from a drainage area of about 384 acres (including the contribution from the Sand Lane trunk sewer) with drainage outlets proposed from the ends of Andrews Street, Wentworth Avenue, Orlando Street, and Oceanside Avenue and Quincy Avenue (which would provide flow from the Sand Lane trunk sewer through a flow splitter).

The principal objectives for this BMP are to provide some relief storage for high-level flows from the Sand Lane trunk sewer and to provide a receiving area for drainage from local streets. The BMP principally consists of a large extended detention wetland that would be inundated during storm events, providing stormwater management, water quality, and ecological benefits. The proposed area of extended detention would incorporate the existing ponds shown in **Figure 5.1-3**. Forebays would be installed at each of the five proposed storm sewer outlets to the BMP to attenuate the incoming stormwater flows from the local sewers and capture sediment. The BMP would also feature a permanent pool with extended detention (about 30 acre-feet of detention to a depth of 4 feet during large storm events) with a low flow channel providing the conveyance function between forebays and the BMP outlet. The outlet for BMP SBE-1B would be via a micropool and outlet pipe into the proposed trunk sewer in Father Capodanno Boulevard, which in turn flows to the existing Sand Lane trunk sewer. Downstream of the tide gate chamber, outflow from this BMP would be conveyed to Lower Bay via the existing Sand Lane outfall. The BMP outlet into the sewer would be equipped with a 50-foot-long weir and a micropool to capture debris. A low-flow orifice would establish the permanent pool elevation for the BMP. In addition, a low landscaped berm would be constructed around the southwestern border of the BMP (to a height approximately 6 to 36 inches above existing grade) for the purposes of hydraulically separating this BMP from BMP SBE-1C, while containing storm flows within the BMP and protecting adjacent properties.

Maintenance access for the five forebays would be from the adjacent paved streets, and access for the micropool and outlet structure would be from a maintenance access way to be built atop the outlet pipe that would connect to Father Capodanno Boulevard.

Currently the site of the proposed BMP is largely dominated by a common reed monoculture, with fill material, two ponds, and little topographical variation. The ecological and habitat values at this site would be improved through the proposed BMP landscaping that would increase wetland acreage (by about 4 acres) through the removal of fill as well as expand the open water system and create a improved wetland habitat by introducing a wide range of native wetland plants for the purposes of diversifying and enhancing natural resource values and reducing the dominance of common reed monocultures. Chapter 1.1, "Project Description of the Overall Program," provides a description of the ecological design objectives that are common to the

proposed lower watershed BMPs. The proposed BMP would also reduce the potential spread of brush fires that occur periodically in the common reed monoculture.

BMP SBE-1C: McLaughlin Street

BMP SBE-1C would be located on Bluebelt property (acquired or to be acquired) with a portion of the site on property under the jurisdiction of DPR. The proposed BMP site is located at the south end of the built segment of McLaughlin Street (see **Figure 5.1-3** and **Figure 5.1-3b**). This proposed BMP would occupy about 0.6 acres and would handle storm flow inputs from a small drainage area that is otherwise too low to drain into BMPs SBE-1A or SBE-1B. The principal objectives for this BMP are to be a receiving area for drainage from one local street by means of a small extended detention wetland with wetland shelves that would be inundated during storm events thereby providing stormwater management, water quality and ecological benefits. Central to the BMP would be the permanent pool and a low flow conveyance channel. A forebay would be installed at the end of the McLaughlin Street pipe to attenuate the incoming stormwater flows from the local sewers and capture sediment. In addition, the outlet would be equipped with a micropool to allow space for debris to settle and be removed by DEP maintenance forces. A low berm would be constructed around the BMP (to a height approximately 6 to 36 inches above existing grade) to hydraulically separate this BMP from the adjacent BMPs, while containing storm flows within the BMP and protecting adjacent properties. The proposed BMP outlet would flow into a proposed outfall to the Lower Bay (see the description below). The proposed outfall to the Lower Bay would run under DEP Bluebelt property, to the unbuilt Andrews Street right-of-way, across Father Capodanno Boulevard and across DPR property along the beach before ending in the Lower Bay (see the description below). Maintenance access for the forebay would be via the paved stub end of McLaughlin Street. Access for the micropool and outlet structure would be via a maintenance accessway built atop the outlet pipe that would connect to Father Capodanno Boulevard.

Currently the site of the proposed BMP is largely dominated by a common reed monoculture. It is proposed to improve the ecological value at this site through the proposed landscaping that would draw from a diverse planting palette to enhance the natural resource values through habitat diversity and reducing the predominance of common reed. Chapter 1.1, "Project Description of the Overall Program," provides a description of the ecological design objectives that are common to the proposed lower watershed BMPs.

BMPS AT CAMERON'S LAKE

BMP SBE-2A: Windemere Road

BMP SBE-2A would be sited on the Cameron's Lake Bluebelt property. Located on the west shore of the lake off of Windermere Road, this proposed BMP would be a forebay situated at a relocated storm sewer outlet into the lake. That outlet handles drainage overflow from Brady's Pond, a privately owned water body to the north. The proposed forebay is 0.2 acres in size would receive drainage from a 60-acre area (see **Figures 5.1-5 and 5.1-5a**). The proposed BMP would replace the current outlet that is a deteriorated, partially submerged pipe extending across private property at the corner of W. Fingerboard Road and Windermere Road. The proposed forebay would attenuate the incoming stormwater flows and capture sediment thereby providing water quality benefits for Cameron's Lake. In addition, the proposed design includes bank stabilization in the vicinity of the BMP as well as an accessway for maintenance. Construction access from Windermere Road would remain post-construction and provide the maintenance access to the BMP for both regular maintenance as well as inspections.

BMP SBE-2B: Allendale Road

BMP SBE-2B would occupy about 0.2 acres on the Cameron's Lake Bluebelt property. Located on the east shore of the lake off of Allendale Road, this proposed BMP would also be a forebay situated at a refurbished outlet that conveys stormwater into the lake. This outlet drains about 1.3 acres of storm sewers in a number of City streets. A small storm sewer is currently situated at this location and handles a number of catch basins in Allendale Road. Under the proposed BMP design, that existing outfall would be replaced with a new pipe, headwall, and BMP (see **Figure 5.1-5**). The proposed forebay would attenuate the incoming stormwater flows and capture sediment thereby providing water quality benefits for Cameron's Lake. In addition, the shoreline around the BMP would be stabilized with a maintenance accessway. The BMP would include the removal of fill and restoration of a wetland immediately south of the forebay. Construction access from Allendale Road would remain post-construction to provide maintenance access to the BMP for both regular maintenance as well as inspections.

BMP SBE-2C: Normalee Road

BMP SBE-2C would occupy about 0.2 acres on the Cameron's Lake Bluebelt property. Located at the southern end of the lake, this proposed BMP includes a riser box outlet structure that would convey overflow from the lake to the storm sewer system. This structured outlet would provide a controlled overflow from the lake and would be designed to maintain the current water surface elevation (at 84 feet). The proposed riser box would include a micropool where debris would be captured before entering the sewer system. This proposed outlet would replace an existing undersized outlet located at the corner of Windemere Road and Clove Road. In addition to being undersized, that outlet is very difficult to maintain because of its inaccessibility on private property. In addition to providing a new and more accessible outlet structure, the proposed outlet is expected to allow for improved water quality in the lake because there will be more circulation in the lake from one end to the other (see **Figure 5.1-5**). Flows into the riser box would then be conveyed west via a sewer in Normalee Road, which in turn connects to an existing storm sewer in Clove Road. Construction access from Normalee Road would remain post-construction to provide access for regular maintenance and inspections.

BMP SBE-3: Whitney Woods

BMP SBE-3 would be located on Bluebelt property referred to as Whitney Woods. Situated at the intersection of Woodlawn and Whitney Avenues, and including two mapped (but unbuilt) streets, the habitat north of Whitney Avenue is characterized by lower quality wetlands dominated by Japanese knotweed, an invasive exotic plant. The habitat south of Whitney Avenue is characterized by a mature woodland. The principal design objective for this 1.2 acre BMP is to function as a receiving area for drainage from local streets through a small extended detention wetland with wetland shelves that would be inundated during storm events thereby providing stormwater management, water quality and ecological benefits. The proposed BMP includes an extended detention wetland, primarily on that northern side of Whitney Avenue where the invasive weeds would be removed (see **Figure 5.1-6**). The proposed BMP would receive drainage from an 11-acre area via a storm sewer discharging at the stub end of Woodlawn Avenue. An outlet stilling basin at the discharge point would reduce velocities of incoming flows and capture sediment for removal by DEP Bluebelt field management forces. An intermittent channel in the middle of the extended detention wetland would connect the outlet stilling basin to the micropool. The outlet for the extended detention wetland would consist of a micropool and riser box at the stub end of Whitney Avenue where water now accumulates and drops into the existing storm sewer grate. That existing grate is subject to clogging by leaves and

other debris. The proposed micropool would reduce such clogging by providing a place where that material and debris could settle out and be removed by Bluebelt maintenance forces. Flows entering a riser box would then be conveyed west via an existing sewer in Whitney Avenue that in turn connects to an existing sewer in Parkinson Avenue. The structured outlet would provide a controlled flow of stormwater from the BMP and maintain its hydrology.

The proposed plan for the BMP would preserve the higher-value woodland at the site while targeting the excavation and clearing of areas dominated by invasive species (e.g., Japanese knotweed). The site perimeter would also be secured, and any encroachments removed.

Construction access from the stub ends of Woodlawn Avenue and Whitney Avenue would remain post-construction and provide access to the BMP for both regular maintenance as well as inspections.

DRAINAGE PLAN IMPROVEMENTS AROUND BRADY'S POND

Brady's Pond is a privately owned water body in the upper watershed near the intersection of Steuben Street and the Staten Island Expressway. DPR's Brady's Pond Park occupies the northeast corner of the pond shoreline and the immediate upland. Two storm sewers drain into the pond—one collects drainage from the Staten Island Expressway and is under the jurisdiction of NYSDOT; the other, off of Steuben Street, is maintained by DEP. The NYSDOT drain is equipped with an oil/grit separator, designed to improve water quality before discharge into the pond.

Under the proposed project, the DEP drain would be eliminated through the installation of storm sewers, thereby reducing contaminants that flow into the pond. Any proposal to remove the existing outfall to the pond would not move forward without first undertaking a thorough analysis of the potential impacts on the pond water quality and hydrology and, as necessary, providing stormwater flows that support the water quality and surface water elevations of the pond.

To further reduce pollutant loadings, the proposed amended drainage plan calls for storm sewers in City streets around the pond to direct storm water away from the pond to the extent possible. Three streets, however, are so sharply pitched toward the pond that gravity flow storm sewers cannot be designed to convey water away from the pond. These streets are Overlook Terrace and the stub ends of Hillcrest Terrace and Hillcrest Court. For these street segments, the drainage plan proposes no storm sewers. Instead, storm water would flow, as it does currently, down the gutters of these streets to the pond, uninterrupted by any intersections. Proposed catch basins at the bottom of the streets next to the pond would accept surface flow. The discharge points could be equipped with outlet stilling basins for sediment capture. An alternative to outlet stilling basins are infiltration basins that would collect the roadway runoff and allow for infiltration with underdrains that discharge into the pond; infiltration basins would provide additional filtering. Final design of the discharge mechanism would be determined by DEP based on site conditions.

LOWER BAY OUTFALLS

One new outfall is proposed as part of the South Beach drainage plan. It would drain the McLaughlin Street BMP SBE-1C and would be located completely on City property including DEP Bluebelt lands, Father Capodanno Boulevard (a City street), and the FDR Boardwalk and Beach Park (City parkland).

The proposed new outfall is necessary because low-lying streets in this sub-drainage area can only be drained with an outfall that is hydraulically separated from the rest of the drainage system. That outfall would be a 24-inch diameter pipe installed between BMP SBE-1C and the bulkhead line along the Lower Bay shoreline. In addition to the proposed new outfall, the outfalls from Quintard

Street and Sand Lane would have second barrels added that are 15 feet and 13 feet wide, respectively, to handle the increased flows projected under the proposed amended drainage plan. These added outfall barrels would be installed adjacent to the existing outfalls. Both existing outfalls also cross under Father Capodanno Boulevard and the DPR parkland.

Final engineering designs, which would include grading and topography, would more definitively establish the areas affected by the installation of the proposed outfalls. Because these outfalls involve the use of public parkland, the proposed designs would also be subject to DPR review and approval. DEP would also need to map 35-foot sewer corridors across DPR property to ensure future access for maintenance purposes for the new outfall. In addition, these outfalls would require permits from NYSDEC and USACE.

MODIFICATIONS TO STREET GRADES

The proposed project would require the modification of street grades along certain street segments in order to provide positive drainage in the stormwater collection system and adequate street cover over the sewers. The street segments affected by these proposed modified street grades are presented in **Figure 5.1-7**. Along these street segments, the maximum change in grade would increase from between 6 inches and up to 24 inches above the existing street grade (the greater increases would be nearer the BMP outlets).

It is standard procedure to raise streets in low-lying areas in order to provide proper cover over the proposed storm sewers, and the City has done this on many projects. As part of the capital project design, site specific survey would be performed to determine the actual street elevation conditions for each individual project and all design techniques would be utilized to limit the raising of street grades to the maximum extent possible. During this process, DEP and DDC, the agency that would manage the project through design and construction, would meet with each individual homeowner prior to construction to limit the impacts of street grade changes and to assist homeowners in developing the best drainage solution possible.

PROPOSED STREET DEMAPPINGS

A number of segments of mapped but unbuilt streets are proposed for demapping in order to accommodate construction of the BMPs and to consolidate Bluebelt property acquisitions and land transfers (see **Table 5.1-2**). ULURP actions are required to formally demap these unbuilt streets and would be implemented by DEP at a later date.

PROPOSED EASEMENTS

There are no easements across private property necessary to implement the proposed South Beach drainage plan.

SANITARY SEWERS

The proposed amended drainage plan also includes sanitary sewers (see **Figure 5.1-2a**). Implementation of future capital projects within the watershed would complete any remaining segments of sanitary sewers in accordance with the proposed amended drainage plan. The remaining sanitary sewer segments to be installed are limited and widely scattered throughout the watershed. Once installed, individual sanitary connections would then be made by lot owners who would need to decommission their septic systems. In addition, the proposed sanitary sewer plans call for increasing the size of some existing sewers from 8-inch to 10-inch in compliance with the current standard for minimum sewer size.

Table 5.1-2
Mapped but Unbuilt Streets
To be Demapped Under Proposed Project (South Beach Watershed)

BMP	BMP Location	Street Segment to be Demapped
SBE-1A	Quintard St.	Patterson Av. between Winfield St. & Pearsall St.
		Unpaved portion of Mallory Av. between Vulcan St. & Lava St.
		Quincy Av. between Pearsall St. & McLaughlin St.
		Quincy Av. between Quintard St. & Vulcan St.
		Quintard St. between Patterson Av. & Father Capodanno Blvd.
		Unpaved portion of Vulcan St. from Father Capodanno Blvd. to Patterson Av.
		Unpaved portion of Winfield St. between Patterson Av. & Father Capodanno Blvd.
		Reynard St. between Vulcan St. & McLaughlin St.
		Oceanside Av. between Vulcan St. & McLaughlin St.
SBE-1B	Sand Lane	Unpaved portion of Oceanside Av. between McLaughlin St. & Sand Lane
		Andrews St. from Quincy Av. to Oceanside Av.
		Quincy Av. between Andrews St. & Wills Place
		Unpaved portion of South Beach Lane from Lansing St. to end
		Wills Place from Quincy Av. to Oceanside Av.
		Wentworth Av. between Oceanside Av. & Quincy Av.
SBE-1C	McLaughlin St.	Unpaved portion of McLaughlin St. between Oceanside Av. & Father Capodanno Blvd.
SBE-2C	Cameron's Lake	Unpaved portion of Normalee Rd. between Clove Rd. & Allendale Rd.
SBE-3	Whitney Woods	Unpaved portion of Whitney Av. between Parkinson Av. & Woodlawn Av.
		Unpaved portion of Grasmere Av. between Grasmere Court & Leslie Av.

Source: DEP Staten Island Bluebelt Unit, January 2011.

The proposed amended drainage plan also calls for the relocation of two sanitary sewers where large extended detention ponds would be created as parts of BMPs SBE-1A and 1B. These sewers would have to be relocated or otherwise they would be submerged within the BMP and, therefore, very difficult to maintain or replace, when necessary. Both are in the mapped but unbuilt bed of Quincy Avenue, one between Wills Place and Wentworth Avenue and the other between Vulcan and Quintard Streets. Under the proposed amended drainage plan, the first segment, starting at Wills Place, would be relocated to the edge of the BMP along the rear lot lines of houses fronting on Lansing Street and then along the edge of Wentworth Avenue before reconnecting to the existing sanitary sewer. The second segment, starting at Vulcan Street, would be rerouted along the northeastern edge of the BMP, towards the southern edge near Father Capodanno Boulevard, and then back along Quintard Street edge of the BMP to reconnect with the existing sewer.

With the completed sewer network, all collected sanitary wastewater within this watershed would be provided secondary treatment at the Oakwood Beach WWTP prior to discharge to the Lower Bay.

C. DRAINAGE PLAN CONSTRUCTION PHASING

Due to the interconnected hydrology of the watershed, constructed improvements, such as sewers or BMPs, have the potential to impact downstream hydrology and potential flood risk. This is particularly the case if additional conveyance is provided without increased flood storage. Given these important phasing considerations, construction is anticipated to proceed as follows.

In the lower watershed, adequate detention must be provided before the relief sewers connect to the trunk sewers in Sand Lane and Quintard Street. The detention in SBE-1A and -1B would provide the relief against surcharging and allow the sewers to be built in low-lying neighborhoods near the wetlands. The McLaughlin Street BMP (SBE-1C) must be constructed along with SBE-1A and -1B. Therefore, the recommended construction sequence is to first build the entire SBE-1 complex (i.e., SBE-1A, -1B, -1C). Once this is complete, the tributary storm sewer network could be completed without concern that the drainage system would not function as designed. The upper watershed BMPs SBE-2 through SBE-3 would serve independent drainage areas and may be constructed at any point. ✷

South Beach Watershed – Proposed BMP Sites

Figure 5.1-1

3.29.11

View of Site for Proposed BMP SBE-1B
Looking North from the End of Crestwater Court

10.16.13

South Beach Watershed:
Existing and Proposed Sanitary Sewers
Figure 5.1-2a

10.16.13

South Beach Watershed:
Existing and Proposed Storm Sewers
Figure 5.1-2b

BMPs SBE-1A, SBE-1B and SBE-1C: Extended Detention Wetlands at Quintard Sreet, Sand Lane and McLaughlin Street

Figure 5.1-3

10.18.13

View of Site for Proposed BMP SBE-1B Looking Northeast to Verrazano Bridge

10.18.13

Aerial View of Proposed BMPs
SBE-1A, -1B and -1C Looking West

Figure 5.1-3b

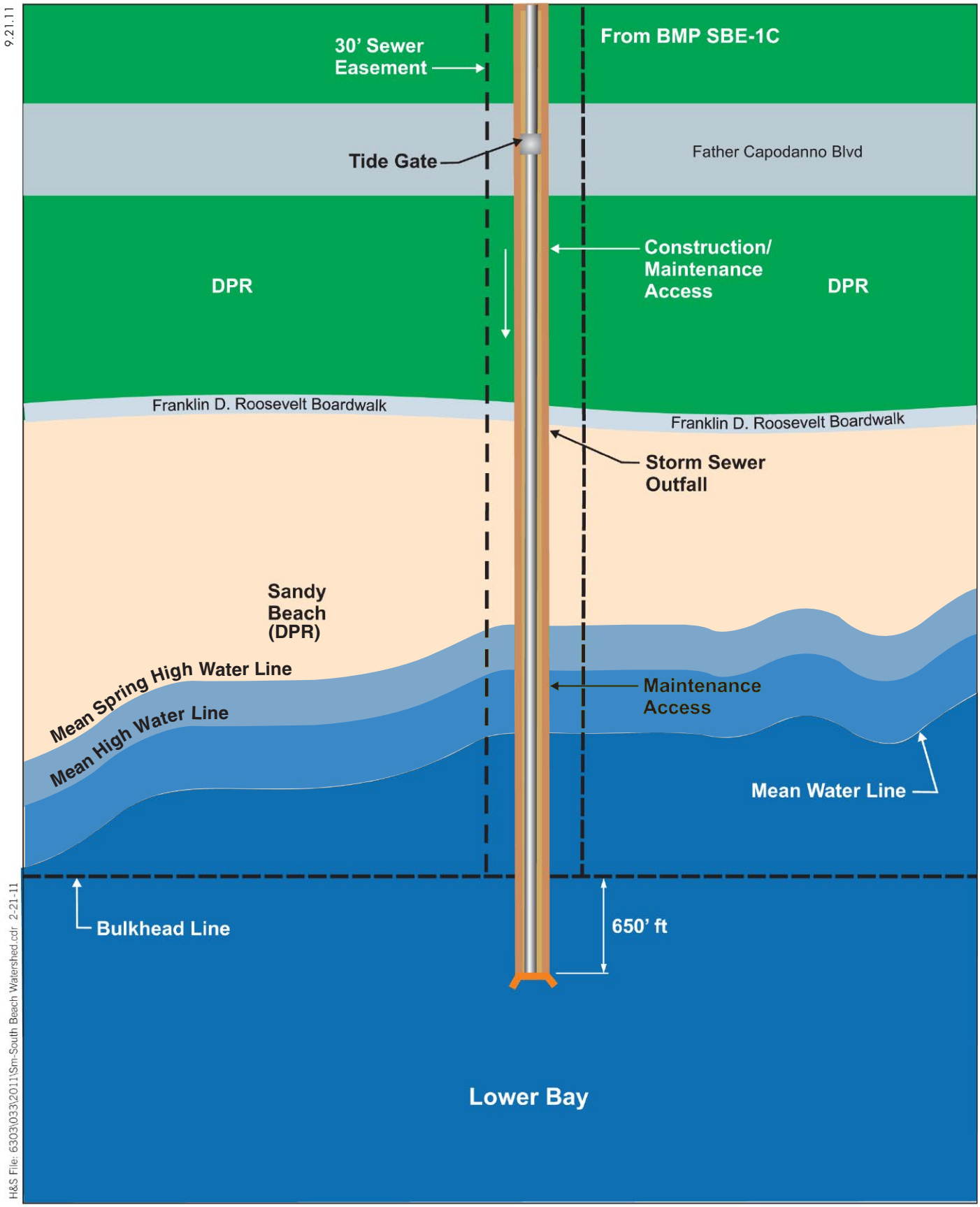
9.16.11

BMP SBE-2:
Conveyance and Water Quality Improvement at Cameron's Lake

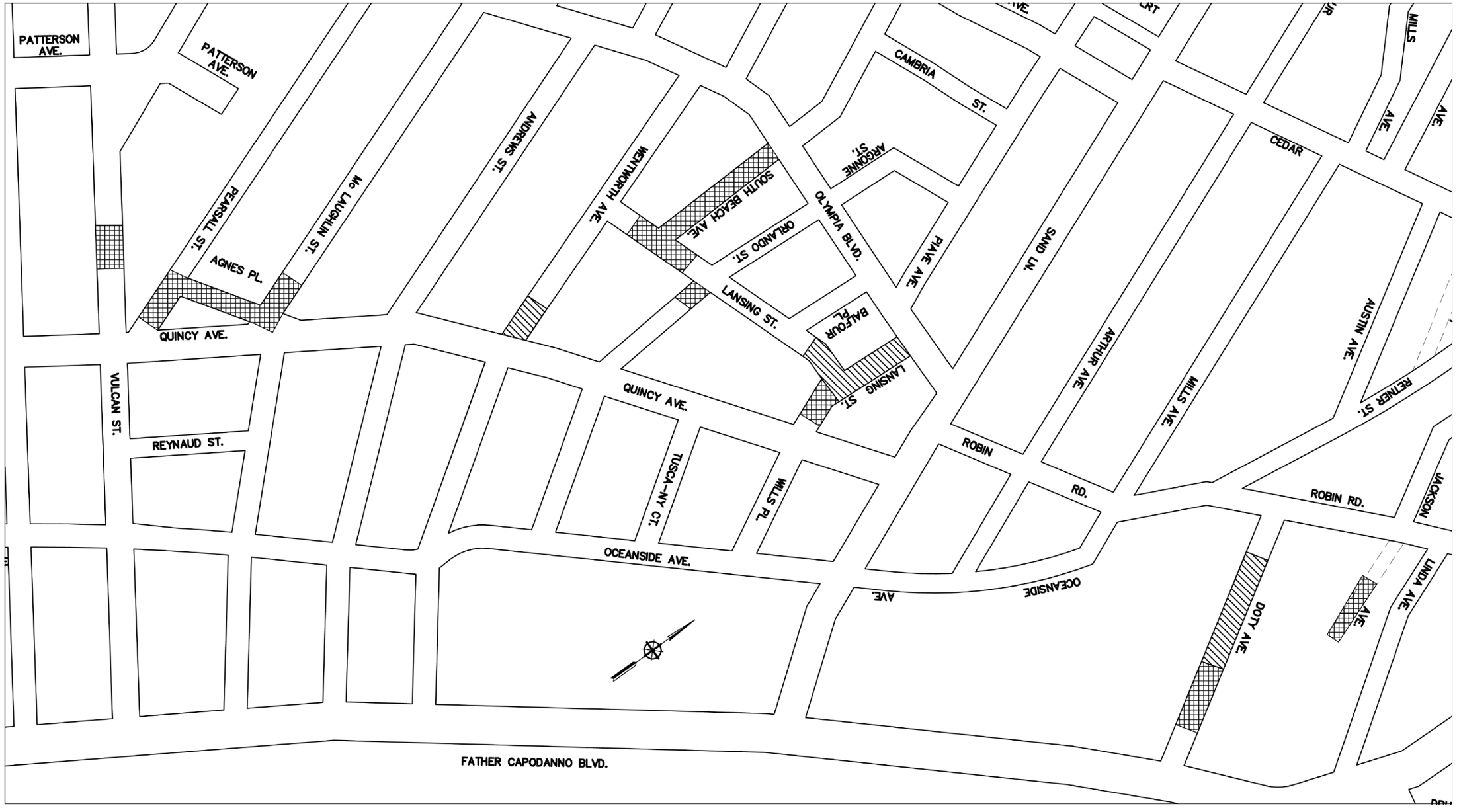
Figure 5.1-4

View of Site for Proposed BMP SBE-2 Looking South Along Windmere Road

BMP SBE-3:
Extended Detention
Wetland at Whitney Woods



Lower Bay Outfall for BMP SBE-1C:
South Beach Watershed



Proposed Modified Street Grades:
South Beach Watershed
Figure 5.1-7

Chapter 5.2: Land Use, Zoning, and Public Policy of the South Beach Drainage Plan

A. INTRODUCTION

This analysis of land use, zoning and public policy describes the existing conditions in the watershed as a whole and within 400 feet of the proposed BMP sites and outfalls. The 400-foot study area is the area that, based on the *City Environmental Quality Review (CEQR) Technical Manual*, has the greatest potential to be affected by the proposed action. This chapter also characterizes anticipated changes in these areas independent of the proposed project and the proposed project's consistency with future land uses, ongoing development trends, zoning, and public policies. Sources used to conduct this analysis include field surveys; evaluation of land use and zoning maps; and consultation with other sources, such as the New York City Zoning Resolution. To determine future conditions without the proposed action, those changes in land use, zoning, and public policy that are likely to occur by 2043 were evaluated based on discussions with public agencies involved in development in the area.

B. EXISTING CONDITIONS

LAND USE

The South Beach watershed is the smallest of the Mid-Island watersheds. As shown in **Figure 5.2.1** and **Table 5.2-1**, the 1,266-acre South Beach Watershed is mostly developed and urbanized and is comprised of residential (about 42 percent), open space (about 11 percent), public facility (about 9 percent), commercial (2.5 percent) and developed roadbed (about 20 percent) uses. Table 5.2-2 shows the land use conditions at each BMP site and within the 400 foot study area.

Table 5.2-1
Land Use in South Beach Watershed

Land Use	Acres	Percentage of total watershed
Residential	535.4	42.3
Road bed/sidewalks	255.7	20.1
Open space *	136.2	10.8
Public facilities/institutional	118.9	9.4
Vacant **	85.7	6.8
Commercial	31.4	2.5
Transportation/utility	16.7	1.3
Mixed residential/commercial	8.3	0.7
Other (industrial, parking, etc.)	78.1	
Total Area	**1,266.3**	**100.0**

Note: ***Open Space includes City parkland.
**Vacant land includes Bluebelt property which totals about 40 acres.
Source: New York City Department of City Planning, MapPLUTO (2010)

Residential uses are predominantly single-family detached homes, although there are also some two-family homes and multi-family apartment buildings in the watershed. Single-family homes on larger lots are more common north of Hylan Boulevard in the area of steeper slopes and higher elevations.

The wide streets and major access roads include Hylan Boulevard and Fingerboard Road. In addition to the streets, another important transportation use crossing the study area and running generally parallel to Hylan Boulevard is the Staten Island Railway line, a rail service operated by the Metropolitan Transit Authority (MTA) and offers transit service between Tottenville and St. George. Within the watershed this also includes rail stations in the Old Town and Grasmere communities. Commercial uses are concentrated along the major east-west streets and are oriented towards providing local good and services. There are also larger destination-type retail uses located along Hylan Boulevard as well.

Larger open spaces in the watershed include Ocean Breeze Park in the lower watershed (this a natural area park with some active uses) and Brady's Pond in the northern watershed (also primarily a natural area park). The Lower Bay waterfront/shoreline is also parkland that is part of the Franklin Delano Roosevelt (FDR) Boardwalk and Beach Park, which is a large, waterfront park extended along Staten Island's south shore (see also Chapter 5.5, "Open Space of the South Beach Drainage Plan").

Public facilities and institutional uses, including places of worship and public and private schools, comprise a small portion of the watershed land use pattern and are located through the watershed.

Only about 7 percent of the land use in the watershed is vacant. The majority of this vacant land is freshwater wetlands in the lower watershed where development is regulated by the NYSDEC and USACE. Some of this land is also DEP land that has been acquired (or to be acquired) for the purposes of implementing the proposed project. DEP Bluebelt 1 and in the watershed totals about 40 acres.

ZONING

UNDERLYING ZONING

As shown in **Table 5.2-2** and **Figure 5.2-2**, the South Beach watershed contains a mix of lower-density residential zoning districts, including R1-2, R3-1, R3-2, R3X, R2, and R5 zoning districts, a commercial zoning district, C8-1, and commercial overlay districts mapped along Hylan Boulevard and Richmond Avenue.

R1-2 residential districts are low-density residential districts that allow single family homes with an allowable floor area ratio (FAR) of 0.5. While the FAR in the R1-2 districts is the same as in the R1-2 district, the allowable yard sizes are smaller, which results in more units per acre.

R3-1 zoning districts are mapped throughout the study area. This district allows 1- and 2-family detached or semi-attached houses (the predominant housing type in the watershed), with a maximum FAR is 0.5.

The R3-2 district is mapped along Hylan Boulevard, New Dorp Lane and Amboy Road. R3-2 zoning districts permit a variety of housing types, including garden apartments and rowhouses, in addition to 1- and 2-family residences. This zoning district provides for a maximum floor area

ratio (FAR) of 0.5, and corner lots are limited in coverage to 60 percent of the lot. It allows a denser housing than is found in the R3-1 district, although the allowable floor area is the same.

Table 5.2-2
Land Use and Zoning Conditions in the Proposed South Beach BMP Sites (and within 400 feet)

BMP Number	BMP Name/Location	Approximate BMP Footprint (acres)	BMP Land Use	Predominant Land Uses within 400 feet	Zoning at the BMP sites
SBE-1A, 1B and 1C	South Beach	42.1	DEP Bluebelt/DPR Parkland	Open space/residential	R3X
SBE-2A, 2B and 2C	Cameron's Lake	0.4	DEP Bluebelt	Residential/commercial	R2
SBE-3	Whitney Woods	1.2	DEP Bluebelt	Residential	R3-2
N/A	New Outfall from SBE-1C	0.6	City Street (Father Capodanno Boulevard) and DPR Parkland	Open space/residential	N/A
N/A	Expanded outfall at Quintard Street	Within existing sewer corridor	City street and DPR Parkland	City street and Parkland	N/A
N/A	Expanded outfall at Sand Lane	Within existing sewer corridor	City Street (Father Capodanno Boulevard) and DPR Parkland	City street and Parkland	N/A

Note: Note: DEP Bluebelt refers to lands owned by DEP or pending acquisition. The area of the proposed outfall corridor is assumed to be 30 feet wide and between the BMP and the bulkhead line..

The R3X district is mapped primarily in the central portion of the watershed. This district has been mapped within New York City as a contextual zoning district that allows 1- and 2-family detached houses on lots with a minimum width of 35 feet. The R3X zoning district has a maximum FAR of 0.5 with an additional attic allowance of 0.2 FAR. R2 districts are also common in the central portion of the watershed. This district is exclusively for single-family homes and also has an FAR of 0.5.

PUBLIC POLICY

The proposed project is located within the boundaries of New York City's coastal zone. The New York City Waterfront Revitalization Program (WRP) is the City's principal coastal zone management tool and establishes policies for management of the coastal zone. The WRP policies also provide a framework for evaluating discretionary actions. The proposed project is located in the City's coastal zone and was therefore analyzed for its consistency with the WRP (see below and Appendix A). It has also been analyzed in accordance with the City's Comprehensive Waterfront Plan (2010).

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

There are currently no land use planning studies in development for the South Beach watershed. It is expected that over the next 30 years, additional residential and commercial development will occur. However, given the limited number of vacant and underdeveloped lots, development is expected to be limited. Portions of the watershed could be rezoned for a variety of purposes by 2043. However, at this time, no rezoning proposals are under review by DCP. In addition, no changes to public policy in the watershed are expected in the future without the proposed action although given the long-term build year for the proposed project additional amendments to the City's Comprehensive Waterfront Plan would be expected. However, no substantive changes in land use, zoning or public policy are anticipated in the future without the proposed action.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

LAND USE

Proposed street demappings associated with the proposed project would be subject to the City's Uniform Land Use Review Procedures (ULURP) and recorded on the City map. The streets proposed for demapping are on Bluebelt land (acquired or to be acquired) and are the proposed sites of the BMPs. BMP SBE-1A is proposed in both City parkland and Bluebelt property while the other BMPs would be sited in entirely within Bluebelt property (acquired or to be acquired). The proposed outfall would be largely below grade and therefore, would not affect land uses in FDR Boardwalk and Beach Park. The two proposed enlarged outfalls would result in larger footprints and headwalls, but would be constructed at the same elevation below grade and adjacent to the existing outfalls. All proposed BMPs would be designed with planted buffers and are compatible with adjacent land uses and activities. Thus, the proposed BMPs and street demappings would not result in land use impacts. Rather, the proposed BMPs would preserve and restore existing open space including wetlands and buffer areas for improved habitats and stormwater management. Therefore, the proposed project would not result in potential significant adverse impacts to land use.

ZONING

None of the proposed BMPs or outfalls would require any zoning text amendments. Where proposed street demappings are recorded on the City map the City would likewise modify the zoning map. Therefore, the proposed project would not result in potential significant adverse impacts to zoning.

PUBLIC POLICY

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM POLICIES

The proposed project was analyzed for consistency with the WRP and a Consistency Assessment Form was prepared (see Appendix A). The South Beach Drainage Plan would be consistent with all of the policies that would be applicable to it, and would advance several goals of the WRP as follows:

- Policy 4: "Protect and restore the quality and function of ecological systems within the New York City coastal area" by implementing the Bluebelt Program which would reduce the adverse impacts of uncontrolled runoff, flooding, erosion, and sedimentation, while enhancing freshwater wetlands and habitats throughout the watershed.
- Policy 5: "Protect and improve water quality in the New York City coastal area" with the implementation of proposed amended drainage plans calling for infrastructure improvements that would control and treat stormwater runoff before discharge into the Lower Bay.
- Policy 6: "Minimize the loss of life, structures, and natural resources caused by flooding and erosion," through a comprehensive stormwater management program that reduces flooding with the least cost and the greatest public benefit.

In March 2011, the New York City Department of City Planning released "Vision 2020: New York City Comprehensive Waterfront Plan." This plan outlines goals for improving New York City's waterfront, and recognizes the range of waterfront uses and opportunities created from the City's approximately 520 miles of shoreline. The following components of the proposed project

would be compatible with and would support Vision 2020 goals: improving water quality through measures that benefit natural habitats and enhance waterfront communities; expansion of the Bluebelt program to the Mid-Island area of Staten Island; restoring and protecting wetlands and shorefront habitats; acquiring and supporting protection of wetlands, along Staten Island's south shore; improving water quality and protecting natural resources; and improving public access to the waterfront.

E. CONCLUSIONS

The proposed project would provide stormwater management infrastructure in areas that currently experience flooding and erosion and sedimentation. The proposed BMPs would be installed in areas that are currently wetlands or natural areas and managed by DPR or DEP. Each BMP would be designed with planted buffers to blend in with existing and adjacent land uses. The proposed outfalls would provide discharge points for the stormwater runoff and would be largely below grade within DPR's FDR Boardwalk Beach and Park. Thus, the proposed BMPs and street demappings would not affect current land uses or require any zoning text amendments. Rather, the proposed BMPs would maximize the preservation and restoration of existing open spaces, wetlands and buffer areas while providing natural stormwater conveyance and treatment features.

As part of the proposed amended drainage plan, a number of segments of mapped but unbuilt streets would be demapped. Chapter 5.1, "Project Description," describes all of the proposed street demappings. The streets proposed for demapping are on lands that would support the permanent protection of wetlands and buffer areas. In all cases, the street demappings would meet all ULURP requirements, would not conflict with local land uses and the zoning map would also be amended to reflect the changes in the City map.

The proposed project would also be consistent City's WRP and the New York City Comprehensive Waterfront Plan and would assist the City in advancing several goals of the WRP and the Plan.

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

Proposed BMP Site

Existing Lower Bay Outfall

Proposed Lower Bay Outfall

Drainage Areas Tributary to South Beach Bluebelt

DEP Bluebelt Property
(Acquired or in the Process of Being Acquired)

Land Uses

Residential

Residential with Commercial Below

Commercial, Office and Retail Buildings

Industrial and Manufacturing

Transportation and Utility

Public Facilities and Institutions

Parking & Roads

Open Space and Outdoor Recreation

Stream / Open Water

Rail Line / Rail Station

South Beach Watershed Land Uses
Figure 5.2-1

2.2.11

Proposed BMP (Best Management Practice) Site

Proposed Outfalls

South Beach Watershed

Staten Island Bluebelt Mid-Island Watersheds

South Beach Watershed Zoning

Figure 5.2-2

Chapter 5.3: Socioeconomic Conditions of the South Beach Drainage Plan

The proposed project would not result in new development in the study area. In addition, the proposed project would neither directly nor indirectly displace existing residential, business and employee populations, nor would it have adverse effects on real estate or specific industry conditions. A complete analysis of the potential for secondary impacts is presented in Chapter 5.20, "Growth Inducing Impacts." Therefore, the proposed project would not result in potential significant adverse impacts to socioeconomic conditions. ✷

Chapter 5.4: Community Facilities and Services of the South Beach Drainage Plan

According to the *CEQR Technical Manual*, a community facilities analysis is needed if there would be potential direct or indirect effects on community facilities. The proposed project would not result in an increase in residential units or population, nor would it directly or indirectly affect any community facilities. None of the proposed BMPs is located adjacent to any community facilities and the proposed BMPs would not require any community services. Therefore, the proposed project would not result in potential significant adverse impacts to community facilities and services. ✷

Chapter 5.5: Open Space of the South Beach Drainage Plan

A. INTRODUCTION

This chapter examines the potential impacts of the proposed project on open space. Based on the *CEQR Technical Manual*, an open space analysis is necessary if a proposed project could directly or indirectly impact open space. Direct impacts include a reduction of public open space acreage or alterations of public open space such that it no longer provides the same facilities or serves the same user population. Indirect impacts include added noise, air, or odor emissions, shadows or increased user demands may alter access or increase user demands on public open space or increase noise, air, or odor emissions, or create shadows on public open space that may affect its use. The proposed project would not generate any open space users, nor would it generate any environmental effects (air, noise, or shadow impacts) that would indirectly impact open space. However, a portion of SBE-1A and SBE-1C would be constructed in City parkland. The remaining BMPS would be located on DEP Bluebelt property, and therefore are not included in this analysis. Chapter 6.1, "Impacts During Construction," assesses the potential for temporary impacts on open space during construction (i.e., the temporary loss of open space, seasonal waterfront uses)

B. EXISTING CONDITIONS

Table 5.5-1 lists the larger open spaces within South Beach watershed and also identifies the location of any BMP sites within these parks (see also (see also **Figure 3.2-1**). There are four parks in the watershed: Ocean Breeze Park, South Beach wetlands, Franklin Delano Roosevelt (FDR) Boardwalk and Beach Park and Brady's Pond Park (see **Figure 5.2-1**).

Table 5.5-1
Open Space in the South Beach Watershed

Name	BMP	Total Acreage	Ownership/ Jurisdiction
Ocean Breeze Park	N/A	136.57*	DPR
FDR Boardwalk and Beach Park	Lower Bay Outfalls	638.5*	DPR
Brady's Pond Park	N/A	6.6*	DPR
South Beach Wetlands	SBE-1A, -1C	±5 acres	DPR
Notes: *Sizes of parkland shown are total park acreages and not just the portion within the watershed.			

OCEAN BREEZE PARK AND SOUTH BEACH WETLANDS

Ocean Breeze Park is a large natural area park covering about 137 acres. located west of Quintard Street. The park provides a variety of coastal natural features including coastal shrub and woodland vegetation, grasses and freshwater wetlands. There are extensive hiking trails across the park. Although primarily a natural area preserve with public trails, an indoor athletic

facility, and an equestrian facility covering approximately 10 acres is currently under construction on the south end of the park (fronting on Father Capodanno Boulevard).

The South Beach wetlands are separate DPR properties located immediately to the east of Ocean Breeze Park. They are isolated properties that are under the jurisdiction of DPR and are managed as natural area wetlands.

BRADY'S POND PARK

Brady's Pond Park is a small park located on the northeast side of Brady's Pond in the higher elevations of the Staten Island Expressway. The northeast corner of the park between the pond and Steuben Street is wooded.

FRANKLIN DELANO ROOSEVELT (FDR) BOARDWALK AND BEACH PARK

The FDR Boardwalk and Beach Park is a large waterfront open space that fronts Lower Bay and is one of the largest beachfront parks located on Staten Island's South Shore. It is an important recreational resource and includes a 2.5-mile boardwalk, ballfields, playgrounds, basketball courts and a roller hockey rink, in addition to memorials and statues. There is also a pier for year-round fishing and the park provides one of the City's three swimming beaches on the South Shore.

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

In the future without the proposed project, the recreational facility under construction at the south end of Ocean Breeze Park is expected to be completed. In addition to this project, other park improvement projects are not currently proposed at study area parks through the 2043 build year.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

SBE-1A AND SBE-1C: SOUTH BEACH

SBE-1A is a proposed extended detention wetland that would partially occupy about 3.6 acres of DPR's South Beach wetlands. Currently, this property is managed by DPR as a natural area. BMP SBE-1C would also be partially within this Park property along with the proposed sanitary line relocation. At this site, the existing common reed dominated vegetation would be cleared for an extended detention wetland that would be similar in design to SBE-1A. The site of the proposed SBE-1C would also occupy about 0.15 acres of the South Beach wetlands.

Neither of the proposed BMPs or the sanitary sewer line relocation would interfere with any existing DPR operations at these properties, nor would they displace any DPR structures or facilities or impact any trail networks or impede public access. The potential impacts at the BMP on the natural resources of the park are analyzed in Chapter 5.9, "Natural Resources." DEP and DPR would coordinate on the final landscape design of the proposed BMPs as well as the tree replacement plan to be developed based on final design and tree surveys. DEP would obtain the necessary permits from DPR for all construction and operational activities in City parkland. All areas along the proposed sewer relocation through the Park would also need to be restored. Therefore, these proposed BMPs would not result in potential significant adverse impacts to open space.

LOWER BAY OUTFALLS

The proposed project includes a new outfall to the Lower Bay from SBE-1C as well as expanded outfalls at Quintard Street and Sand Lane. The proposed new outfall would be installed in a 35-foot-wide wide corridor to be mapped and the outfalls at Quintard Street and Sand Lane would be expanded. The added outfalls would be constructed adjacent to the existing outfalls and within an existing corridor. Both the new outfall and the expanded outfall would cross FDR Boardwalk and Beach Park. The proposed outfalls would be below grade with the exception of the in-water segment extending out from the shoreline into the bay and the headwall, which would be exposed at the shoreline edge and in the water. The affected open space along the proposed outfall alignment would include portions of the park boardwalk and beach shoreline at the outfall and headwall location. As part of the proposed outfall design, the entire outfall corridor across the park would be restored.

The proposed project would not impede public access along the beach as access would remain available upland along the sandy beach and all outfalls would be designed consistent with the existing outfalls and constructed below grade. Any grade changes necessary to bury the outfall in sand along the beach would be minor and not visually distinguishable and would not impede public access or adversely impact public swimming beaches. In addition, the proposed project would include restoration of any affected DPR facilities (such as the boardwalk or any recreational facilities at the FDR Boardwalk and Beach Park). All construction activities within the park would require a permit from DPR, which DEP would obtain prior to construction. DEP and DPR would coordinate on the final design of the proposed BMPs as well as the tree replacement plan to be developed based on final design and tree surveys. All activities within the park would require a permit from DPR, which DEP would obtain prior to construction. Therefore, the proposed outfalls would not result in any potential significant adverse impacts to open space.

E. CONCLUSIONS

The proposed project includes infrastructure improvements within two City-owned parklands: South Beach wetlands and the FDR Boardwalk and Beach Park. There are no DPR facilities within BMPs SBE-1A and -1C that would be impacted by the proposed project. All natural areas affected by the proposed project would be restored as part of the proposed BMP design which would be coordinated with DPR for those portions of the site that are within DPR lands. The proposed project would include a landscape and tree replacement plan for natural land over any trees that would need to be cleared in constructing the proposed BMP or the proposed relocation of the sanitary sewer line.

The proposed project would also install outfalls across FDR Boardwalk and Beach Park out into the Lower Bay. These outfalls would require activities within a sandy beach and across recreational areas including a boardwalk and the associated recreational facilities. The proposed project would require a permit from DPR prior to construction, and all affected DPR facilities would have to be restored after construction. The proposed outfalls would also not permanently impact public access along this wide sandy beach or adversely impact public swimming beaches. Therefore, the proposed project would not result in potential significant adverse impacts to open space. ✷

Chapter 5.6: Shadows of the South Beach Drainage Plan

The *CEQR Technical Manual* states that an assessment of shadows is needed for actions that would result in new structures or additions to existing structures of 50 feet or more in height. The proposed project would not result in any structures 50 feet in height, nor would it result in any structures that would create shadows. The proposed storm sewer connections would be below grade and the proposed BMPs are largely at or below grade and are natural constructs. Therefore, the proposed project would not result in potential significant adverse impacts to shadows. ✷

Chapter 5.7: Historic and Cultural Resources of the South Beach Drainage Plan

A. INTRODUCTION

Preliminary amended drainage plans have been developed for the South Beach watershed with the objectives of improving water quality, reducing flooding and erosion, and enhancing vegetative communities and wildlife habitats. The proposed project would require site-specific and subsurface changes on private and public properties. This chapter considers the potential effects of the proposed project on historic and cultural resources in the South Beach watershed. As described in Chapter 2.1, "Methodology," the proposed amended drainage plan has been examined to determine if there would be potential significant adverse impacts to architectural and archaeological resources within the South Beach watershed.

B. EXISTING CONDITIONS

ARCHAEOLOGICAL RESOURCES[1]

PRECONTACT ARCHAEOLOGICAL SENSITIVITY

BMP SBE-1A

Based on review of historic maps, the only portion of the proposed site of BMP SBE-1A that once contained naturally raised landforms, or hummocks overlooking the wetlands, was a portion of land at the intersection of Vulcan Avenue and Mallory Avenue. However, review of the soil borings within this proposed location, coupled with the site investigations, suggests that natural soils above the water table in this area have been disturbed from grading and filling, and therefore, this area is no longer sensitive for precontact archaeological resources.

BMP SBE-1B

Based on a review of historic maps, there were no raised landforms, or hummocks, within the footprint of this proposed BMP site. Only a raised track bed for a railroad that was built in the early twentieth century is located within the footprint. Therefore, it is concluded that this proposed BMP site does not possess precontact archaeological sensitivity.

BMP SBE-1C

Based on a review of historic maps, there were no raised landforms, or hummocks, within the footprint of this proposed BMP site. Only a raised track bed for a railroad that was built in the early twentieth century is located within the footprint. Therefore, it is concluded that this proposed BMP site does not possess precontact archaeological sensitivity.

[1] Provided below is a summary of the report "South Beach Phase IA Archaeological Documentary Study," Historical Perspectives, March 2011. That Phase 1A report was accepted as completed by the City's Landmarks Preservation Commission on April 18, 2011.

BMP SBE-2A

Several precontact sites have been recorded in close proximity to this proposed BMP location, and the proposed BMP would be located on the banks of and partially within a natural lake. However, the portion of the proposed BMP that would be on firm ground is sloped, and appears disturbed from nearby road construction. Therefore, this proposed BMP site does not possess precontact archaeological sensitivity.

BMP SBE-2B

Several precontact sites have been recorded in close proximity to this proposed BMP location, and the proposed BMP would be located on the banks of and partially within a natural lake. However, the portion of the proposed BMP that would be on firm ground is sloped, and appears disturbed from nearby storm sewer and road construction. Therefore, it is concluded that this proposed BMP site does not possess precontact archaeological sensitivity.

BMP SBE-2C

Several precontact sites have been recorded in close proximity to this proposed BMP location, and the proposed BMP would be located on the banks of and partially within a natural lake. The portion of the proposed BMP on firm ground appears relatively level, has well drained soils, and appears to be relatively undisturbed, although ground cover at the time of the field survey made confirmation difficult. Based on the unknown degree of disturbance, the portion of the proposed BMP on firm ground has a moderate potential for precontact archaeological sensitivity, while the portion of the proposed BMP within water has minimal sensitivity.

BMP SBE-3

Based on a review of historic maps, this proposed BMP site had a low-lying marshy landform in its natural condition. Field investigations confirmed that wetlands and vegetation existed, suggesting the area is still poorly drained. Heavy ground surface disturbance was evident during field investigations. Given these factors, it is concluded that this proposed BMP site does not possess precontact archaeological sensitivity.

HISTORIC PERIOD ARCHAEOLOGICAL SENSITIVITY

None of the proposed BMP sites have had any historic period development within or immediately adjacent to their boundaries. It is therefore concluded that these proposed BMP sites possess no historic period archaeological sensitivity.

ARCHITECTURAL RESOURCES

DESIGNATED RESOURCES

There are no designated architectural resources within the study areas of proposed BMPs SBE-1A through SBE-3.

POTENTIAL RESOURCES

There is one potential architectural resource located within the study area of proposed BMP SBE-2, **48 Allendale Road** (Block 3226, Lot 72), which backs onto Cameron Lake in the Grasmere neighborhood of Staten Island. Built in 1925, this two-story, single-family house is framed in white clapboard. The main entrance to the house is capped by a pediment that mirrors the arched doorway with sidelights. There is a porch off the south end of the second story.

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

In the future without the proposed project, additional structures and sites could potentially be designated as historic resources through the year 2043. However, there are no known pending designations at this time. In addition, it is also assumed there would be no site disturbance at any of the proposed BMP sites.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

ARCHAEOLOGICAL RESOURCES

A Phase IA study was conducted for the study area for the purposes of identifying areas of potential archaeological sensitivity. A portion of the proposed site of SBE-2C contains discrete areas of precontact archaeological sensitivity. The remaining proposed BMP sites contain no precontact period archaeological sensitivity. None of the proposed BMP sites contain historic period archaeological sensitivity. The Phase 1A study recommends that Phase1B archaeology testing be performed at this proposed BMP site. This testing would involve several shovel tests that would be used to determine the presence or absence of any Native American archaeological resources. The Phase 1B archaeological field testing would be implemented as part of the proposed project and would not commence until review and approval of a testing protocol by LPC and SHPO. All Phase 1B testing would be performed by a certified professional archaeologist and in accordance with a protocol that meets LPC's Guidelines for Archaeological Work in New York City (2002), the recommendations of the New York State Education Department, Cultural Resources Survey Program, and SHPO standards. The archaeology team would also be required to notify both LPC and SHPO when testing is scheduled to begin and it is anticipated that staff from each agency may visit the site during the testing process. Once the testing is completed, the archaeologist would also be required to submit a Phase 1B report that documents the field investigations and findings to LPC and SHPO.

To avoid impacts, this investigation would be performed after final design is completed and the contract is awarded, but prior to the start of construction. With these measures in place, the proposed project would not result in potentially significant adverse archaeology impacts.

ARCHITECTURAL RESOURCES

The proposed project would not have any direct or indirect impacts on historic architectural resources. The proposed project would install a new storm sewer collection system with five proposed BMPs, three of which would be located near one potential architectural resource. The majority of the proposed BMP improvements would be below grade, with the exception of the outlet structures to the proposed BMPs and the associated plantings.

The proposed BMPs are largely natural constructs and include grade contouring and landscaping with new plantings that would screen the structural elements. As the proposed BMP landscaping matures, it would visually integrate into the surroundings and become part of the local visual setting. Thus, the proposed BMPs would not alter the setting of the identified potential historic architectural resource. In addition, sight lines from the historic architectural resource to the proposed BMPs, and from the proposed BMPs to the resource, are limited. Therefore, the proposed project would not result in potential significant adverse impacts to historic architectural resources.

E. CONCLUSION

The proposed project would install a new storm sewer collection system with five new proposed BMPs, two of which would be located within the study area of one potential architectural resource. However, the proposed BMP improvements would be primarily below grade with the exception of the outlet structures to the proposed BMPs and the associated plantings. Thus, the proposed BMPs would not alter the visual setting of this resource. In addition, sight lines from the historic architectural resource to the proposed BMPs, and from the BMPs to the resource, are limited.

With respect to archaeological resources, a Phase IA study was conducted to determine if the proposed BMPs have archaeological sensitivity. The Phase IA study concluded that the proposed site of BMP SBE-2C contains a discrete area of pre-contact archaeological sensitivity. Therefore, Phase IB archaeological testing would be conducted at this site, if this area would experience subsurface impacts as part of the proposed BMP construction. The Phase 1B report would be submitted to LPC for review and approval and recommendations would be implemented as part of the proposed capital project.

With respect to architectural resources, the proposed BMPs would not alter the setting of the identified potential historic architectural resource. In addition, sight lines from the identified historic architectural resource to the proposed BMPs, and from the proposed BMPs to the resource, are limited.

Therefore, the proposed project would not result in potential significant adverse impacts to historic and cultural resources. ✷

Chapter 5.8: Urban Design and Visual Resources of the South Beach Drainage Plan

A. INTRODUCTION

This chapter examines the potential effects of the proposed project on urban design and visual resources in the South Beach watershed. The analysis of the proposed project was completed to identify potential changes to the urban setting or local visual experiences from the perspective of adjacent residences, pedestrians and open space users. The proposed amended drainage plan would install new storm sewers, one new and two expanded outfalls, and seven BMPs. The proposed sewers would be below grade. However, certain structures within the BMPs (e.g., weirs) and proposed berms would be above grade. In addition, outfall improvements would be partially above grade. There are also limited segments of local streets where the street grades would need to be raised in order to install the proposed storm sewers.

B. EXISTING CONDITIONS

BMPS SBE-1A,-1B AND-1C: QUINTARD STREET, SAND LANE AND MCLAUGHLIN STREET

The majority of this site is flat with little topographical relief and at an elevation just above or at sea level. It is a coastal site, albeit just inland and separated from the beach by Father Capodanno Boulevard. The site is primarily an emergent wetland that is visually dominated by dense stands of common reed that can reach heights of six to eight feet and obscuring much of the street level public view into these sites. Bordering much of the site to the north and east are low-density residential structures; Ocean Breeze Park and its public trails are adjacent and to the west (portions of the parkland extend into the site, but no trails). There are limited public sidewalks around the perimeter of the site, and private views into the site are generally limited to the edges of the proposed BMP sites. The limited views from the street and adjacent private properties are due to the flat topography, the absence of public vantage points and the thick common reed vegetation at the street edges that can grow up to and above the average eye level (i.e., equal to or greater than five feet above grade).

Within the site interior there are some channels and open water ponds, although these are only partially visible from the adjoining streets or the trails of Ocean Breeze Park. At the site of SBE-1B, near Sand Lane and south by Oceanside Avenue, a shallow vegetated pond with smaller open water areas is partially visible from the street. Along the edges of the site there are transitional wooded habitats between the wetland and upland communities. Where present, these transitional areas (e.g., south of Oceanside Avenue in the vicinity of the proposed site of SBE-1A, east of Wentworth Avenue in the vicinity of the proposed sites of SBE-1C and SBE-1B, southwest of Quincy Avenue, and several stretches along Father Capodanno Boulevard) are visually characterized by successional southern hardwoods trees that rise 10-20 feet above grade. Debris piles and fill material are also visible along certain segments of streets.

SBE-2A, -2B AND -2C: CAMERON'S LAKE

The dominant visual feature at this site is Cameron's Lake, an approximately 3.5 acre DEP-owned water body bordered by residential development. The houses around the lake have yards and larger mature trees such as red maple and red oak, with ornamentals and some successional hardwoods. Public views of the lake are available from the sidewalks and streets around the proposed BMP perimeter of the lake property. There are also private views from the homes adjacent to the lake.

SBE-3: WHITNEY WOODS

Proposed BMP SBE-3 would be located within the unbuilt portions of Whitney Avenue. The site is bounded by the street ends of Whitney Avenue on the east and west, residential development along Marie Street and Woodlawn Avenue to the north, with surrounding residential development. The visual features of this site are its higher canopy mature trees that grow from a sloped depression while the upland edges are framed by residential development. There is some evidence of dumping of yard waste. Public views are available from local streets that lead to the site with private views from the adjacent residences.

LOWER BAY OUTFALLS

The proposed corridor for the new outfall extends from what is the proposed site of BMP SBE-1C: McLaughlin Street out to the Lower Bay. In addition, the sites of the existing Quintard Street and Sand Land outfalls are proposed for additional secondary outfall barrels. The Lower Bay is a large marine open water system with an intertidal sand beach shoreline that, at these locations, is several hundred feet wide. The sandy beach is part of DPR's Franklin Delano Roosevelt Boardwalk and Beach Park and inland from the beach is the public boardwalk. East to west views along the sandy beach are generally unobstructed, but do include structures in the water (e.g., outfalls and a pier). The viewshed is primarily of a sandy beach, the waters of the Lower Bay to the south, and the public boardwalk and recreational areas to the north.

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

In the future without the proposed project, no major changes in the built form of the watershed are expected as no major developments are currently proposed. It is also assumed that stormwater flows will remain unabated with regular flooding during storms and high tides. Wetlands currently degraded with debris, erosion, and invasive plant species, would remain in a similar or declining condition without an improvement or maintenance program in place. As a result, episodic brush fires across the common reed-dominated habitats would continue to occur. In addition it is expected that the DPR recreational facility at the south end of Ocean Breeze Park would be completed. This would not significantly alter views in the study area.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

SBE-1A,-1B AND -1C: SOUTH BEACH AT QUINTARD STREET, SAND LANE AND MCLAUGHLIN STREET

These proposed BMPs would visually diversify the current visual landscape by creating more open water and emergent wetlands that would enhance the visual appearance of the site through a diversified planting program providing aesthetically diverse and pleasing views for the

surrounding community.. The transformation of the existing common reed marsh into a more diverse planted landscape would also open up views into the site for the community and enhance the appearance of the site with new island habitats and deep ponds. Wooded borders and hummocks would be preserved to the extent possible during final BMP design for the purposes of minimizing tree removal and preserving edge buffers.

While there would be a grow-in period as the BMP wetland and upland plantings become established, the landscaped areas and wetlands within the proposed BMP sites would have mature vegetation with an attractive landscape. Final landscape design of all the proposed BMPs would be made to enhance natural features and natural aesthetics through a diverse planting program with appropriate tree planting locations to be determined in conjunction with DPR and located as close to the BMP sites as possible.

The proposed BMPs would also include the installation of physical structures (e.g., sewer outlets, forebays, berms, outlet stilling basin, weirs). These structures would be at or below grade and not visually prominent with two exceptions, the berms and weirs. The berms would be constructed low-rise features, between 6 and 36 inches above grade, and planted with a final vegetated cover that once grown in, would visually integrate the berms to their surroundings. The weirs would be longer structural elements, between 50 and 70 feet in length. However, since they would be at or below grade with the proposed planting program, the weirs would not be visible from most view public and private views. Visually prominent structures in the BMP would be stone-faced, similar to existing Staten Island Bluebelt designs in South Richmond.

The Bluebelt monitoring and maintenance program would secure the site, provide regular maintenance and cleanup and monitor the success of the planted vegetation and replace plantings as necessary. Therefore, the proposed BMPs would not result in potential significant adverse impacts to urban design or visual resources.

SBE-2A, -2B AND -2C: CAMERON'S LAKE

The proposed BMPs at Cameron's Lake include two forebays on the north side of the lake, and a riser box on the south side providing a new outflow structure. The forebays would be small structural below-grade features and while some individual trees may need to be cleared (BMP final design would have the objective of minimizing this clearing), overall the forebays would not be highly visible nor would they alter the natural visual setting of Cameron's Lake. There would also be the removal of some fill and re-vegetation of the shoreline on the north shore which would be a positive visual enhancement.

At the outlet from the lake a micropool and riser box (proposed site of BMP SBE-2C) would be installed. The riser box would be about ten feet by 15 feet, and three feet above the water line. Given its highly visible location in the lake, the riser box would be clad in a natural finish (e.g., stone). Therefore, these proposed BMPs would not result in potential significant adverse impacts to urban design or visual resources.

SBE-3: WHITNEY WOODS

While some canopy trees may be removed at this BMP, the final BMP design for SBE-3 would include a tree survey for the purposes of minimizing tree clearing. There would also be a buffer of protected woodlands flanking the proposed stream channel and extended detention. The proposed site of this BMP would, therefore, be partially screened by existing vegetation and views from both the public sidewalk and private views from residential areas adjacent to this

proposed BMP would not be significantly altered. In addition, once the BMP vegetation matures, the BMP would provide a natural wetland landscape. Therefore, the proposed BMP would not result in potential significant adverse impacts to urban design or visual resources.

LOWER BAY OUTFALLS

The proposed project would install new and supplemental storm sewer outfalls out to Lower Bay that would be buried and not visible as they extend beneath the Bluebelt property, Father Capodanno Boulevard, and below Franklin Delano Roosevelt Beach and Park, which is a DPR property. The segments of the proposed outfalls that would be visible are along the shoreline at the headwall (which is a concrete encasement installed at the end of outfall). The proposed outfall from SBE-1C would be about two feet wide and five feet high and the outfalls to be enlarged at Quintard Street and Sand Lane would be about 15 feet and 13 feet wide, respectively and five feet high at the shoreline where the structures would first appear from below grade. Any grade changes necessary to bury the outfall in sand along the beach would be minor and not visually distinguishable. The sections of the outfall between the shoreline and out into the bay would also be limited in length and would not be significant structural additions to the public beach. In addition, there are other outfalls and structures along this segment of the shoreline such that the added outfalls would not significantly alter public views along the sandy beach. Therefore, the proposed outfalls would not result in potential significant adverse impacts to urban design and visual resources.

SEWER IMPROVEMENTS AND STREET RAISINGS

The proposed project would require the modification of existing street grades in order to install the proposed storm sewers. Some street segments would be raised from current street grades by between 6 and 24 inches. Given the limited number and length of street segments that would need to be raised (see Chapter 5.1 “Project Description of the South Beach Drainage Plan”) as well as the small increase in grade, these increased street elevations would not be perceptible from a visual or urban design perspective and would not impact urban view corridors or streetscapes along affected streets. The design of the street cross-section would be determined during the final sewer (and street) design for these affected streets in order to minimize differences between the proposed street grade and adjacent private property grade. This would limit transitions between local property and sidewalk elevations. Therefore, the proposed modified street grades would not result in potential significant adverse impacts to urban design and visual resources.

E. CONCLUSIONS

The proposed lower watershed BMPs would transform existing views of large monocultures of common reed into more visually diverse wetlands with open water and a variety of plantings. Views from adjacent streets and private homes would be opened up at street ends where currently common reed impedes most views into the sites. This would be a visual benefit for the community.

With respect to tree stands and visual borders, final BMP designs would include survey details for the purposes of minimizing tree clearing, particularly at those sites where wooded borders are part of the local visual landscape or could potentially screen the BMP site during the grown-in period. Structures within the BMPs would be at or below grade and not visually prominent.

Visually prominent structures would be stone-faced, similar to existing Staten Island Bluebelt designs in South Richmond. In addition, the proposed lower watershed berms would be low-rise features and landscaped such that they are not distinguishable visual features in public views from streets or private views from adjoining properties. Final landscape design of the proposed BMP would be made to enhance natural features and natural aesthetics through a diverse planting program with appropriate tree planting locations to be determined in conjunction with DPR and located as close to the BMP sites as possible. In addition, with the proposed BMPs, the sites would be regularly maintained including the removal of litter, elimination of fill, and the maintenance of vegetation which would contribute positively to the local visual character, particularly along the public street frontages. With the proposed BMPs, brush fires could also be controlled which would limit the potential for visual scarring of the landscape as is caused by the uncontrolled brushfires that have occurred historically in this area.

The proposed project would not significantly alter urban design features or visual conditions of the upper watershed. The upper watershed BMPs are smaller structures (e.g., forebays) that would be at or below grade and not visually prominent with natural feature restoration, with the exception of the proposed riser box at SBE-2C. The proposed riser box would extend above the water line of the lake and given more visible location would be clad in a natural finish (e.g., stone) to support the natural visual setting of the lake. The proposed BMP at Whitney Woods would integrate existing large trees and wooded borders in the BMP design to minimize clearing and visual impacts. Therefore, with the proposed BMP, public views from local streets and private views from adjoining properties would continue to be a natural landscape.

The proposed sewer segments would be below grade with the exception of the proposed outfalls. The proposed new and enlarged outfalls and headwall would be visible as these structures extend out from the shoreline into the Lower Bay; however, given the presence of existing outfall structures and the limited size of the proposed structures (the proposed secondary outfalls would also be adjacent to existing outfalls), the proposed outfalls would not be expected to significantly impact public views along the beach.

Given the anticipated limited increases in street grades, 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 to minimize transitions between adjacent properties and the street and sidewalk.

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

Chapter 5.9: Natural Resources of the South Beach Watershed

A. INTRODUCTION

Preliminary amended drainage plans have been developed for the South Beach watershed (**Figure 5.9-1**) with the objectives of improving water quality, reducing flooding and erosion, and enhancing vegetative communities and wildlife habitats. Overall the proposed project would benefit natural resources; however, certain project elements do require site-specific changes that could affect hydrology, groundwater, water quality, wetlands, vegetation and trees, wildlife, including endangered and threatened species. The proposed site alterations potentially affecting natural resources are examined in this section to determine if there would be potential significant adverse impacts as a result of the proposed project.

B. EXISTING CONDITIONS

HYDROLOGY

UPPER WATERSHED

The upper watershed is characterized by three separate hydrologic features, Brady's Pond, Cameron's Lake and Whitney Woods (see **Figure 5.9-2**). Brady's Pond is at the top of the watershed and has a water surface elevation of approximately 94 feet.[1]

Brady's Pond is a privately owned water body in the upper watershed and located near the intersection of Steuben Street and the Staten Island Expressway. DPR's Brady's Pond Park occupies the northeast corner of the pond shoreline and the immediate upland. Two storm sewers drain into the pond—one collects drainage from the Staten Island Expressway and is under the jurisdiction of NYSDOT; the other, off of Steuben Street, is maintained by DEP. The drainage areas for the two storm sewers are approximately 24 and 6 acres, respectively. Stormwater drainage also enters the pond via overland flow, adding an additional 25 acres. Thus, Brady's Pond has a total drainage area of 55 acres.

Water levels in the pond are controlled by a privately maintained outlet at Windmere Road and Delphine Terrace. The water surface elevation in the pond is generally constant during extended dry weather, which suggests that the water level in the pond is dependent on groundwater inflow. Presently, private owners currently swim in Brady's Pond and treat the waters with chemicals that discourage algal growth during the summer months based on a permit authorization from NYSDEC.

Overflow from Brady's Pond is controlled via an existing weir and culvert located at the intersection of Windermere Road and Delphine Terrace. This flow feeds Cameron's Lake (immediately to the south).

[1] Elevations are in Staten Island Datum unless otherwise noted.

Cameron's Lake is hydraulically below Brady's Pond. The water surface elevation of Cameron's Lake is approximately 88 feet. Flow from the lake discharges to an existing storm sewer in Clove Road. As with Brady's Pond, Cameron's Lake does not dry up during periods of low rainfall, so it is assumed that there is significant groundwater inflow.

Six bathymetry readings have been taken of Cameron's Lake by DEP. The deepest reading was 4.5 feet in the middle of the lake. The remaining readings show a depth of four feet at various locations.

At Whitney Woods, water currently collects on the property at the stub end of Woodlawn Avenue due to the local topography before feeding an existing storm sewer grate at the end of Whitney Avenue. The existing grate is subject to clogging by leaves and other debris, which exacerbates localized pooling of water. The watershed of Whitney Woods is approximately 9.3 acres.

LOWER WATERSHED

The lower South Beach watershed is situated generally in the vicinity of Olympia Boulevard and McLaughlin Street (see **Figure 5.9-3**). The lower watershed where the Bluebelt is located consists of a large common reed monoculture bordering Farther Capodanno Boulevard and the shoreline. A large open water pond at the northeast side of this common reed marsh is the main hydrologic feature of the lower watershed. Under existing conditions, the 10-year design storm produces a peak water surface elevation of 2.5 feet at both Sand Lane (near Quincy Avenue) and at Quintard Street (near Patterson Avenue). In the lower watershed, existing street elevations are as low as elevation 0.0 on McLaughlin Street, and elevation 2.4 on Andrews Street, so with an existing water surface elevation of 2.5 feet for the 10-year storm event, the hydraulic/hydrologic model developed for this project indicates that street flooding occurs under these conditions.

GROUNDWATER

To understand groundwater conditions in the South Beach watershed, monitoring wells were installed along the Quintard Street right-of-way, at the end of Quincy Avenue near Sand Lane, and at the end of McLaughlin Street, roughly corresponding to the proposed locations of South Beach proposed BMPs SBE-1A, -1B, and -1C (**Figure 5.9-4a**).

Groundwater elevations at each well were averaged for the spring, summer, and fall monitoring periods and shown as a range of levels in **Figure 5.9-4b**. In general, results of the groundwater monitoring indicate that the water table in the lower watershed is not far below the ground surface elevations. The spring monitoring was done in April 2010 after one of the wettest months of March on record. Water table elevations are, not surprisingly, highest during the wet period in April and May. Highest recorded elevations in the vicinity of proposed BMPs SBE-1A, SBE-1B, and SBE-1C are 0.71, 0.39, and 0.79 feet, respectively (**Table 5.9-1**). The summer and fall water table elevations are fairly similar, with July observations slightly lower than October to November elevations. The lowest observed groundwater elevations at SBE-1A, SBE-1B, and SBE-1C were 0.01, -0.31, and -0.06 feet, respectively (**Table 5.9-1**). In general, spring water table elevations averaged about 0.75 feet higher than summer and fall measurements.

Table 5.9-1
Range of Observed Groundwater Elevations During 2010 Monitoring Period

BMP	Highest Levels (Spring)	Lowest Levels (Summer/Fall)
Quintard Street and Patterson Avenue (SBE-1A)	0.71	0.01
Sand Lane and Quincy Street (SBE-1B)	0.39	-0.31
End of McLaughlin Street (SBE-1C)	0.79	-0.06

Note: All elevations in Staten Island Datum unless otherwise noted.
Source: *Hydrologic and Hydraulic Analysis of the South Beach watershed and Drainage Plan*, Hazen and Sawyer for the New York City Department of Environmental Protection (DEP), December 2010.

Groundwater elevations were also found to fall between typical low- and high-tide elevations, which is consistent with the assumption that the tide establishes the groundwater table elevation in the lower watershed. However, no correlation was found between the tide elevation at the time of measurement and the groundwater elevation. This indicates that while the sea level controls the broader water table elevation, individual tidal cycles do not impact the movement of groundwater in these areas of the South Beach watershed.

FLOODPLAINS

Figure 5.9-4 presents the 100-year floodplain (area with a one percent chance of being inundated within any given year) and 500-year flood plain (area with a 0.2 percent of being inundated within any given year). New York City is affected by local (e.g., flooding of inland portions of the City from short-term, high-intensity rain events in areas with poor drainage), fluvial (e.g., rivers and streams overflowing their banks), and coastal flooding (e.g., long and short wave surges that affect oceans and bays such as Lower Bay, and tidally influenced rivers, streams and inlets). Much of the lower watershed is within the 100-year floodplain, which extends north to Hylan Boulevard). Standing water in the streets and slumping of soil and pavement in low lying areas is evidence of frequent local flooding within the study area.

Based on an examination of the Flood Insurance Rate Maps (FIRMs) for the watershed, the 100-year flood elevation varies in the lower watershed from 10 feet National Geodetic Vertical Datum (NGVD) to 11 feet NGVD (6.8 to 7.8 feet Staten Island Datum). The Federal Emergency Management Agency has not calculated 100-year flood elevations for the upper watershed, meaning that those areas do not typically experience significant flooding. Therefore, the proposed upper watershed BMPs were not evaluated during a 100-year storm event.

WATER QUALITY

Surface waters in the upper watershed include Brady's Pond, Cameron's Lake, and Whitney Woods. The New York State Department of Environmental Conservation (NYSDEC) classifies Brady's Pond and Cameron's Lake as Class B waterbodies (see **Figure 5.9-5**), which means they should be suitable for human contact. The Lower Bay is classified SB, which is a marine water designation that also calls for recreational uses, such as swimming and boating. The surface water that collects in Whitney Woods is not classified by the State. Under existing conditions, water quality issues at Brady's Pond include algal blooms that can lead to low dissolved oxygen counts in addition to the impacts on aesthetics and recreational uses. As discussed above, water supply to Brady's Pond is most likely dependent on groundwater discharges since water levels do not fluctuate seasonally or with periods of low rainfall and the quality of the water is swimmable. Presently, the private owners of Brady's Pond treat the waters

with chemicals that discourage algal growth during the summer months. The owners obtained a permit from NYSDEC to authorize those treatments.

Under existing conditions, pollutants enter the water bodies of the upper watershed and trunk sewers and in turn flow to the Lower Bay. Those pollutants include organic matter that can increase the biochemical oxygen demand (BOD) within the water column thereby resulting in a reduction in the dissolved oxygen (DO) concentrations that stress natural communities. The contaminants also cause an increase in coliform bacteria, and nutrients, which can result in a eutrophic condition. This can cause phytoplankton blooms, including nuisance algal forms, which further depresses DO levels in water bodies. With large stormwater runoff volumes that are not attenuated in any way, as under current conditions, more of these pollutants coming from rooftops, lawns, roadway surfaces and other urban areas are transported directly to local streams and ultimately to the Lower Bay. There are also the erosive forces of unmanaged runoff which leads to sedimentation in local waterbodies.

WETLANDS

NYSDEC MAPPED FRESHWATER WETLANDS

There are three NYSDEC wetlands that have been mapped within the South Beach watershed (see Figure **5.9-6**). These wetlands are described below. **Table 5.9-2** provides the NYSDEC wetland classifications.

Table 5.9-2
NYSDEC-Mapped Wetlands of the South Beach Watershed

Wetland Code	Wetland Name	Wetland Class	BMP
NA-4	Brady's Pond	II	N/A
NA-6	Cameron's Lake	II	SBE-2
NA-7	South Beach	I	SBE-1

Note: NYSDEC identifies four classes of wetlands. Class I is the most critical for preservation and protection typically because it is a diminishing resource in an urban setting, and provides flood control and wildlife habitat. Class II wetlands is the second most important of the wetland classifications.
Sources: NYSDEC 1987

BMP NA-4: Brady's Pond

NYSDEC-mapped wetland NA-4 covers Brady's Pond. As described by NYSDEC, wetland NA-4 is the remaining portion of a two-mile wetland complex that once included bogs, marshes, and swamps prior to the development of this section of Staten Island. Currently, the edges of this pond are heavily developed. Although the northeast portion of the pond is DPR's 6.6 acre Brady's Pond Park, this park is wooded and includes a small spring-fed deciduous swamp which feeds into Brady's Pond (NYSDEC 1987).

Wetland NA-4 is a Class II wetland for its flood prevention benefits comprised of 3 percent deciduous swamp, 10 percent emergent marsh, and 87 percent floating and submergent vegetation. Wetland benefits associated with natural resources of this wetland include flood and storm control, wildlife habitat, pollution treatment, erosion and sedimentation control, and fish habitat (NYSDEC 1987).

BMP NA-6: Cameron's Lake

NYSDEC-mapped wetland NA-6 is a four-acre lake located in the upper watershed that is bordered by residential development. Wetland NA-6 is a Class II wetland characterized by 60 percent floating and submergent vegetation and 40 percent wetland open water. The Class II designation of this wetland means that this wetland is within an urbanized area and supports wildlife diversity or abundance not common to Staten Island (NYSDEC 1987).

BMP NA-7: South Beach

NYSDEC-mapped freshwater wetland NA-7 is an 89 acre wetland comprised of two adjacent sections. The northeastern portion of wetland NA-7 remains at its original elevation near sea level. However, due to loss of tidal circulation from development and filling, open water ponds have developed and are now dominated by common reed (NYSDEC 1987).

The southwestern portion of wetland NA-7 has undergone the most disturbance as a result of the fill activities and the current conditions, which are a result of successional vegetative growth over fill material. Influenced by storm events, water tends to pond in low areas creating conditions ideal for wetland vegetation, but only a small number of these ponds stay permanently wet throughout the year. The wetlands are subject to brush fires when the common reed plants have dried out, especially in the late winter and early spring. The ponds or basins of wetland NA-7 are separated by strips of upland areas that are vegetated with upland species.

Wetland NA-7 is a NYSDEC-designated Class I wetland due to its important natural habitats and flood control features in an otherwise urban setting. Approximately 49 percent of the wetland is identified as emergent marsh, 38 percent as wet meadow, and 13 percent as open water. According to the NYSDEC wetland designation report, wetland NA-7 was documented as resident habitat for state-listed threatened or endangered animal species (NYSDEC 1987).

NYSDEC MAPPED TIDAL WETLANDS

In addition to the freshwater wetlands described above, the Lower Bay contains tidal (littoral zone) wetlands as mapped by NYSDEC (see **Figure 5.9-6**).

NWI MAPPED WETLANDS

NWI-mapped wetlands are found in the watershed generally at the same locations as the NYSDEC wetlands. Mapped NWI wetlands include open water lakes and palustrine wetlands that characterize the upper watershed and emergent (common reed dominated) wetlands of the lower watershed. Estuarine subtidal and intertidal wetlands are mapped along the shoreline and within the bay. **Figure 5.9-7** shows the locations of these wetlands within the watershed (see also Appendix C for the wetland definitions).

WILDLIFE

The South Beach watershed has sand dunes, wetlands, grasslands and shrub forests, freshwater ponds, and emergent marshes. With the exception of the open water habitats of Brady's Pond and Cameron's Lake in the upper watershed, the majority of these habitats are concentrated in the lower portion of the watershed within NYSDEC designated wetland NA-7. This section of the chapter provides an overview of the wildlife expected within the watersheds habitats.

Birds

The South Beach watershed has been surveyed as part of the New York State Breeding Bird Atlas and 70 species have been identified. Those species can be found in many habitats,

including mudflats, shores, salt marshes, uplands, ponds, and wetlands. Appendix C provides the breeding bird atlas inventory data for this watershed.

Bird species expected in the fresh water ponds and lakes of the upper reaches of the watershed include waterbirds such as the Canada goose[1], mute swan, mallard duck, and black duck. Long-legged wading birds, such as green heron, great blue heron, and American egret would be expected to forage in shallow watercourses of the South Beach watershed. Foraging ground feeders such as the brown thrasher, American robin, and wood thrush as well as woodpeckers (i.e., Red-bellied woodpecker and hairy woodpecker) and a variety of songbirds (i.e., northern cardinal, Baltimore oriole, mockingbird, chipping sparrow) would be expected to occur in the wooded areas of the watershed.

Bird species expected within wetlands and associated edge and forested habitats of the lower watershed include species such as the gray catbird, northern flicker, American crow, Carolina wren, eastern phoebe, tufted titmouse, American robin, yellow warbler, common yellowthroat, common grackle, song sparrow, northern cardinal, barn swallow, and red-winged blackbird. Waterbirds would be expected to utilize watercourses of the lower watershed and could include species of mallard, double crested cormorant, great egret, black-crowned night-heron, and glossy ibis.

The Breeding Bird Atlas identifies two State-protected species of birds, the Peregrine falcon and the common nighthawk, as present in this watershed (see also "Endangered, Threatened, and Special Concern Species and Communities," below).

Reptiles and Amphibians

There is limited reptile and amphibian diversity in the watershed and the species that are likely to be present at the proposed BMP sites are habitat generalists that can tolerate disturbed conditions. Within the watershed, Eastern red-backed salamanders may utilize cover objects such as downed logs in some of the wetlands. The mix of residential yards and pockets of forested uplands may provide habitat for species dependent on wet areas for breeding. Spring peepers and Fowler's toads are also expected to use the wetlands as breeding habitat and utilize the uplands for both summer and overwintering habitat. American bullfrogs and green frogs are expected to inhabit the permanent waters within the wetland year round. Common garter snake, Northern brown snake, and the milk snake would utilize the peripheral boundaries of the proposed BMP sites while the Northern water snake may inhabit the permanent waters of the ponds and wetlands. Three species of turtles are expected to inhabit the proposed BMP sites: snapping turtle, red-eared slider, and painted turtle. All three species are dependent on permanent water and may use the surrounding uplands for nesting sites in late spring/summer. Appendix C provides a listing of reptile and amphibian species that may be found in this watershed.

Fish

The drainage system in the South Beach watershed is largely piped and contains no open stream corridors. However, there are two open water bodies in the upper watershed: Cameron's Lake and Brady's Pond. Both of these surface water features have been identified as fish habitats in NYSDEC wetland designation reports. Bluegill and pumpkinseed sunfish were reported for both water bodies, and bullhead catfish, gambusia, pumpkinseed, and goldfish were also reported in

[1] Latin species names are provided in Appendix C.

Brady's Pond. Largemouth bass were reported in Brady's Pond, but were not observed. The South Beach wetlands of the lower watershed are ephemeral, would not support a viable fish habitat and were not identified as potential fish habitat in the NYSDEC wetland designation reports. This condition was confirmed during summer 2011 field observations.

In addition, Lower Bay is an important marine fishery resource. Species common to the bay include winter flounder, bluefish, Atlantic butterfish, Atlantic mackerel, summer flounder, black sea bass, Spanish mackerel, and sandbar shark, all of which are considered part of the Essential Fish Habitat designation for Lower Bay (see Appendix C).

Mammals

There is limited mammalian diversity within the watershed. Mammalian species in urbanized watersheds such as South Beach tend to be habitat generalists and are commonly found in a variety of habitats. These species may include raccoons, white-footed mouse, Norway rat, moles, opossum, groundhog, gray squirrel, chipmunk, muskrat, eastern cottontail rabbit, little brown bat, and feral domestic cat. Among the large mammals, the white-tailed deer is expected to occur throughout all of the proposed BMP sites.

BMP SITES

BMPS SBE-1A, 1B AND 1C: SOUTH BEACH AT QUINTARD STREET, SAND LANE AND MCLAUGHLIN STREET

The majority of this site is within the NYSDEC-mapped NA-7 wetland and also contains NWI wetlands including palustrine emergent, palustrine open water, and palustrine forested wetlands. Observations of these wetlands identified three distinctive features: (1) a common reed dominated marsh with ponds; (2) open water habitat; and (3) transitional areas from the wetland to upland communities.

Open marsh wetlands dominated by a common reed marsh as defined by Edinger et. al., (2002) is the most common habitat type observed at this site. Although common reed is the dominant species, it does not form a monoculture throughout the entire site; other species found within the reedgrass marsh include jewelweed, sensitive fern, and royal fern in the herbaceous layer and arrowwood, elderberry, dogwoods, red maple, grey birch, and silver maple in the shrub and canopy strata in central and edge communities of the marsh. Red maple and gray birch are also present in pockets along the wetland edges. Other non-native species noted within the wetland area include multi-flora rose, Japanese knotweed, and porcelain berry.

In the vicinity of Sand Lane at Oceanside Avenue, a shallow pond is present along with smaller open water areas. These isolated open water areas are surrounded by common reed and have coverage of duckweed. Other species include swamp loosestrife, rose mallow, soft rush and sedge species along their perimeter.

Transitional areas comprised of typical successional species are present south of Patterson Avenue (in the vicinity of SBE-1A), east of Wentworth Avenue (in the vicinity of SBE-1B and SBE-1C), south of Quincy Avenue, and along the southerly side of the proposed BMP. In this area red maple and gray birch are present in pockets along the wetland edges. Typical species observed within the canopy and subcanopy layers also include porcelain berry, fox grape, wisteria and other vines which are present in varying densities. In addition, a native transitional area was observed within the northern portion of SBE-1A in the vicinity of Vulcan Street. This area contains a number of native herbaceous species and shrubs including cinnamon fern, Canadian burnet, tussock sedge, and royal fern, in the herbaceous layer and azalea, blueberries,

arrowwood, coastal pepperbush, and pussy willow in the shrub layer. In areas of higher elevation, invasive species such as mugwort, multiflora rose, and Japanese knotweed are present. Other species include cottonwood, black cherry, and sassafras, which seems to be a result of the adjacent residential development. In addition, some transition areas along street edges have been planted with species including pussy willow, other willows, and dogwoods.

Upland habitats within this proposed BMP are also dominated by narrow corridors of successional southern hardwoods. Prior filling at this site has created elevated mounds composed of soil and debris. Overgrowth in these areas has resulted in successional southern hardwoods habitat. This community within the BMP proposed site typically has dominant canopy and subcanopy tree species that include black locust, cottonwood, mulberry, tree-of-heaven, black cherry, box elder, Norway, silver, and red maple, gray birch, pussy willow, and autumn olive. Dominant species in the understory include saplings of these woody species, along with multiflora rose, Japanese knotweed, mugwort, blackberry, smooth and winged sumac, bayberry, inkberry, and red chokeberry. Substantial coverage by porcelainberry, Asiatic bittersweet, fox grape, wisteria, Japanese honesuckle, and other vines is present to varying degrees, but is generally most dense in locations adjacent to roads and developed areas. The herbaceous layer is often limited. Although white snakeroot, aster, and goldenrod are present in more open areas, there is substantial cover of mugwort and Japanese knotweed in the interior portions of the berms.

The largest successional old field community within this proposed BMP site is located adjacent to Ocean Breeze Park and south of Patterson Avenue, in the vicinity of SBE-1A. Forbs of this community include Canada goldenrod, seaside goldenrod and other goldenrod species, various aster species, common milkweed, hyssop-leaved and tall thoroughwort, Queen Anne's lace, chicory, red and alsike clover, and grasses including switchgrass species, fescue, among others. Areas closer to residential sites are dominated by mugwort, Japanese knotweed, and porcelainberry.

Based on its large size, relative variety of habitats, and proximity to the Lower Bay, this site would be expected to provide breeding, foraging and stopover site for waterbirds and passerines. This was confirmed by the wildlife observed at this site during 2009 and 2010 site investigations included a variety of birds, amphibians, and mammals. A number of waterbird species were observed at this proposed BMP site, particularly within the shallow, open water ponds and channels. Observed species included gadwall, mallard, American black duck, green-winged teal, Virginia rail, black-crowned night-heron, great blue heron, and belted kingfisher (fall 2009), great egret, double-crested Cormorant, Canada goose, and mallard (spring 2010). These species were predominantly observed in open water and stream channel areas that were away from the developed border and protected by large areas of common reed. These relatively protected, shallow water habitats likely represent important foraging and nesting habitat for waterfowl, rails, and long-legged wading birds.

The successional southern hardwoods and scrub-shrub communities at the borders of the site would support several resident and fall and winter migrant species, including red-tailed hawk, red-bellied woodpecker, yellow-bellied sapsucker, northern flicker, gray catbird, brown thrasher, black-capped chickadee, red-breasted and white-breasted nuthatches, golden-crowned kinglet, indigo bunting, scarlet tanager, Nashville warbler, yellow-rumped warbler, common yellowthroat, song sparrow, white-throated sparrow, fox sparrow (observed in fall 2009), Baltimore oriole, northern cardinal, crow sp., American robin, American goldfinch, downy woodpecker, and ring-necked pheasant (observed in spring 2010). Large flocks of red-winged

blackbirds (also a common breeder in open marsh areas based on available habitat), common grackle, and American robin were observed during fall 2010 surveys. In closer proximity to developed areas, introduced species (such as rock pigeon, European starling and house sparrow) were observed in large numbers.

All of the reptile and amphibian species common in the Mid-Island lower watersheds (see Appendix C) would be expected to inhabit this proposed BMP. During fall 2009 site reconnaissance, vocalizing spring peepers were detected in substantial numbers (about 75 individuals) throughout the entire proposed BMP, suggesting that this site may be critical to amphibian populations. Since the open water at this site is more seasonal or intermittent (with the exception of the small pond at the west end of Crestwater Court) no fishery is expected at this proposed BMP site. Given its size and the current habitat communities, all of the mammalian species common to the watershed and Mid-Island area would be expected within the various ecological communities of SBE-1; muskrat, eastern gray squirrel, Norway rat, and feral cats and dogs were observed during the field investigations.

BMPS SBE-2A, -2B, -2C: CAMERON'S LAKE

As described above, Cameron's Lake is mapped by NYSDEC as wetland NA-6 and is an open water lake as mapped by NWI. It is surrounded by residential homes on sizeable lots with maintained yards with mature trees. Trees in the canopy include sweetgum, red oak, red maple, mulberry, mockernut hickory, and green ash. In areas between homes and along roadside edges, the ecological community closely resembles that of the successional southern hardwoods. The understory of this community is dominated by introduced and ornamental species, such as Japanese knotweed and porcelainberry, with some native species common to disturbed areas (e.g., evening primrose). Mature sweetgum trees are located on the northeastern and northwestern corners of the pond at the existing outfalls, with an understory dominated by exotic invasive vegetation (i.e., porcelainberry, Japanese knotweed). Mature red maples and red oaks are present along the shoreline.

This site currently offers suitable wintering and foraging habitat for waterbirds and nesting habitat for common, human-adapted passerines. Wildlife observed at Cameron's Lake in fall 2009 included great blue heron and several species of waterfowl, both native (mallard, gadwall, American wigeon, green-winged teal, Canada goose) and introduced species (Chinese goose, domesticated goose). Passerines associated with developed landscapes with mature trees and ornamental understory, including northern cardinal, house finch, house sparrow, and European starling, were also observed. Species observed in spring 2010 include Baltimore oriole, northern cardinal, American robin, red-winged blackbird, rock dove, American goldfinch, European starling, yellow warbler, herring gull, ring-necked pheasant, great egret, gray catbird, downy woodpecker, and common yellowthroat. Waterbirds included double-crested Cormorant, Canada goose, and mallard.

All of the reptile and amphibian species common to the watershed (see Appendix C) would be expected to inhabit Cameron's Lake and is immediately adjacent shoreline, although the presence of developed residential uses and built streets in the immediate uplands would significantly limit the available reptile and amphibian habitat at this site. With respect to aquatic wildlife, Cameron's Lake has been identified in the NYSDEC wetland designation reports as containing common lake and pond fish such as bluegill and pumpkinseed sunfish. Small mammals, including raccoon, gray squirrel, eastern cottontail rabbit, Norway rat, chipmunks, and muskrat, would be expected in the residential areas fronting this lake. Eastern gray squirrels were identified during the field investigations.

BMP SBE-3: WHITNEY WOODS

No NYSDEC or NWI wetlands are mapped at this site. The depression within the site can be characterized as a remnant red maple-hardwood swamp that is surrounded along the perimeter (and being colonized by) invasive plant species. Dominant trees in the canopy include red maple, some of which are greater than 24 inches diameter at breast height. The shrub layer is dominated by Japanese knotweed, although arrowwood and regeneration of red maple is also present. Native species observed in the herbaceous layer include sensitive fern, cinnamon fern, and jewelweed. Several species of vines are present in the understory and include English ivy, Japanese honeysuckle, poison ivy, and greenbrier. In the western portion of the basin, in the vicinity of Whitney Avenue, there is an area of standing water and muck that is bordered by Japanese knotweed. This wet area drains to a storm drain located at the street end of Whitney Avenue on the western edge of the site, containing spike rushes, broad-leaved cattail, and boneset. Substantial amounts of litter (including a large number of bottles) were present within this area.

The eastern and southern ends of the site are at higher elevations and support a forested upland edge. This community contains several large trees including red oak (>36" dbh), silver maple (>36" dbh), and mulberry (>24" dbh) along with smaller trees of red oak, Norway maple, and cherries. The understory contains several ornamental species including burning bush, privet, and Japanese barberry. Species occurring within the herbaceous layer include white wood aster, pokeweed, garlic mustard, and Japanese knotweed. This vegetation cover closely resembles successional southern hardwoods.

In general, this site contains large trees, with red maples, silver maples and red oaks up to 25 inches in diameter. Although regeneration of seedlings was noted within the understory, invasion of understory vegetation by non-native species, particularly Japanese knotweed, is prevalent.

Numerous woodland and edge bird species common to the watershed would be expected to breed, forage, or overwinter at this site. The trees of this site provide perching opportunities for aerial foragers, such as flycatchers, and canopy birds (i.e., warblers) as well as breeding and foraging habitat for ground feeders such as the brown thrasher, American robin, and wood thrush. Species observed on site during the October 2010 site reconnaissance included American robin, northern cardinal, European starling, golden-crowned and ruby-crowned kinglet, white-throated sparrow, mourning dove, Carolian wren, black-throated green warbler, yellow-rumped warbler, song sparrow, house finch, and black-capped chickadee.

Several species of reptiles and amphibians may also inhabit the site. However, due to the lack of permanent water, the northern water snake and all three freshwater species of turtles with the potential to occur in the South Beach watershed are unlikely. No reptiles or amphibians were observed during the October 2010 site reconnaissance.

This small site would be expected to provide food sources and cover for many of the common mammals at the watershed including opossum, raccoon, white-footed mouse, groundhog, and white-tailed deer. Only eastern grey squirrel was observed during the October 2010 field investigation.

LOWER BAY OUTFALL

Lower Bay is mapped by NYSDEC as a littoral zone tidal wetland and by NWI as estuarine subtidal waters with unconsolidated bottoms that are permanently flooded (E1UBL). The

shoreline along the bay is mapped as estuarine intertidal unconsolidated shore, parts of which are regularly flooded (E2US2N) and others irregularly flooded (E2US2P). The ecological community of the shoreline can be characterized as an estuarine dredge material shore that is maintained as a portion of DPR's Franklin D. Roosevelt Boardwalk and Beach. Spring and fall 2009 field observations of this site confirm a groomed sand beach void of vegetation.

Wildlife expected at this site would include shorebirds (e.g., American sandpiper and willet), gulls (e.g., herring gull and great black-backed gull), and waterbirds [e.g., double-crested cormorant] as well as mallard and brant. Reptiles and amphibians would not be expected at this site. Mammals, including feral cats and dogs, eastern gray squirrel, Norway rat, and other species common to the urban environment may be found along this area. For the in-water section, the benthic zone of Lower Bay would also be expected to include a variety of invertebrates and mollusks common to the bay. Fish would also be expected in the shallow near-shore waters out to the pierhead line.

Lower Bay is an important fishery resource. Species that are common to the bay include winter flounder, bluefish, Atlantic butterfish, Atlantic mackerel, summer flounder, black sea bass, Spanish mackerel, and sandbar shark all of which are considered part of the Essential Fish Habitat designation for the Lower Bay (see Appendix C).

ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES AND COMMUNITIES

Information on endangered, threatened, special concern, and rare species was obtained from the National Marine Fisheries Service (NMFS), the New York Natural Heritage Program (NYNHP) and the U.S. Fish and Wildlife Service (USFWS). In addition, data was provided by DPR's Natural Resources Group (NRG). A review of that data found that one maritime protected species, the shortnose sturgeon, is listed for the Lower Bay. There are also four species of federally threatened or endangered sea turtles that may be found seasonally. In correspondence with NMFS, the agency indicated that although there are federally listed species of whales and terrapins that occur within Lower Bay, there are no endangered, threatened, or special concern species that are likely along the project area.

The results of the database indicate that there are three state-listed plant species within the South Beach watershed and literature review indicates that there are potentially seven additional records of state-listed plant species. In addition, the Breeding Bird Atlas lists two state-protected bird species for this watershed.

Table 5.9-3 lists the federally and state protected species of the watershed (such as endangered or threatened wildlife, or rare plants) along with their potential to occur at each proposed BMP site. **Appendix C** provides a brief description of these species along their ranking and status as well as description of other species that may be special concern species or species or habitats of interest. In addition, wildlife and plants that are historically known to occur in one or more locations within the watershed are provided in **Appendix C**.

Table 5.9-3
Potential for Federal- and State-listed Protected Species within the South Beach Watershed

Species	Source	NYNHP Status	Habitat	Potential Yes/No
Marine Species				
Shortnose Sturgeon	USFWS	E*		Not expected
Birds				
Osprey	Breeding Bird Atlas	SC	Coastlines; lakes; rivers; dead trees; human-made structures	Potential to occur at SBE-1A, -1B2,-1C
Northern Harrier	Breeding Bird Atlas	T	Coastal marshes, grasslands, meadows and cultivated fields	Potential to occur at SBE-1A, -1B,-1C
Peregrine Falcon /NYSDEC	Breeding Bird Atlas	E	Coastal marshes, grasslands, meadows and cultivated fields	Potential to occur at SBE-1A, -1B,-1C
Plants				
Slender Rose Gentian	NYCDPR	E	Salt and brackish marshes of coastal areas	Potential to occur at SBE-1A, -1B,-1C
Green Milkweed	NYNHP	T	Serpentine Rocks/Grasslands	Low Potential
Hop Sedge	Data and literature review	T	Coastal Sands	Potential to occur at SBE-1A, -1B,-1C
Fringed boneset	Data and literature review	T	Coastal Sands and meadows	Potential to occur at SBE-1A, -1B,-1C
Needlepod Rush	Data and literature review	E	Coastal Sands and meadows	Potential to occur at SBE-1A, -1B,-1C
Seaside knotweed	Data and literature review	R	Sandy beaches and shores	Potential to occur at SBE-1A, -1B,-1C
Globose Flatsedge	Data and literature review	E	Sandy coastal plains	Potential to occur at SBE-1A, -1B,-1C
Butterfly Milkweed	Data and literature review	EV	Dry fields/banks	Potential to occur at SBE-1A, -1B,-1C
Nodding Ladies Tresses	NYCDPR	EV	Wet meadows and swamps	Potential to occur at SBE-1A, -1B,-1C
Royal Fern	AKRF	EV	Emergent wetlands, red-maple hardwood swamp, shrub-dominated wetlands; areas with low common reed coverage	Potential to occur at SBE-1A, -1B,-1C (observed at these sites)
Cinnamon Fern	Observed	EV	Wet meadows	Potential to occur at SBE-1A, -1B,-1C and SBE-3 (observed at these sites)

Notes: (*) Also federally endangered. NYNHP ranks and codes: (E) Endangered; (T) Threatened: (EV) Exploitably Vulnerable; (R) Rare.
Observed=observed during the 2009/2010 BMP site surveys.
Sources: NYNHP (2009; 2010); DPR (2009) unless otherwise noted.

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

HYDROLOGY

In the future without the proposed project it is assumed that stormwater flows will remain uncontrolled and regular storm-event flooding will continue within the watershed particularly in the streets and properties of the lower watershed.

In addition, no major changes in runoff patterns are expected in the future without the proposed project. Therefore, the issues of local street and property flooding are assumed to continue through the 2043 analysis year.

GROUNDWATER

Without the proposed project, groundwater elevations within the South Beach watershed are not anticipated to change. Driven largely by constant factors such as the low-lying nature of the watershed and the influence of the tide, the levels of the groundwater table in the area are not anticipated to change in the future.

WATER QUALITY

Water quality conditions are expected to most likely remain unchanged or decline as stormwater remains uncontrolled.

WETLANDS

In the future without the proposed project, wetlands that are now degraded with debris, erosion, and invasive plant species are assumed to remain in a similar condition and current native plant communities may decline as a result of the spread of invasive plants and uncontrolled runoff. There would also be only limited maintenance of the Bluebelt properties since they would not be adapted to the proposed BMPs.

In addition, the common reed dominated sites of the proposed lower watershed BMPs have been the scene of many brush fires in recent years. Those fires have occurred as recently as fall 2010. In the future without the proposed project, these fires are expected to continue on a regular basis through the 2043 analysis year.

VEGETATION AND TREES

In the future without the proposed project, no major changes in vegetative cover are expected in the watershed. While the Bluebelt and public open space are protected from development, there could be some reduction in vegetative cover and trees due to development in the watershed; however, there is little remaining undeveloped land in the watershed.

WILDLIFE

No major change in wildlife cover or habitat are expected in the future without the proposed project. Under this condition, the wetland would remain unimproved and the current common reed dominated habitat of the lower watershed would remain.

ENDANGERED, THREATENED AND SPECIAL CONCERN SPECIES AND COMMUNITIES

No major changes in the habitats of protected species within the watershed are expected in future without the proposed project. Thus, it is assumed that the wetland would remain unimproved and the current common reed-dominated habitat of the lower watershed would remain intact.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

HYDROLOGY

UPPER WATERSHED

Under the proposed project, new storm sewers are proposed for Windermere Road, Delphine Terrace, Clove Road West, and Lakeview Terrace, and the DEP drain to Brady's Pond would be eliminated through the installation of storm sewers, for discharge to the Lower Bay. As a result, the proposed project would divert the 6-acre drainage area associated with the existing DEP drain away from Brady's Pond during storm events. Stabilized outlets are also proposed at the ends of Overlook Terrace, Hillcrest Court and Hillcrest Terrace that would discharge overland flow into the pond from a drainage area of approximately 7 acres (see Figure 3.1-2b). However, any proposal to remove the existing outfall to the pond would not move forward without first undertaking a thorough analysis of the potential impacts on the pond hydrology and, as necessary, providing stormwater flows that support the water elevations of the pond and provide proper circulation in the pond for good water quality.

In order to provide adequate street drainage, the proposed amended drainage plan also requires the installation of storm sewers in all mapped City streets. The proposed stormwater collection network would convey 45 percent of the overland flow that currently drains into the pond to the Lower Bay through the three proposed outfalls located at SBE-1C, Sand Lane, and Quintard Street. This portion of the proposed stormwater collection network, including all proposed catch basins and sewers downstream in Brady's Pond, is sized for the five-year storm.

With DEP's proposed amended drainage plans, the surface water inputs from the DOT outfall would remain unchanged (drainage area about 24 acres) and overland flow from an additional 7 acres would also remain. While fluctuations in water surface elevations during storm events may be reduced, the proposed project would not affect water levels in the pond, which are generally constant during periods of extended dry weather under current conditions and controlled by the privately maintained outlet at Windmere Road and Delphine Terrace.

Downstream, at Cameron's Lake, two existing outlets would be replaced to handle additional flow from the neighboring storm sewers proposed as part of the overall stormwater management plan. However, there would also be a reduction in the size of the Cameron's Lake watershed from 56 to 38 acres due to the reduction of flow into Brady's Pond. Therefore, a flow rate reduction to Cameron's Lake of approximately 30 percent, or 54 cubic feet per second is anticipated. However, since Cameron's Lake seems to be fed significantly by groundwater, the loss of this percentage of stormwater flow is not anticipated to have an adverse impact on water flow through the lake or water surface elevation.

Other features of the drainage plan in this area have been designed to maintain existing water surface elevations in the two water bodies. Therefore, according to the proposed drainage plan, storm sewers in Windermere Road and downstream at proposed BMP SBE-2A are sized such that all the flow from Brady's Pond can be accommodated, since the conservative assumption is made that no storage occurs in Brady's Pond. A new outlet structure to replace the current outlet in Clove Road is also proposed as part of the stormwater management plan at Cameron's Lake. It would be located in the right-of-way of Normalee Road (proposed BMP SBE-2C). The proposed riser box structure under the proposed drainage plan (about 12 feet square) would be designed to preserve the existing lake elevation of approximately 84.0 feet and would allow for an appropriate level of fluctuation during storm events. The outlet structure would bring

stormwater to the storm sewer in Clove Road via Normalee Road. Therefore, the proposed project is not anticipated to impact water surface elevations in Cameron's Lake.

Finally, the proposed plan calls for one outlet at the east end of Whitney Woods where Woodlawn Avenue deadends, discharging just slightly more drainage area then under the existing conditions, 10.3 acres as compared to 9.3. Because the increase in drainage area is modest, flow rates are not expected to increase significantly within Whitney Woods. The proposed BMP would be excavated in the existing woods to provide detention volume without impacting the neighboring properties, and discharge at the necessary elevation through an outlet structure at Whitney Avenue draining to the Parkinson Avenue storm sewer. The peak water surface elevation during the 10-year design storm would be elevation 80. As the existing grade in the area is approximately elevation 86, the current flooding problem in the vicinity Whitney Woods would be resolved with implementation of the proposed project.

Therefore, the proposed project would not result in potential significant impacts to hydrology in the upper South Beach watershed.

LOWER WATERSHED

10 Year Storm Event

In the lower watershed, proposed BMPs are comprised of large, shallow extended detention wetlands, which provide floodwater storage during high tides. The results of watershed modeling with the proposed drainage plan in place under the 10-year storm event for the lower watershed are presented in **Figures 5.9-9** through **5.9-11**. **Table 5.9-5** also provides a summary of water surface elevations for proposed conditions with and without the proposed extended detention wetland BMPs during the peak of the 10-year storm event. The results indicate that the proposed BMPs would reduce peak water surface elevations throughout the lower watershed by approximately one foot during a 10-year event.

Table 5.9-5
Peak Water Surface Reductions During the 10-Year Storm Event Under the Proposed Amended Drainage Plan

BMP	Existing Peak Stage	Peak Stage with the Proposed Project	Reduction (ft)
BMP Peak Stages (ft. SI)			
Quintard St and Patterson Avenue (SBE-1A)	2.46	1.17	1.29
Sand Lane and Quincy St (SBE-1B)	2.45	0.95	1.50
End of McLaughlin St (SBE-1C)	2.45	-1.62	4.07
Note: Elevations are in Staten Island Datum. **Source:** Hazen and Sawyer, January 2011.			

The reduction for McLaughlin Street was assumed based on the existing conditions of one large connected lot between Sand Lane and Quintard Street, such that water surface elevations of 2.45 feet would result in similar water surface elevations throughout those low-lying areas, since there is no way for them to drain otherwise. Most importantly, the peak water surface elevations would remain below the target peak water surface elevation of 2.0 feet in proposed BMP SBE-1A and -1B, and -1.0 feet for SBE-1C. This reduction in peak water surface elevations in the lower watershed wetlands, combined with the installation of storm sewers in the streets, would dramatically improve the surface drainage of these streets and the adjacent neighborhoods. Therefore, the proposed project would have a positive impact on flooding conditions and reduce

flooding impacts to local streets and houses by significantly improving the detention and conveyance of stormwater runoff.

Therefore, the proposed project would not result in any significant adverse impacts on hydrology in the lower watershed under the 10-year storm event.

Affects of Sea Level Rise

New York City has an extensive coastal zone with billions of dollars of private and public investments, making sea level rise an important long-term planning issue. The potential impacts of sea level rise on the City were a major focus of the City's PlanNYC report which recommended preparation of a comprehensive climate change adaptation study and examination of climate change resiliency options.

Warming global temperatures are considered extremely likely over the coming decades and through the course of the next century. It is anticipated that this warming will be at a faster rate than past trends which will have the effect of increasing the rate of global sea level rise. Given the long-term nature of sea level rise effects and the variables intrinsic to predicting global carbon emissions, global climate conditions, and the resulting effects on sea level, there are ranges in sea level rise projections that take into account various scenarios. In February 2009, the City's Panel on Climate Change released its report "Climate Risk Information" which was prepared with the assistance of the Mayor's Office of Long Term Sustainability. That report presents sea level rise projections that take into account the predicted ranges of both global climate change and local land subsidence. The central range of these projections are sea level increases of 2 to 5 inches by the 2020's, 7 to 12 inches by the 2050's, and 12 to 23 inches by the 2080's. Impacts of sea level rise as identified in the report include the risk of increased coastal flooding and precipitation. A report released by the New York State Sea Level Rise Task Force—Report to the Legislature (December 31, 2010) accepts similar sea level rise projections.

The proposed BMPs are the type of infrastructure design and investment for the City that is climate change resilient and reduces expansion and reliance on hard infrastructure, which is less adaptable to increasing sea level and more susceptible to the effects of submersion under higher tides. In contrast, the proposed BMPs can adapt to sea level rise while preserving and restoring coastal floodplains as wetlands (there are approximately 61 acres of permanently preserved Bluebelt property in the South Beach Watershed) and the limited structural elements that are necessary (e.g., weirs) are more adaptable to changes in surface water elevations that may result from increasing sea levels. For example, the proposed BMP weir structures are designed with flexible weir plates or adjustable valves so that discharge rates can be modified in response to changes in BMP surface water elevations. Thus, the proposed project would be more adaptable to changing tidal conditions than the conventional stormwater piped systems, which cannot be adjusted. It is projected that the proposed BMP designs can accommodate a 9-inch increase in sea level--which is within the central range of the City and State projection and is used by DEP at the direction of the New York City Panel on Climate Change. The BMP weirs or valves would be sized to drain the extended detention storage volume in about 6 hours (under current sea level conditions). However, assuming a 9-inch increase in sea level and the associated effects of groundwater inflow to the BMP, the weirs or valves could also be adjusted to drain the BMP in as little as 4 hours—which is the estimated reduced duration of drainage assuming that the tide gates are closed longer due to higher tides.

While increasing the rate of drawdown may reduce BMP detention time, it would preserve the BMP function of flood protection and would address both the potential effects of rising sea

levels on the outfall operations (such as a shorter duration that the tide gate is open) and the higher local groundwater levels that may also result from increase in sea level. Finally, the proposed BMPs are designed to maximize stormwater management effectiveness in an existing low-lying developed coastal area where the street and property grades are essentially fixed and cannot be modified. The alternative to the proposed BMPs is either hard infrastructure, which is almost inflexible to increasing sea level because the pipes are fixed in-place, or no storm water management system, which would leave the developed lower watersheds of Mid-Island facing greater flooding impacts with no remedy.

In sum, the proposed project would reduce flood levels during the 10 year storm event and operation of the proposed BMPs would not be impacted by sea level rise. Therefore, the proposed project would not result in potential significant adverse impacts on hydrology in the South Beach watershed.

100 Year Storm Event

In addition to the 10-year storm event, the 100-year storm event was modeled for the lower watershed in order to assess potential impacts associated from the proposed drainage plan under larger storm events. As shown in **Table 5.9-6**, when the 100-year storm event was examined with the proposed drainage plan in place, the resulting water surface elevations remained well below the FIRM 100-year flood stage. (It is noted that the analysis with the proposed project is for the rain event only and does not take into account the storm surge from the Lower Bay.) Therefore, the proposed project is anticipated to have a positive impact on flooding conditions not only during the 10-year storm event but also during larger storm events, up to the 100-year event.

Table 5.9-6
100-Year Storm Water Surface Elevations Under the Proposed Amended Drainage Plan

BMP	Existing Peak Stage Water Surface Elevation (FEMA)	Peak Stage Water Surface Elevation with the Proposed Project (1)
100-Year Peak Stages (ft. SI)		
Quintard St and Patterson Avenue (SBE-1A)	6.8	1.89
Sand Lane and Quincy St (SBE-1B)	6.8	1.12
End of McLaughlin St (SBE-1C)	6.8	1.44

Notes: Elevations are in Staten Island Datum. (1) For rainfall event only. Does not take into account the effect of high tide storm surges in a 100-year storm
Source: Hazen and Sawyer, January 2011; FEMA and FIRM maps, September 2007.

Thus, the proposed project would reduce flood levels during the 100 year storm event. Therefore the proposed project would not have a potential significant adverse impact on flooding conditions under the 100-year storm event.

MODIFIED STREET GRADES

It is expected to be necessary to modify the street existing grades along certain segments of the streets in order to ensure proper drainage and cover over the proposed storm sewers. Chapter 5.1 “Project Description” shows the locations of the proposed street grade modifications which are expected to range between 6 inches and 24 inches.

It is standard procedure to raise streets in low-lying areas in order to provide proper cover over the proposed storm sewers, and the City has done this on many projects. As part of the capital

project design, site specific survey will be performed to determine the actual street elevation conditions for each individual project and all design techniques will be utilized to limit the raising of street grades to the maximum extent possible. During this process, DEP and DDC, the agency that would manage the project through design and construction, will meet with each individual homeowner prior to construction to limit the impacts of street grade changes and to assist homeowners in developing the best drainage solution possible.

Therefore, the proposed street grade modifications would not result in potential significant adverse hydrology impacts.

PROPOSED BERMS

As part of the proposed BMPs for the lower South Beach watershed, DEP is proposing to install berms between 6 and 36 inches above grade parallel to McLaughlin Street and Quincy Avenue to protect McLaughlin Street and SBE-1C from the higher water surface elevations of proposed BMPs SBE-1A and -1B. The proposed berms would be necessary to keep proposed BMP SBE-1C hydrologically separate from the surrounding BMPs, allowing McLaughlin Street to drain into proposed BMP-1C at all times. The berm would also ensure that the homes on McLaughlin Street would not be subject to flooding under storm conditions, as currently occurs, and would protect the roadways of McLaughlin St and Quincy Avenue.

The berms would also be designed and constructed with careful attention as to how they could affect existing drainage patterns for adjacent homeowners. In some cases, yard drainage, especially for the rear yards, may now flow into the Bluebelt wetlands unimpeded. However, the proposed berms may have the potential to block drainage coming from adjacent private properties on McLaughlin Street. Possible techniques for addressing any water accumulating inside the private property against the berms may include drain tiles, French drains, swales, or yard outlets as appropriate to convey runoff parallel to or from the berm to the closest storm sewer inlet.

The berms would be classified as “dams” under NYSDEC regulations and would be constructed according to NYSDEC standards. However, since the berms would be less than six ft in height, no permits would be required for construction and maintenance of the berms. Therefore, the proposed berms would not have a potential significant adverse impact on hydrology.

GROUNDWATER

BMP OPERATIONS

The proposed BMP SBE-1 complex in the Lower watershed would require excavation below the shallow groundwater table. Therefore, groundwater inflow to the proposed BMPs is expected to generate a constant baseflow that would slowly enter the proposed BMPs during high tide, before the water surface elevation would return to about the permanent pool elevation during low tide.

In order to understand the potential effects of groundwater on the BMP proposed functions, groundwater inflow rates and volumes were projected. These results are presented in **Table 5.9-7** as a percentage of the BMP proposed low-flow discharge rate and storage capacity that could be consumed by groundwater inflow. The ranges in the estimates reflect the uncertainty of data regarding soil conductivity and hydraulic gradient at each proposed BMP site. For example, the more conservative estimate (i.e., the higher percentage) presents a worst-case scenario in which the hydraulic conductivity of the soils is assumed to be high (i.e., porous sandy soil) with a high hydraulic head gradient, thereby producing large inflow rates to the proposed BMPs. The less

conservative estimate (i.e., the lower percentage) assumes a sand/silt mixed soil with less of a hydraulic gradient.

As shown in the table, under the less conservative assumptions, groundwater inflow consumes only a small fraction of the BMP proposed storage capacity. However, in the more conservative assumption, higher groundwater inflow rates would have the potential to reduce BMP proposed storage capacity (particularly during a high-tide event). In the less conservative case, the BMP proposed orifices are sized with adequate conveyance capacity to accommodate both the groundwater baseflow plus the proposed BMP storage of flood waters. However, if field data gathered during final design indicate that a higher rate of inflow may occur at a proposed BMP, then the hydraulic structures may need to be upsized during final design for the purposes of enlarging the low-flow orifices. The soils surrounding the proposed BMP may also need to be amended as well to reduce the hydraulic conductivity, thereby acting similar to the less conservative assumptions. Flow rates during final design would be determined using test pits and soil borings and monitoring of groundwater movement would also be conducted during the dewatering and construction of the proposed BMPs.

Table 5.9-7
Characteristics of Groundwater Baseflows into BMPs Under the Proposed Amended Drainage Plan

BMP	Percent of Low-Flow Discharge	Percent of Storage Capacity
Quintard St and Patterson Avenue (SBE-1A)	1 to 18%	2 to 17%
Sand Lane and Quincy St (SBE-1B)	1 to 22%	2 to 22%
End of McLaughlin St (SBE-1C)	N/A	10 to 75%
Source: *Hydrologic and Hydraulic Analysis of the South Beach watershed and Drainage Plan*, Hazen and Sawyer for DEP, December 2010.		

Therefore, the proposed BMPs would not result in potential significant adverse impacts on groundwater flows.

ANALYSIS OF GROUNDWATER TABLE IMPACTS

The proposed amended drainage plan was also examined for potential impacts on the groundwater table in the immediate vicinity of the proposed BMPs. With the proposed BMPs, some groundwater would inflow to the proposed BMPs to become surface water. Because the proposed BMPs would provide a less restrictive hydraulic path for groundwater to leave the watershed, this hydraulic affect was examined for potential impacts on the groundwater table. Based on a preliminary worst case analysis, the magnitude of the impact would be the difference between the proposed BMP permanent pool water surface elevation and the existing water table elevation, which is about 3 feet in the SBE-1 complex. However, the actual effect the groundwater table is expected to be less than this range. This is due to several factors, including the hydraulic conductivity of the soils and the proximity of the proposed BMPs to the Lower Bay, where the bay elevation ultimately controls the groundwater table. Any impact to the vertical groundwater table elevation would also decrease with increasing distance from the proposed BMPs. Therefore, the proposed project would not result in potential significant adverse impacts on the groundwater table.

In extreme cases, a lowered water table can also lead to the consolidation of soils and ground subsidence, which on large scales can cause damage to property and infrastructure. Based on available data about the types of soils in the watershed and the anticipated minor changes in the

groundwater table, ground subsidence with the proposed project is estimated to be negligible. Under the worst-case assumptions, subsidence in the immediate vicinity of the proposed lower watershed BMPs is calculated to be on the order of 0.6 inches, which would not cause any damage to neighboring structures. As with impacts to the water table, any subsidence would dissipate with increasing distance from the proposed BMPs. Also proposed is the collection of additional groundwater data to inform the design of the lower watershed BMPs (see also Chapter 8.1, "Mitigation").

Therefore, the proposed project would not result in potential significant adverse impacts on groundwater volumes, the groundwater table, or land subsidence.

WATER QUALITY

The proposed project is expected to result in improved water quality in the watershed over the condition in the future without the proposed project condition. This conclusion is supported by a literature review and data collected for the South Richmond Bluebelt projects. Supporting data is provided in Appendix D.

In the future without the proposed project, runoff is not collected and directed to the proposed BMPs. In contrast, BMPs function as wetlands that provide physical, chemical, and biological treatment of pollutants contained within runoff; flow rates into wetlands are attenuated, allowing sediment and organic debris to settle. During this process, nutrients undergo both chemical and biological transformation in a wetland. Nitrogen can be naturally altered into forms that are more favorable to uptake by wetland plants and phosphorus is readily precipitated out of water in many of its chemical forms, depending on the pH of the water and is also utilized by plants. Extended detention BMPs can also reduce fecal coliform concentrations by detaining water, allowing for die-off of microorganisms. Pollutant removal efficiencies of up to 77 percent for certain pollutants are reported with BMPs in place.

As presented in the appendix, data gathered by the American Society of Civil Engineers (ASCE), the U.S. Environmental Protection Agency (USEPA), Water Environment Research Foundation (WERF), the American Public Works Association (APWA), and the Federal Highway Administration (FHWA) indicate that pollutant concentrations are reduced by storm flows filtered through wetlands. A Center for Watershed Protection (CWP) report on updated BMP removal efficiency also shows reduction in pollutant loading with BMP wetlands.

In addition, analyses of BMPs previously constructed and operating on Staten Island (in the South Richmond Bluebelt) show general water quality improvement resulting from BMPs. Data from a 2003 water quality study of three Staten Island BMPs installed in the South Richmond Bluebelt (including two extended detention wetlands and one wetland retrofit BMP) show that extended detention wetlands are performing as a typical stormwater wetland, achieving good pollutant removal efficiencies. In addition, in the Richmond Creek watershed of South Richmond, it has been found that outlet stilling basins and other velocity attenuating structures can provide a 10 to 20 percent pollutant removal efficiency that is attributable to velocity reductions that allow sediment and other debris present in the water to settle instead of being transported downstream[1].

[1] O'Connor, T.P., and Rossi, J. "Monitoring of a Best Management Practice Before and After Maintenance," *American Society of Civil Engineer's Journal of Environmental Engineering*, November 2009, Vol. 135, Issue 11.

The proposed wetland BMPs also include a vegetated buffer as part of the design. In addition to being planted with flood-tolerant species, the buffer zone helps filter overland flow into the proposed BMP from neighboring properties. This helps reduce nutrient loads from adjacent properties such as ball fields or lawns from directly entering the wetlands as currently occurs in most proposed BMP locations, thereby improving the water quality over the existing conditions.

Therefore, the proposed project would not result in potential significant adverse impacts to water quality.

In addition, potential impact on the water quality of Brady's Pond and Cameron's Lake in the upper watershed was examined. The proposed BMPs are not expected to have an adverse impact on these water bodies.

The diversion of urban stormwater away from Brady's Pond is not expected to adversely affect water quality in the pond. For the few streets where the topography makes it infeasible to route the storm sewers away from the pond (e.g. Manorville Court, Overlook Terrace and Hillcrest Court and Terrace), and which currently contribute overland flow from local roads to the pond, outlet stilling basins or infiltration basins are proposed. These proposed stabilized outlets would provide pollutant removal for runoff from streets where currently no such removal is provided. As a result, water quality in the pond would not be adversely impacted from these stormwater systems, but would benefit from the proposed pollutant removal of the new outlets that would allow pollutants to settle out in a stilling basin or be removed through an infiltration basin before the collected stormwater reaches the pond either through surface or groundwater discharges, respectively. In either approach, the proposed project would not have any negative impacts on the water quality of Brady's Pond due to these proposed outlets. However, any proposal to remove the existing outfall to the pond would not move forward without first undertaking a thorough analysis of the potential impacts on the pond water quality and hydrology and, as necessary, providing stormwater flows that support the water quality and surface water elevations of the pond.

For Cameron's Lake, the proposed outlet structure would not change the weir elevation within the lake; and, therefore, the water surface elevation is not anticipated to vary from existing conditions. As a result, aquatic conditions in the lake, such as temperature, are not anticipated to change significantly as a result of the proposed project. This is important since Cameron's Lake has an existing fish population and supports other aquatic wildlife. With the addition of outlet stilling basins at discharge points for storm sewers into the Lake, the proposed project would have a positive impact on lake water quality, because sediment and concomitant contaminants would be intercepted there with the potential to improve conditions for fish populations living within the lake. In addition, the proposed BMP and riser box outlet sited at the south end of the lake should improve flow through and flushing in the lake, which would benefit water quality.

Therefore, the proposed project would not result in potential significant adverse impacts to water quality.

WETLANDS

An objective of the proposed project is to increase wetland acreage through the removal of legal and illegal fill in wetlands and to use existing functional freshwater wetlands (such as ponds) and their adjacent areas to improve stormwater management, reduce flooding and erosion, and improve the overall ecological values of the watershed through the proposed amended drainage plan and its proposed BMPs. To that end, the proposed larger BMPs of the lower watershed, specifically SBE-A, SBE-1B and SBE-1C would expand, improve and diversify wetland habitats

transforming the existing ponds and common reed dominated wetlands into a variety of open water, emergent periodically inundated wetlands and upland buffer areas (see **Tables 5.9-8a** and **5.9-8b**). As shown in the table, the proposed project would increase wetland acreage in the watershed (by about 7.67 acres), primarily through the removal of fill and the proposed project would also have the ecological objective of creating and expanding open water (low-flow channels and ponds) and permanent pools (emergent wetlands) habitats. This includes the removal of fill due to wetland violations that had occurred at the site under prior owners. These features have the hydrologic objective of storing and detaining stormwater periodically inundated wetlands and upland buffer areas storage of runoff during storm events, the proposed BMPs would provide extended detention that would alternately flood during storm events and gradually release stormwater afterwards. All portions of the proposed BMPs excavated for permanent pools and extended detention would be planted with wetland appropriate plants to support nutrient uptake and provide wildlife habitat. In addition, wetland buffers on Bluebelt properties that currently protect higher-quality, existing or proposed wetlands from adjacent uses would be preserved as part of the proposed BMP final designs (see also "Water Quality" above regarding the buffer protections).

BMP proposed designs also require the relocation/creation of stream channels as well as stabilization of some existing channels. In addition to the natural systems within the proposed BMPs, structures to be constructed within the proposed BMPs include new stormwater outlets to convey storm flows to the proposed BMPs, outlet stilling basins to minimize erosion at the sewer discharge locations, micropools to control flows at the proposed BMP outlets and access maintenance corridors. These would be minor structural systems within the individual BMPs. Overall, the proposed project would result in an increase in freshwater wetland acreage in the watershed (primarily due to new extended detention BMPs proposed in the upper watershed) along with improvements in wetland quality.

The proposed project would also have a limited impact on tidal wetlands due to the proposed outfalls (see **Table 5.9-9**). Impacts on tidal wetlands would be minimized in final design and a wetland restoration plan would be developed, as necessary. DEP has also identified potential sites for tidal wetland restoration as part of the proposed project (see Chapter 8.1 "Mitigation").

VEGETATION AND TREES

Under the proposed amended drainage plans, impacts on vegetative cover, in particular woodlands and trees of the watershed is limited as most of proposed BMP sites are common reed dominated (except SBE-2 and SBE-3) and the proposed BMPs can be shaped to avoid woodland edges and borders. Nonetheless, DEP has the objective of minimizing the clearing of woodland and trees at all sites (and all proposed BMP sites requiring tree clearing) in the final design of all proposed BMPs. To that end, DEP would coordinate with DPR in the final design of sites located within DPR parkland for the purposes of both minimizing the total extent of woodland cover and tree impacts and to develop a tree mitigation plan for all BMPs where tree clearing is proposed (see also Chapter 8.1, "Mitigation").

Table 5.9-8a
Freshwater Wetland Habitat Impacts: South Beach Watershed (in acres)

				Existing Conditions				Conditions with Proposed BMP					
										Extended Detention Wetland			
BMP	Name/ Location	BMP Type	BMP Size (Acres)	Water Area (ponded or stream corridor)	Emergent Common Reed wetlands or previously disturbed	Wooded Wetlands (a)	Upland edge (a)	Open Water[1]	Permanent Pool[2]	Wooded wetlands	Emergent Wetlands	Buffers[4]	Wetland Acreage Impacts
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
												Total	**+7.61 acres (DEC Wetlands)/ NWI Habitat Improvement**

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 5.9-8b
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	-.02	N.A.	-.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	-.02	N/A	-.02	0.0
SBE-3: Whitney Woods	Extended detention and perimeter treatment	1.2	1.2	-.02	N.A.	-.02	0.5
					Total	**+7.61 acres (DEC Wetlands)**	

Notes::
(1) Does not take into account the wetland enhancement.
(2) Improvements in common reed dominated (*phragmites*) or otherwise degraded wetlands and exclusive of berms and structures. Does not include portion of BMP currently occupied by open water and ponds.
Sources: Hazen and Sawyer, AKRF, DEP, April, 2013.

WILDLIFE

As is the case throughout the region, Staten Island has lost much of its historic freshwater and tidal wetlands and the Mid-Island watersheds are no exception. Therefore, the preservation of remaining wetlands under the Bluebelt Program, coupled with the created and enhanced wetlands of the proposed project, provides an opportunity to protect and reinvigorate important natural resources habitats in the Mid-Island region, including the South Beach watershed. To achieve the goal of habitat enhancements, natural features and wildlife attractors have been designed into the proposed BMPs for the purposes of providing ecological diversity in addition to (and in support of) the BMP proposed functions of stormwater management. The objective of these diverse design elements is to enhance the overall habitat complexity and ecological values at each proposed BMP site. For example, irregularly shaped wetland edges with coves and peninsulas have been included in the proposed lower watershed BMPs in order to create a more complex shoreline edge. Irregular shorelines increase the linear footage of edge habitats

available for feeding and provides smaller secluded areas preferred by more reclusive species (see the discussion below). Small islands have also been included in the proposed BMP designs as ecological features called hummocks, aimed at diversifying the otherwise permanent pool habitat.

Wildlife observed during field surveys as well as the current literature and survey data suggests that the proposed BMPs could provide habitat to a wide range of avian species. It is the objective of the proposed project to build upon the opportunities created by the current ecological features of the watershed, by expanding and diversifying these habitats and wildlife attractors. To this end, BMP proposed designs would provide, for example, habitat attractors for coastal nesting and feeding birds (once prey populations such as invertebrates and fish colonize the proposed BMPs).

There are also species, including rails and secretive marsh birds, migratory waterfowl species, and a variety of passerines (particularly marsh-obligate species) that require the existing wetland structure for nesting and these species inhabit the Bluebelt properties during breeding, migratory, and overwintering periods. Additionally, existing wetlands provide habitat for reptiles and amphibians. Since some portion of the approximately 40.1 acres that comprise the large Bluebelt properties of the lower South Beach watershed would remain as a buffer area of protected Bluebelt property, the common reed habitat would continue to provide this wildlife function, thereby supplying an overall mix of beneficial habitats on DEP Bluebelt property.

Since the New Creek watershed lies within the Eastern Flyway migration route it presents an opportunity to enhance habitat for migratory birds and other avifauna. Several of the critical stormwater wetland design elements currently employed by the Staten Island Bluebelt program for flood control and water treatment are similar to the restoration criteria used in waterfowl habitat creation projects around the region. These include deep water zones, shallow water zones with emergent vegetation and fluctuating water levels. Shallow water zones with a diverse native wetland plant community are preferred feeding areas for dabbling ducks, herons, and egrets. Other species prefer to forage along the edge of the deep and shallow water areas, such as wood ducks. These proposed “nesting islands” provide predator-free nesting, resting, and feeding sites for mallard ducks and other waterfowl. The incorporation of wildlife habitat improvement techniques such as these would increase the habitat value of the stormwater detention wetlands in these otherwise heavily altered watersheds. Given that the proposed lower watershed BMP sites are along the migratory flyway, there is the potential to attract to these habitats some of the 325 species of waterfowl and other bird species that are reported in the Jamaica Bay wetlands to the east.

Lastly, a variety of other wildlife species, including reptiles and amphibians (spring peeper, green frog), migratory passerines (warblers, sparrows, etc), mammals (including water-dependent species), and insects are also present in various populations within these wetlands under existing conditions. Assuming suitable vegetative cover with complexity in understory/overstory is integrated into the proposed BMPs, and with the expansion of surface water with the proposed BMP SBE-1A (see Figure 5.1-3), along with enhanced shorelines, wooded islands, and other ecological enhancements of the proposed BMP designs, the project would support and enhance native habitat values for a variety of wildlife species, specifically water-dependent mammals, reptiles and amphibians, and insects within the watershed.

A more detailed description of potential impacts at each proposed BMP site follows.

IMPACTS AT INDIVIDUAL BMPS

SBE-1A, -1B, AND -1C: SOUTH BEACH AT QUINTARD STREET, SAND LANE AND MCLAUGHLIN STREET

Currently, these three proposed BMP sites are largely dominated by a common reed monoculture wetland (with some areas of open water mostly a sizable pond at SBE-1B and a small wooded area near Patterson Avenue, in the northwestern portion of SBE-1A). However, overall the three proposed BMP sites are characterized by little topographical variation with areas of fill. The proposed project would remove fill, and reconstruct the hydrology at these sites with the objective of not only improving stormwater management functions, but the ecology of the three sites. To that end, the proposed BMP design includes the expansion of wetland acreage—adding about 4.66 acres of wetlands—while also increasing wetland functions through expanded open water, irregular shorelines and coves, wooded islands, and deep ponds to provide greater habitat complexity. The design objective is to create a complex shoreline around a central area of open water flanked by wetland shelves. The proposed ecological landscaping would also draw from a diverse planting palette to enhance the natural resource values of the site, providing habitat diversity and reducing the predominance of common reed.

Table 5.9-7 summarizes the areas of each proposed BMP that would become open water (low-flow channel), permanent pool (emergent marsh), extended detention wetland, and upland buffer areas. These are the areas where the existing wetlands would be transformed to the greatest extent by the proposed project. As presented in that table, under the proposed BMP designs, existing wetland areas would be excavated, regraded, and planted to create about 20 acres of permanent open water and low flow channels, about 18 acres of extended detention wetlands, and about 5 acre of adjacent buffer areas as these three sites.

The proposed BMPs would have the design objective of creating a permanent pool that increases open water area while also retrofitting the existing ponds and depressional areas at this site that currently receive stormwater flows (such as expanding the existing ponds in the vicinity of Sand Lane and Oceanside Avenue). In addition to facilitating stormwater storage during rain events, the proposed BMPs would provide a zone of extended detention that would alternately flood during storm events and then gradually release stormwater. Moreover, all zones within the proposed BMPs excavated for extended detention would be planted with wetland appropriate native plants to support nutrient uptake and to provide wildlife habitat.

The proposed project would require some tree clearing at this complex of BMPs in order to install both the proposed BMPs as well as the storm sewer outlets and connections to the BMPs. This tree clearing would occur primarily within the transitional successional hardwood complexes at the site perimeter (e.g., along the southerly border). During final design, DEP would shape the propose BMPs to avoid any valuable tree stands as well as to minimize these tree impacts. In addition, DEP would coordinate with DPR regarding any final design and tree clearing at the portion of proposed BMP SBE-1A that is connected to Ocean Breeze Park. Final site survey for this proposed BMP would then determine the numbers of trees that would need to be cleared and replaced as part of the final design for the proposed BMP. Therefore the proposed project would not result in potential adverse impacts on vegetation and trees at this proposed BMP site.

Other species, including rails and other secretive marsh birds, migratory waterfowl species, and a variety of passerines (particularly marsh-obligate species that require structure for nesting) that currently inhabit or use the common reed marsh during breeding, migratory, and overwintering

periods would continue to use the mix of habitat types at the proposed BMP as well as the preserved existing wildlife habitats with the protected Bluebelt property. The proposed BMP would also not adversely impact any fishery resources or aquatic habitats; rather, with the proposed BMP in place, the project would expand surface waters and submerged shoreline edges that would be expected to increase populations of aquatic wildlife at this proposed BMP site. Finally, since some portion of the approximately 42 acres of this proposed BMP complex would continue to exist as thick common reed habitat, the wildlife benefits of that vegetative cover type would remain, thereby providing an overall mix of existing and proposed beneficial habitats at this propose BMP. Therefore, the proposed BMP would not result in potential significant adverse impacts on wildlife.

In addition, as described in greater detail above, the proposed BMP SBE-1A, -1B and -1C complex lies within the Eastern Flyway migration route and, therefore, represent an opportunity to enhance habitat for migratory birds and other avifauna. Given that the proposed lower watershed sites are within this flyway, there is the potential as avian habitat for 325 species of waterfowl and other bird species that are reported in the Jamaica Bay wetlands to the east. A variety of other wildlife species, including reptiles and amphibians (spring peeper, green frog), migratory passerines (warblers, sparrows, etc), mammals (including water-dependent species), and insects would be supported by this proposed BMP complex.

Therefore, the proposed BMP would not result in potential significant adverse impacts on wildlife at this proposed BMP site.

SBE-2: CAMERON'S LAKE

The proposed BMP would require a limited clearing of trees and understory; and overall, given the small area that would be impacted by proposed structures (about 0.1 acres for each of the outlet stilling basins and riser box), impacts on the overall ecological community of the lake is expected to be insignificant. Since the outlet stilling basin and the riser box outlet would create small structural footprints, the structures that would occupy the freshwater wetlands of the lake would be limited. In addition, the proposed project includes the removal of fill and a wetland restoration project along the northeast shoreline.

While some tree clearing may be necessary, overall the removal of trees at this site is expected to be limited. Therefore, the proposed project would not result in potential significant adverse impacts on vegetation and trees at this proposed BMP site.

The site of the proposed BMP currently provides some wildlife habitat value, primarily through its open and adjacent wooded and vegetated edge. Although use of habitats is constrained by the presence of adjoining residential use, numerous woodland and edge bird species noted in the Breeding Bird Atlas do breed, forage, or overwinter at this site. The bordering trees provide perching opportunities for aerial foragers, such as flycatchers, and canopy birds (i.e., warblers) as well as breeding and foraging habitat for ground feeders such as the brown thrasher, American robin, and wood thrush.

Removal of a large wooded area could potentially adversely impact these species, and removal of large individual trees could also impact nesting or roosting trees. The proposed project, however, would involve limited tree clearing at the three SBE-2 sites and, therefore, the proposed BMP is not expected to have any significant adverse impacts on the avian species that may use the lake or the adjoining tree canopy. Nonetheless, to minimize impacts, final design for the proposed BMP with a survey of trees would be used to minimize impacts to animals that utilize trees.

Several species of reptiles and amphibians are also expected to inhabit the site; however, adverse impacts on these species are not anticipated. These small sites may provide food sources and cover for mammals of the watershed such as opossum, raccoon, white-footed mouse, groundhog, muskrat, and white-tailed deer. Although no reptiles, amphibians or mammals (other than squirrels) were observed during the site reconnaissance, the proposed project would have a minimal intrusion along the water's edge; and the proposed outlet stilling basins would be bordered by vegetation which would limit any impacts the proposed BMPs may have on these species.

Three BMPs are proposed at Cameron's Lake, two of which would formalize and upgrade two existing outfalls along the north shoreline. These two shoreline outfalls would not impact fish habitat. The third proposed BMP, SBE-2C, would include a riser box that would occupy a small portion of the south shoreline of the lake. This structure, about 12 feet square, 144 square feet, would replace an existing deteriorated and undersized structure at the south end of the lake. The proposed riser box would occupy only a small portion of the lake and would not negatively affect existing fish habitat or fish populations in Cameron's Lake. Rather, the proposed outflow structure, coupled with the introduction of new inflow via the two proposed BMPs on the north side of the lake, is expected to improve water circulation and water quality in Cameron's Lake. In addition, the proposed project would include the removal of fill and expanded wetlands on the northeast shoreline of the lake. Therefore, it is anticipated that the proposed BMPs and the resultant improvement in water quality and habitat would benefit existing and future fish populations and aquatic resources.

Therefore, the proposed project would not result in potential significant adverse impacts on wildlife at this proposed BMP site.

BMP SBE-3: WHITNEY WOODS

There are no NYSDEC or NWI mapped wetlands at this site. However, the depression within the site can be characterized as a remnant red maple-hardwood swamp that is surrounded along the perimeter (and being colonized by) invasive and exotic plant species. With the proposed project, wetland habitats would be increased as the proposed BMP formalizes the stream connections and also provides an expanded area of extended detention wetland. This would improve wetland habitat at the site both through expanded water area as well as improved diversity in the vegetative habitats that would be provided with the proposed BMP. The large area of Japanese knotweed would be replaced with native plantings of value to wildlife. This would be a positive impact for wetland habitats at this site.

Dominant trees in the canopy include red maple, some of which are greater than 24 inches. Due to the significant number of large (up to 25" dbh) and mature hardwoods present within the central portion of this proposed BMP, final design would include tree details for the purposes of minimizing impacts to trees (in particular large trees) within the area of disturbance.

Wildlife

Preservation of the site as a proposed BMP would provide a wildlife habitat in an area that is otherwise developed with residential uses. The proposed project would support the provision of wildlife diversity at this site and for the surrounding area primarily by increasing open water stream corridor and the coverage of more diverse wetland plantings. In addition, preservation of larger trees provide the opportunity for a forested stream corridor that would support reptiles, amphibians and avian wildlife. Therefore, the proposed project would have positive impacts with respect to wildlife at this proposed BMP.

The mature woodlands (dominated by red maples, oaks, sweetgum, and other species) at the site south of the Whitney Avenue right-of-way would be expected to continue to provide some habitat for forest-dwelling birds, including cavity nesting species such as owls and woodpeckers, mammals, reptiles and amphibians, and insects. The BMP was deliberately proposed to the north of that right-of-way in order to avoid the woodlands. In addition, final designs will benefit from detailed tree surveys, which will be used to minimize impacts to large and important tree stands.

The proposed project would involve limited tree clearing; and, therefore, the proposed BMP is not expected to have any significant adverse impacts on these avian species that may use the tree canopy along this corridor. Likewise, the site has no open water and is disconnected from the open water systems of the South Beach watershed. Therefore, the proposed BMP would not adversely impact fish or other aquatic resources.

LOWER BAY OUTFALLS

The proposed amended drainage plan also includes outfalls to the Lower Bay. There would be one new outfall to the Lower Bay within the South Beach watershed. The affected area along the outfall, which would extend between proposed BMP SBE-1C and the bulkhead line in the Lower Bay, would be a narrow corridor (about 35 feet wide and 850 feet long or about 29,750 square feet). About 200 linear feet would cross common reed marsh and upland below proposed BMP SBE-1C; about 300 linear feet would cross Father Capodanno Boulevard and the recreational fields and the boardwalk of Franklin D. Roosevelt Waterfront Park; and about 250 linear feet would cross sandy beach out to the waterline of the Lower Bay. In addition, two additional outfalls are proposed to augment existing outfalls at Quintard Street (south of Ocean Breeze Park) and Sand lane. These outfalls are proposed to be about 15 feet wide and 13 feet wide respectively.

Upland of the water line, the outfall would be buried and the outfall corridors would be restored to preconstruction conditions. For the in-water segment, **Table 5.9-9** shows the potential area of impact of the proposed outfalls on tidal wetlands within Lower Bay. Temporary impacts (as shown in the table) would only occur during construction; this area would then be restored to pre-construction conditions. The area occupied by the proposed outfall structures would be a permanent impact of the structure. As shown in the table, the area of the proposed structures within tidal wetlands is estimated to be about 9,350 square feet (about 0.21 acres) and the work area (within the area of the proposed easement) is estimated to be about 14, 950 square feet. No salt marsh vegetation would be temporarily or permanently impacted by the proposed project and the impacted area is essentially a limited area of sand beach and benthic habitat. Assuming a wetland restoration of two to one for sub-tidal habitat, the proposed project would then incorporate approximately 18,700 square feet (about 0.43 acres) of tidal wetland restoration for the impact of the proposed outfall structure.

Table 5.9-9
Areas of Tidal Wetland Impacts for Proposed Outfalls

Outfall	Linear Feet Below the Water Line	Width of Pipe (feet)	Estimated Area of Permanent Impact From Outfall Structure (square feet)	Potential Width of Outfall Easement/Corridor (feet)	Estimated Area of Temporary Wetland Impact From Construction Easement Area (square feet)
SBE-1C	50	2	100	35	1,750
Quintard Street/Ocean Breeze Park (expanded outfall)	340	15	5,100	Within existing outfall corridor	6,800
Sand Lane (expanded outfall)	320	13	4,160	Within existing outfall corridor	6,400

Notes: 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.

The primary impacts to wildlife and wildlife habitat from the proposed outfalls would be the direct impact of disturbance on the sandy beach and benthic habitat along the proposed outfall structure. A significant adverse impact would not be expected for terrestrial wildlife due to the relatively limited area of impact and the existing public use of the park, which would tend to discourage wildlife use. In addition, the upland area would be restored as part of the construction. Thus, the proposed outfall is not expected to result in any permanent impacts to beach wildlife. Installation of the structure within the Lower Bay would impact aquatic habitat below the waterline. This impact is expected to amount to about 9,350 square feet, and the proposed project would include a tidal wetlands restoration plan for this impact. Since the area of impact is primarily along the shoreline, the proposed outfall structure would have a limited and insignificant impact on fish habitat of the Lower Bay with no significant adverse impacts on the essential fish habitat. In addition, no indirect impacts on aquatic habitat are expected since no adverse water quality impacts would occur with the proposed project (see "Water Quality" above).

Therefore, the proposed outfall would not result in potential significant adverse impacts on natural resources.

Shoreline Erosion

As stated above, the proposed project would extend an outfall into the Lower Bay and across (perpendicular to) the shoreline. Therefore, the proposed outfall raises the potential for indirect impacts on beaches and shorelines, particularly with respect to the littoral drift of sand. A prevailing east to west littoral drift of sand is a known pattern on the South Shore of Staten Island. However, the proposed outfall is not expected to significantly alter or interrupt these drift patterns since there are already multiple existing outfall structures immediately updrift to the east (e.g., extending out into the bay from approximately the end of Likely Pond Road and Sand Lane, see **Figure 5.9-1**) and to the west (e.g., extending out into the bay from approximately the end of Quintard Street and Atlantic Avenue, see **Figure 5.9-1**) that have already altered the natural littoral drift pattern. The USACE's Storm Reduction Impact Techniques would also be referenced and applied during the design of this outfall in order to minimize impacts.

Therefore, the proposed outfall would not result in potential significant impacts on beach conditions.

Therefore, the proposed outfall would not result in potential significant indirect impacts on shoreline conditions and littoral drift.

ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES AND COMMUNITIES

With respect to the marine related species, shortnose sturgeon is not expected within the New Creek watershed streams. Although it may use Lower Bay in some way during the migratory seasons, given the limited nearshore area that would be directly impacted by the proposed outfall and that it would be located in shallow habitat, no significant adverse impacts on this species would be expected with the proposed project. Similarly, the proposed outfall (construction and operation) would not result in a significant adverse impact on Kemp's ridley sea turtles, loggerhead sea turtles, green sea turtles, or leatherback sea turtles as all four species are not likely to occur in the vicinity of the proposed outfall site. Similarly, no significant adverse impacts are expected on marine mammals.

Peregrine falcon has the potential to forage or flyover and osprey and northern harrier have the potential to nest, forage or flyover the proposed lower watershed BMPs. Therefore, a pre-construction survey would be conducted for these species at SBE-1A, -1B and -1C. If these species are observed nesting during a preconstruction survey, measures would be taken to avoid impacting these species during construction and operation of the proposed BMPs.

In addition, with respect to protected plant species, a pre-construction survey would be performed at SBE-1A, -1B, and -1C for slender rose gentian, green milkweed, dune sandspur, hop sedge, fringed boneset, needlepod rush, seaside knotweed, globose flatsedge, and exploitably vulnerable butterfly milkweed and nodding ladies tresses as well as two exploitably vulnerable ferns, cinnamon and royal fern.

If protected species are identified during the final design/pre-construction stage, DEP would explore the possibility of refining the BMP proposed design to avoid these species or their habitats and, with respect to plants, plant salvage may also be implemented as a technique for relocating plants to avoid impacts. Additional details on mitigation for the protection of rare, threatened and endangered species is presented in Chapter 8.1, "Mitigation."

E. CONCLUSIONS

The proposed amended drainage plan would not result in potential significant adverse impacts on surface or groundwater hydrology. Rather, the proposed project is expected to reduce local stream flooding that currently affects streets and private properties. Modeling of storm events has disclosed that the proposed project would not adversely impact the 10-year or 100-year floodplain (in fact, reductions in water surface elevations and reduced flooding are projected), nor would it have any adverse impacts on local surface drainage due to the proposed BMP berms or modified street grades. The proposed project would also not result in any erosive stream velocities downstream of the proposed BMPs. In addition, the proposed project would not adversely impact local groundwater flows or the local water table. Also proposed is the collection of additional groundwater data to inform the design of the lower watershed BMPs (see also Chapter 8.1, "Mitigation").

The proposed amended drainage plan would also not result in potential significant adverse water quality impacts. Rather, it would provide water quality improvements through the proposed BMPs that would otherwise not occur under the "no action" condition. The proposed BMPs of the amended drainage plan are anticipated to provide water quality benefits through the partial

removal of contaminants, such as total suspended solids and phosphorous from the runoff along with reductions in runoff velocity and uncontrolled runoff that can cause scouring and erosion in the watershed with the resulting sedimentation in local water bodies. Therefore, by incorporating the proposed BMPs, the proposed amended drainage plan would not result in any direct or indirect significant adverse water quality impacts on either the local streams or the ultimate receiving waters of the Lower Bay.

The proposed BMPs, particularly in the lower watershed (SBE-1A, 1B and 1C), would diversify wetland habitats by expanding open water wetlands and periodically inundated wetlands. The proposed project would increase wetland acreage and functions in the lower watershed through the removal of fill at a number of sites. In the upper watershed, the addition of structures at Cameron's Lake would be offset by the proposed fill removal and wetland restoration on the northeast shore. The proposed Whitney Woods BMP would see no major change in wetland acreage, although functional wetlands would be expanded through the introduction of additional stormwater and the regrading that could widen channels and floodplains.

In addition to the increased wetland acreage, the proposed BMPs would provide improved wetland habitats through diversified planting programs and the proposed BMP designs that would diversify and enhance the ecology of these sites and watershed system as a whole. This would include open water and island habitats in the lower watershed. To avoid impacts to existing functional ecological habitats, proposed BMP designs would also integrate existing contributing habitats (such as existing wooded edges) and minimize or avoid impacts to these habitats to the extent possible.

With respect to vegetation and trees, the overall habitat of the watershed, in particular the lower watershed, contains limited woodlands. However, certain proposed BMP sites do currently contain wooded borders as well as (in limited cases) wooded hummocks within the BMP SBE-1A, SBE-1B and SBE-1C proposed sites. In addition, the proposed BMP SBE-2 and SBE-3 sites (at Cameron's Lake and Whitney Woods) are more wooded than the lower watershed locations. To protect, to the extent feasible, existing trees and woodland stands at these sites, final BMP designs would include survey details for the purposes of minimizing tree impacts, particularly at those BMP sites where wooded borders could potentially provide ecological benefits and support the diversity of habitats within not only the proposed BMP, but the watershed as a whole. DEP would also develop a tree mitigation plan with DPR, as necessary, to replace trees that may need to be cleared to develop the proposed BMPs within parkland (see also Chapter 8.1, "Mitigation").

Regarding any protected wildlife or plant species that have been identified at the proposed BMP sites, the proposed project would include a preconstruction survey that would determine the presence or absence of such species at the proposed BMP sites where these species have been identified. Based upon that preconstruction survey, the final BMP design may be modified to avoid particular habitats, or plant rescue could be used as a technique to avoid impacts to protected plant species (see also Chapter 8.1, "Mitigation").

The proposed BMP planting programs would include ongoing maintenance and monitoring by the Staten Island Bluebelt Unit (see Chapter 1 "Overall Description of the Proposed Program") for the purposes of maintaining the BMP hydrologic functions and the habitat benefits. This would include monitoring of new plantings, replacement and transplanted vegetation, as necessary.

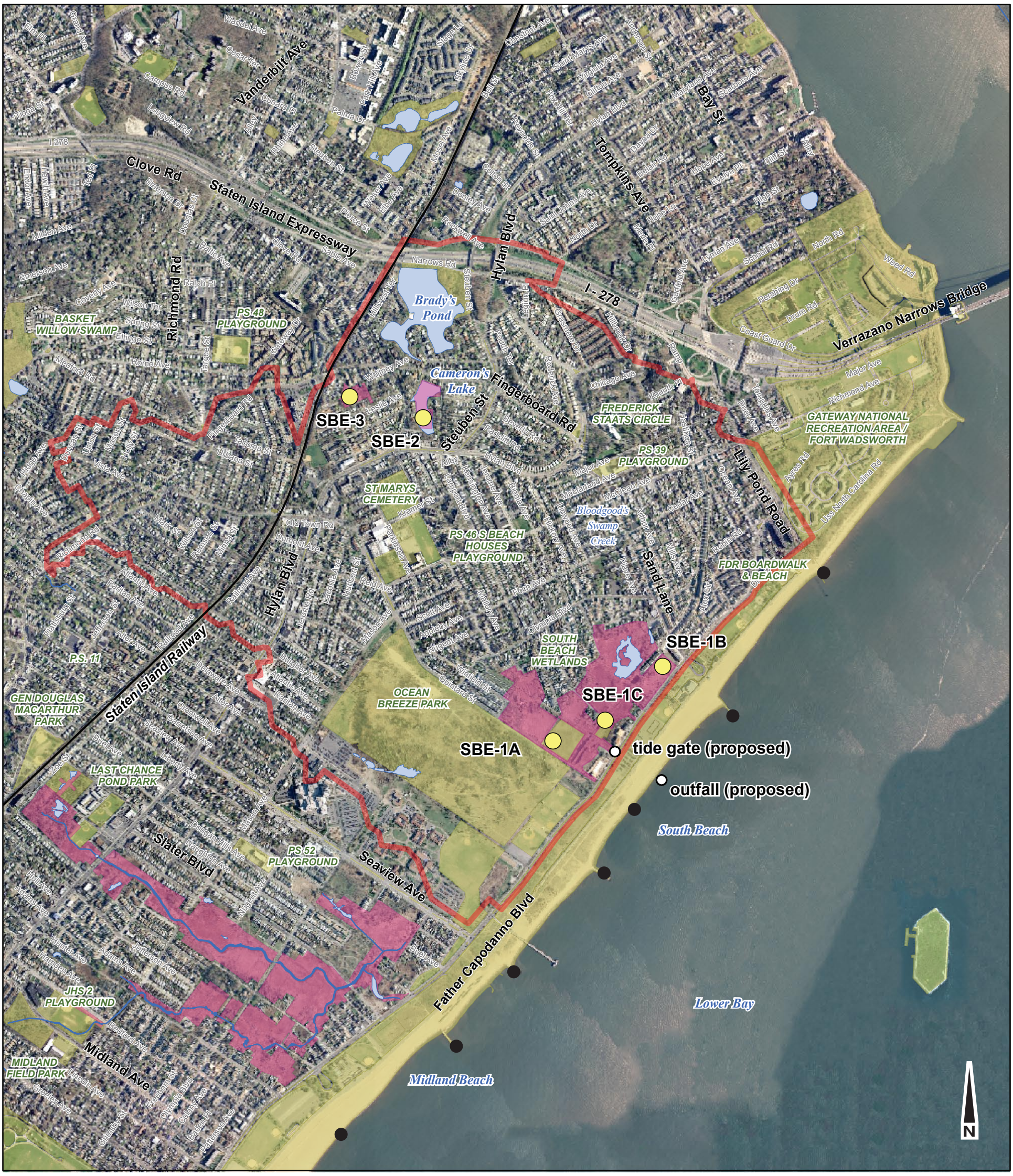
Impacts of the proposed BMPs, while analyzed in one analysis year (2043), would actually be phased in over a 30-year period, thereby allowing for the created habitats of the BMPs to

become established as other proposed BMPs enter into a design and construction phase. Moreover, once completed, the proposed BMPs are expected to provide ecological benefits at a watershed level.

Finally, as stated above, the proposed lower watershed BMP sites have historically experienced brush fires. By removing the large stands of common reed that have been prone to brush fires in the Mid-Island area and replacing it with open water, maintenance corridors and maintained berms, the proposed project would provide firebreaks against the spread of brushfires at these sites, along with access in the event of emergency, which would be a beneficial impact of the proposed project.

The proposed project would also include a tidal wetlands restoration plan for any impacts on tidal wetlands due to the proposed new and expanded outfalls.

Thus, the proposed project would not result in potential significant adverse impacts on hydrology, groundwater, wetlands, vegetation and trees, or wildlife. Therefore, the proposed project would not result in potential significant adverse impacts on natural resources. ✷



Proposed BMP Site

Existing Outfall

Proposed Outfall

Drainage Area Tributary to South Beach Bluebelt

Existing Stream

Parks Property (City, State & Federal)

DEP Bluebelt Property (Acquired or in the Process of Being Acquired)

Aerial Photograph — South Beach Watershed

Figure 5.9-1

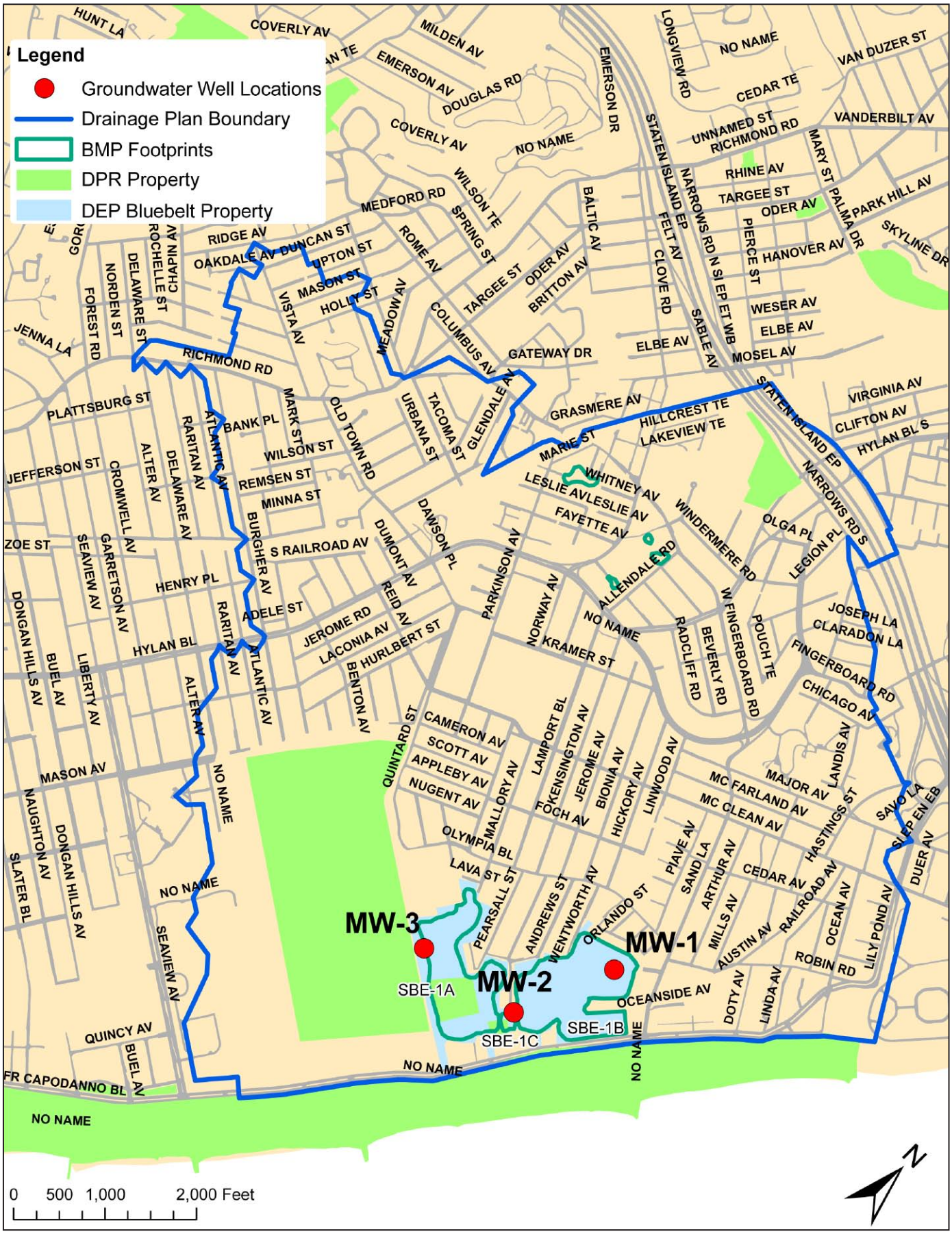
10.16.13

Existing Upper Watershed Drainage System:
South Beach Watershed

3.29.11

Existing Lower Watershed Drainage System:
South Beach Watershed

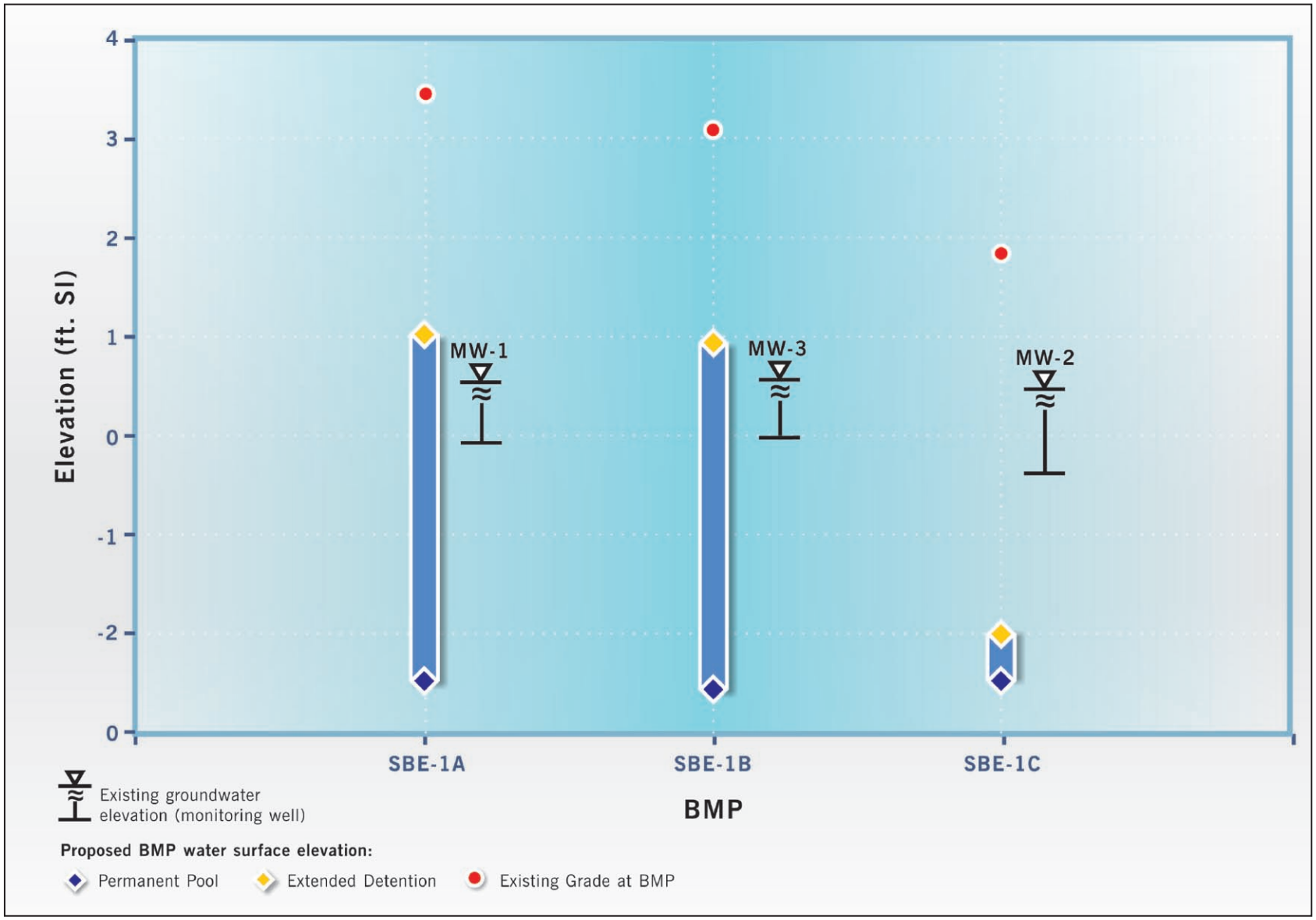
Figure 5.9-3



Groundwater Well Locations

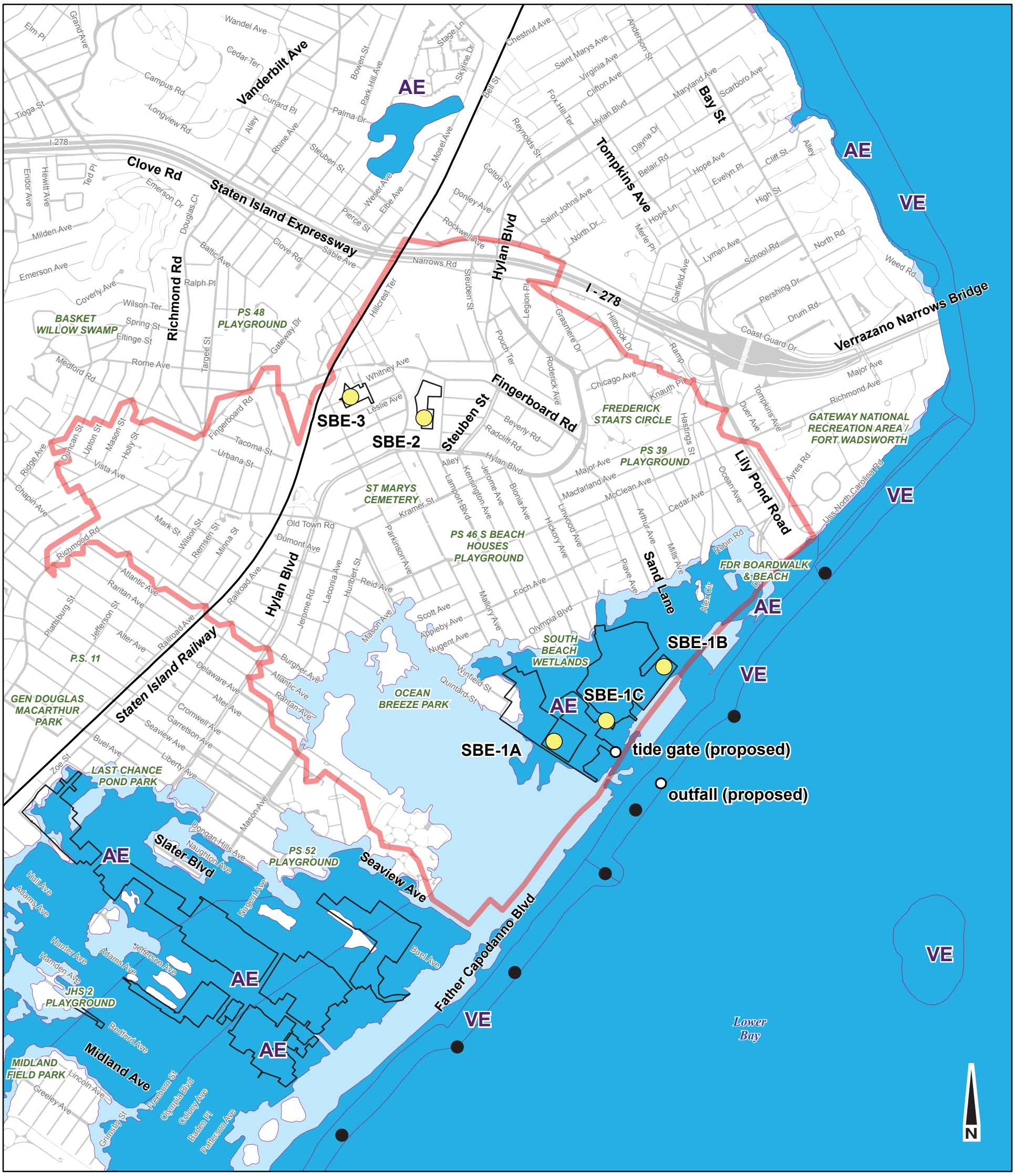
Figure 5.9-4

4.11.11



Comparison of the Lower Watershed South Beach BMP Elevations with the Observed Groundwater Table Elevations (average of high and low tides) during the Spring-Fall 2010 Monitoring Period

Figure 5.9-5



Proposed BMP Site

Existing Outfall *Proposed Outfall*

Proposed Drainage Areas Tributary to South Beach Bluebelt

DEP Bluebelt Property (Acquired or in the Process of Being Acquired)

100 Year Flood Zone (1 % Annual Chance Flood Risk Zone)

500 Year Flood Zone (0.2 % Annual Chance Flood Risk Zone)

Flood Codes:

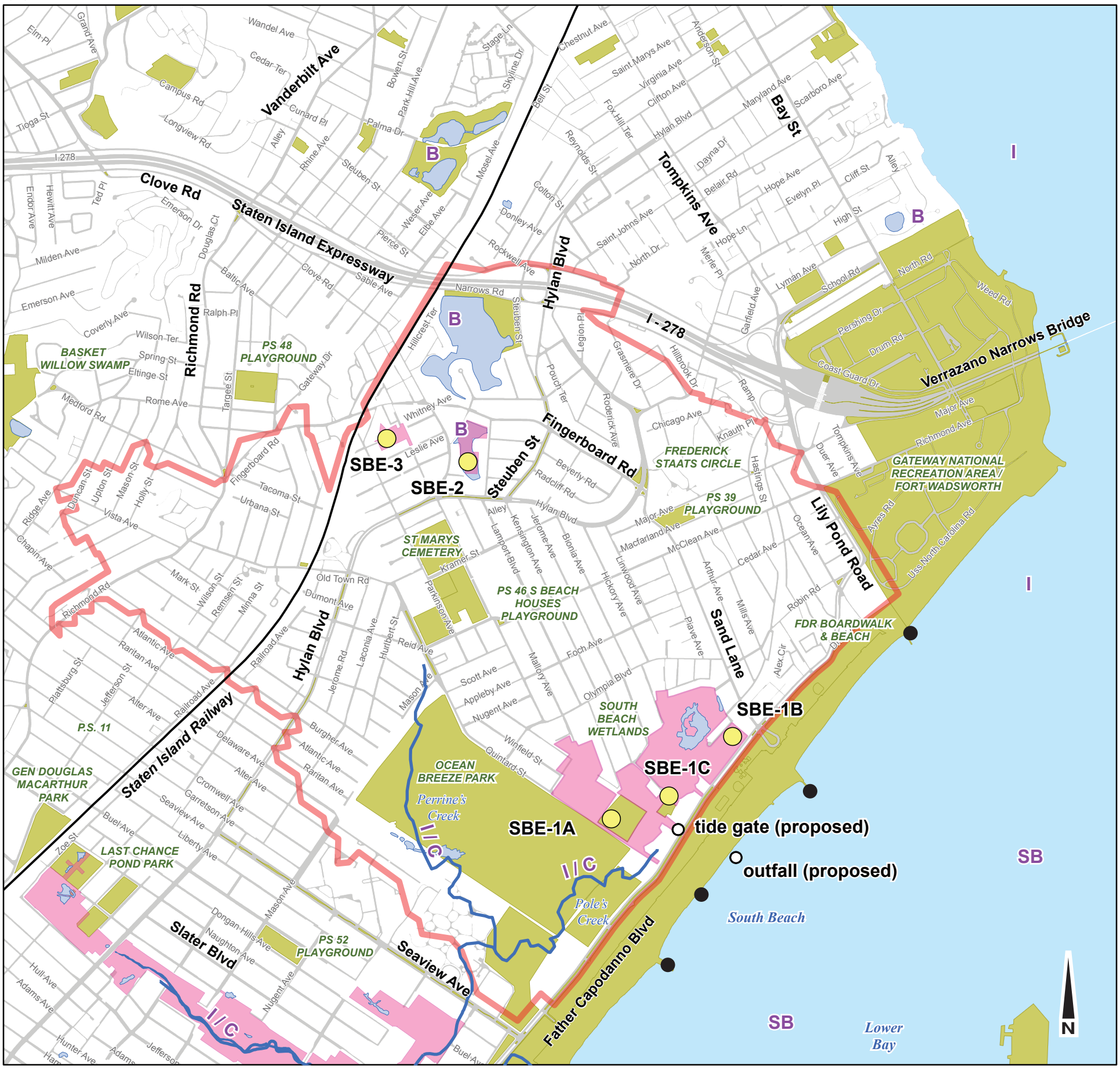
VE *An area inundated by 100-year flooding with velocity hazard (wave action); BFEs (Base Flood Elevations) have been determined.*

A *An area inundated by 100-year flooding, for which no BFEs have been determined.*

AE *An area inundated by 100-year flooding, for which BFEs have been determined.*

NOTE: This map is based on the current Flood Insurance Rate Maps (FIRM) that FEMA is currently in the process of reevaluating for the New York City area. Since the issuance of the DEIS (September 2011), FEMA has released Advisory Base Flood Elevation (ABFE) Maps that reflect the effects of Hurricane Sandy in October 2012. The information presented on the ABFE Maps will be incorporated into official updates to the FIRMs that FEMA expects to release at a later date.

FEMA Flood Zones
Figure 5.9-6



Proposed BMP Site

Existing Outfall

Proposed Outfall

Drainage Area Tributary to South Beach Bluebelt

Classified Streams

Parks Property (City, State & Federal)

DEP Bluebelt Property (Acquired or in the Process of Being Acquired)

SB / SA, B, I / C **NYSDEC Water Quality Standard Rating (2007)**

(Note: NYSDEC 2007 Stream Quality Rating Database includes streams since piped and diverted to new outfalls)

Class B waters - primary and secondary contact recreation and fishing.These waters shall be suitable for fish propagation and survival.

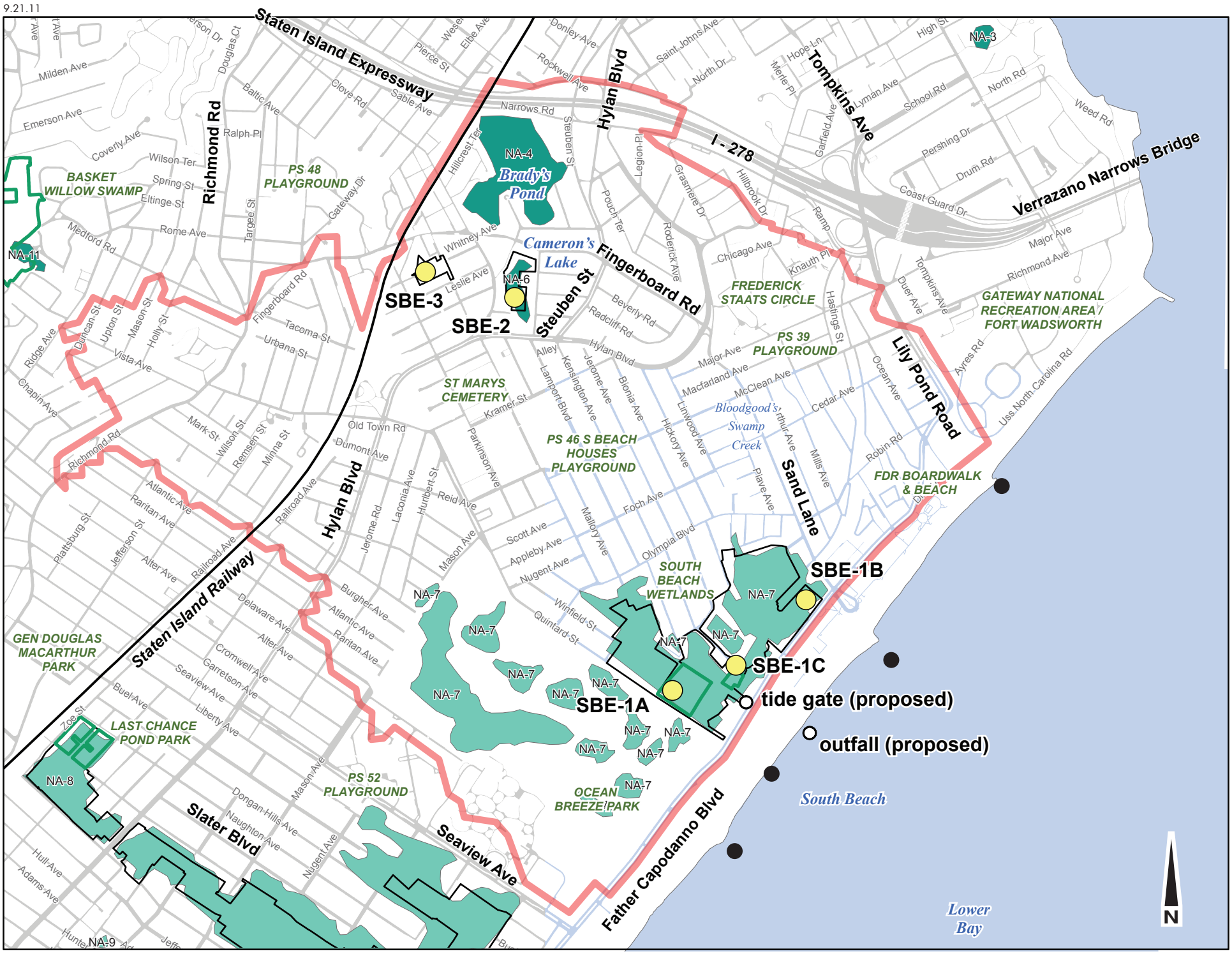
Class C waters - best usage is fishing. These waters shall be suitable for fish propagation and survival.

Class SB waters - primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival.

Class I waters - best usages are secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival.

NYSDEC Water Use Classification
Figure 5.9-7

9.21.11



Staten Island Bluebelt Mid-Island Watersheds

NYSDEC Wetlands

Figure 5.9-8

Proposed BMP Site

Existing Outfall *Proposed Outfall*

Proposed Drainage Areas Tributary to South Beach Bluebelt

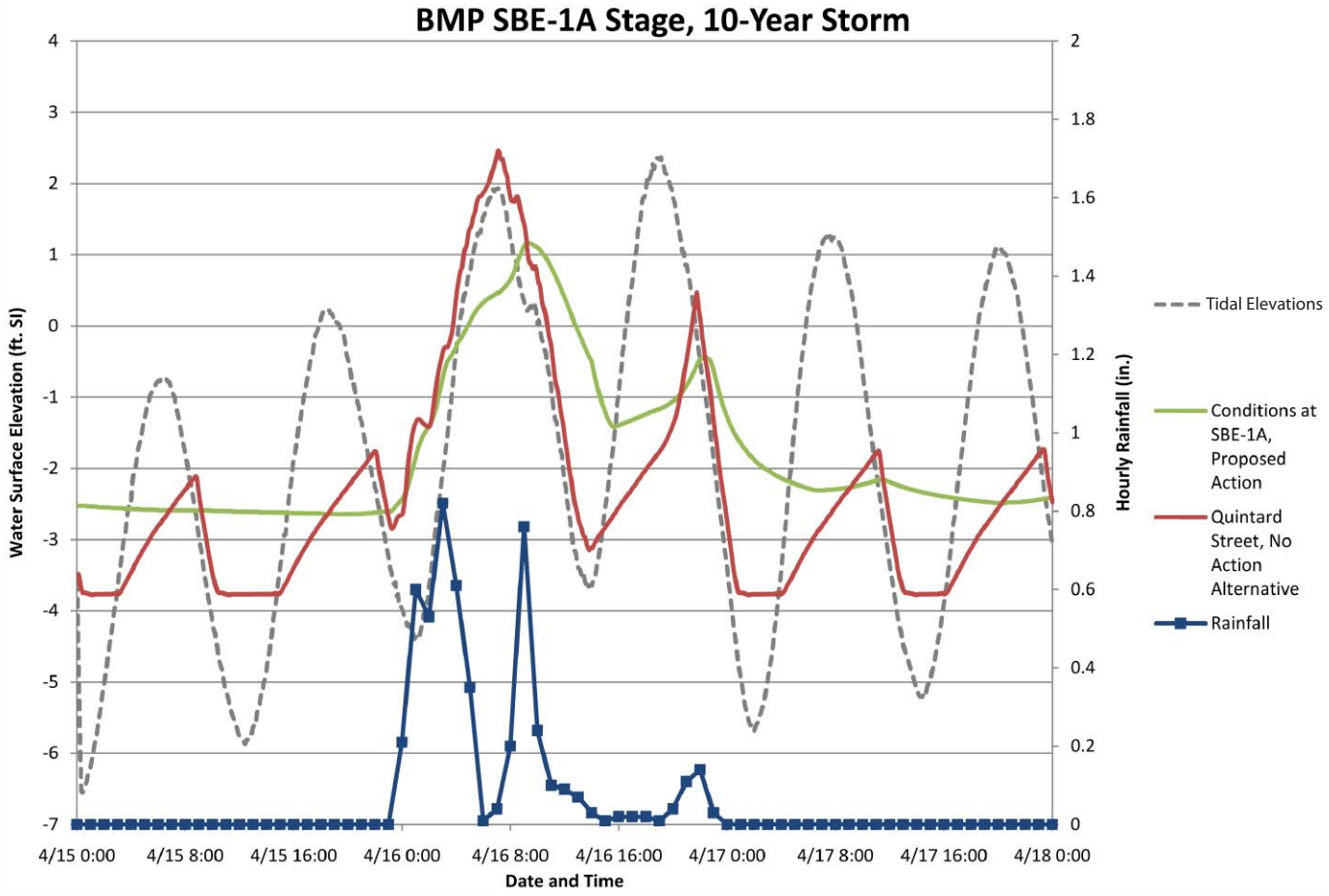
DEP Bluebelt Property
(Acquired or in the Process of Being Acquired)

Wetland Types

- *Estuarine and Marine Deepwater*
- *Estuarine and Marine Wetland*
- *Freshwater Emergent Wetland*
- *Freshwater Forested/Shrub Wetland*
- *Freshwater Pond*
- *Lake*

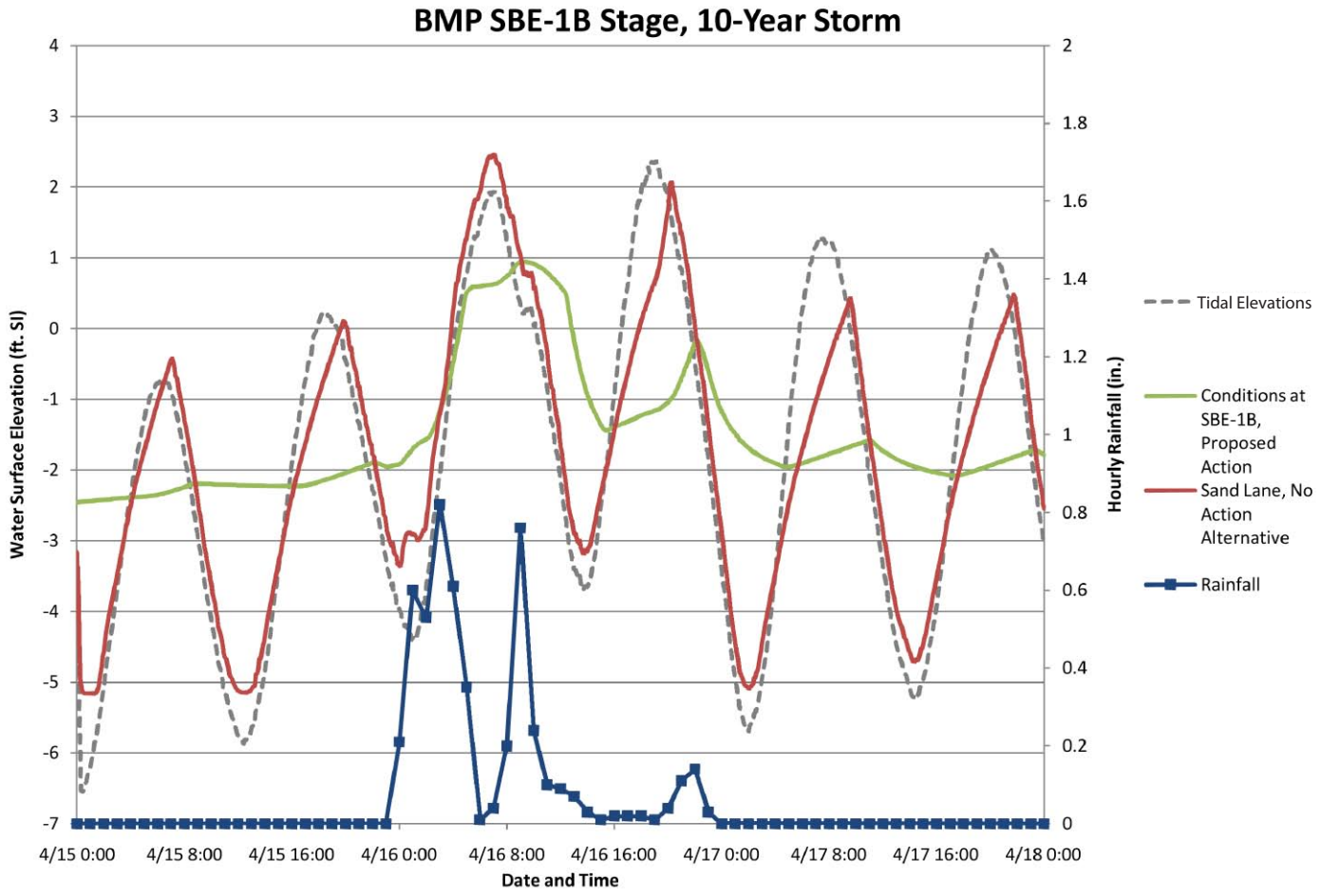
0 1000 2000 FEET
SCALE

NWI Wetlands
Figure 5.9-9



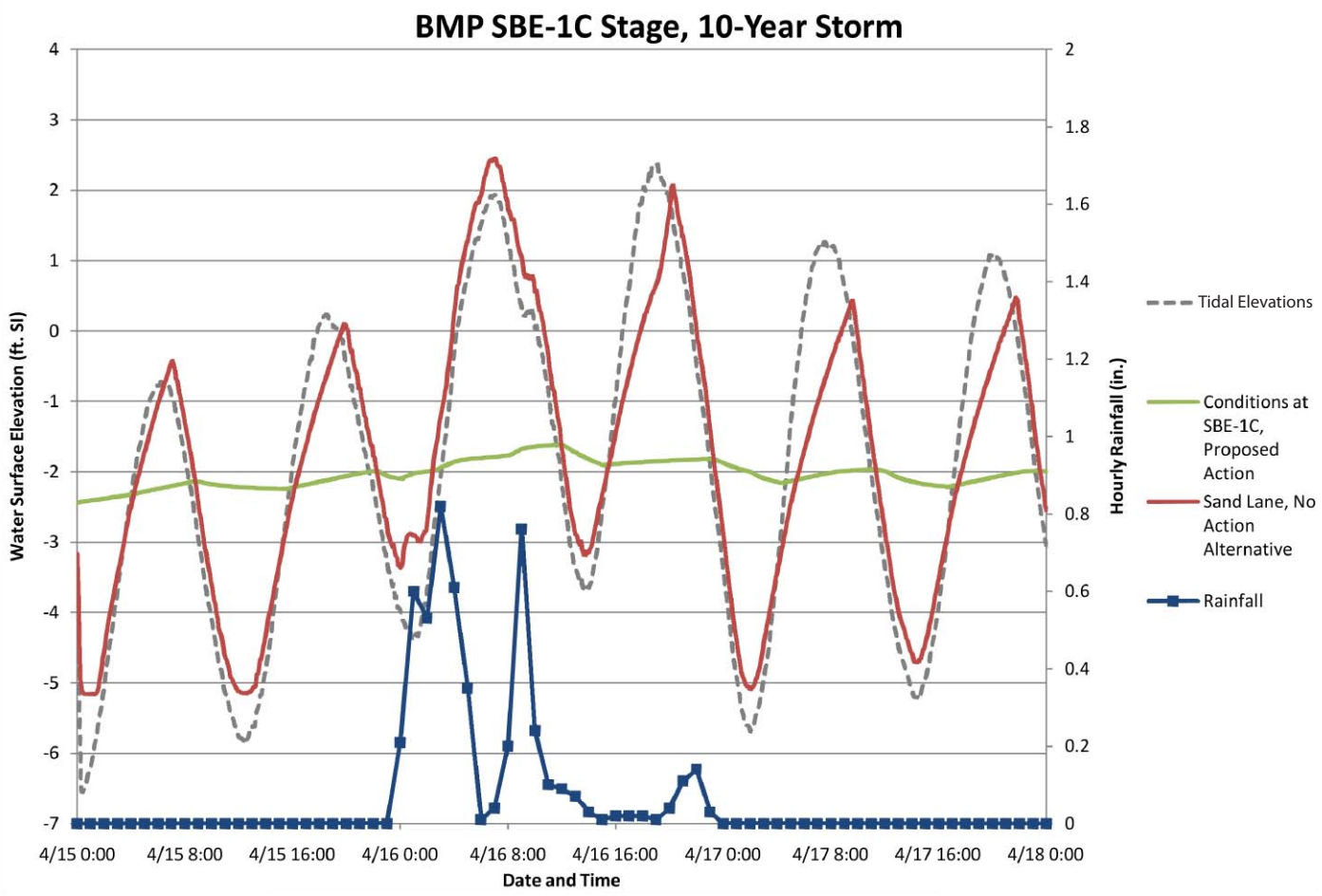
Modeling for BMP SBE-1A: 10-Year Storm

Figure 5.9-10



Modeling for BMP SBE-1B: 10-Year Storm

Figure 5.9-11



Modeling for BMP SBE-1C: 10-Year Storm

Figure 5.9-12

Chapter 5.10: Hazardous Materials of the South Beach Drainage Plan

A. INTRODUCTION

This chapter examines the potential for the presence of subsurface hazardous materials at each of the proposed BMP sites and the potential for these materials to be disturbed by the proposed project. The analysis focuses on hazardous materials that may have resulted from historic and existing land use conditions and activities at the proposed BMP sites and in their respective study areas; if such contamination is present, the section provides a summary of potential impacts and recommendations that through project implementation measures would avoid impacts to workers, the community, and the environment.

B. EXISTING CONDITIONS

SUBSURFACE CONDITIONS

The South Beach watershed elevations range from approximately 200 above mean sea level in the upper watershed to less than 10 feet above mean sea level in the lower watershed, with the greatest variation in elevation in the hilly northwestern portion of the watershed. Groundwater is expected to flow toward surface water bodies (such as Brady's Pond and Cameron's Lake in the upper watershed) or in a southerly direction toward the Lower Bay. Actual groundwater depth and flow direction may be affected by past filling activities, underground utilities, other subsurface openings or obstructions such as basements, tidal fluctuations, and other factors. Groundwater in Staten Island is not used as a source of drinking water.

Phase II investigations previously undertaken for the watershed encountered groundwater approximately 2 to 10 feet below grade at the proposed site of BMP SBE-1. Depth to groundwater at the proposed sites of BMP SBE-2 and BMP SBE-3 is also expected to be shallow based on the proximity to surface water Additional data on groundwater conditions is also provided in Chapter 5.9, "Natural Resources." The previously prepared Phase II investigations also encountered fill materials along the periphery of the proposed site of SBE-1.

CURRENT LAND USES

Land use in the watershed is primarily residential, institutional or open space uses with commercial and transportation/utility uses concentrated along Hylan Boulevard, Sand Lane and McClean Avenue—there are also two small areas with industrial or manufacturing uses (on Ledyard Place and Robin Road) and the Staten Island Railway runs east/west across the watershed. Commercial uses which may have impacted groundwater include auto repair facilities, filling stations and dry cleaners.

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

In the future without the proposed project it is expected that there would not be any significant changes in environmental conditions at the proposed BMP sites, nor would any project-related soil disturbance be undertaken.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

POTENTIAL FOR SITE CONTAMINATION

SBE-1A, -1B AND -1C

Phase I Results

Dumped materials (trash and construction/demolition debris) were observed in the accessible portions of the proposed site of BMP SBE-1. A 2005 Phase I ESA also noted abandoned vehicles and apparent fill material on the periphery of the proposed site of SBE-1 and in the interior of the proposed site of SBE-1B. Portions of the proposed site of SBE-1 that could not be visually inspected may also contain dumped materials. Sanborn maps show that in the early 20th century, historical railroad tracks ran adjacent to the proposed site of SBE-1B along Oceanside Avenue and may have extended into the eastern portion of the proposed site of SBE-1B, and that small dwellings were historically located on portions of the proposed site of SBE-1. Regulatory databases identified a historical New York City municipal waste disposal site, once used for dumping unspecified waste, on Quincy Avenue (potentially on or adjacent to the proposed sites of SBE-1A and/or SBE-1B). Fill or demolition debris may be associated with historical and existing structures and potentially, municipal waste dumping. Regulatory databases noted three potential on-site spills. All of these spills have a NYSDEC closed status. There is also a dry cleaner approximately 260 feet east of the proposed site of SBE-1B (potentially upgradient) at Sand Lane and Quincy Avenue.

Regulatory databases listed four active-status petroleum or hydraulic oil spills potentially upgradient of the proposed site of SBE-1. Groundwater contamination (gasoline and methyl tert butyl ether, MTBE, a gasoline additive) was reported for only one of the active-status spills, approximately 3,460 feet to the northwest. However, the active-status spill nearest to the proposed site of SBE-1 (a filling station approximately 850 feet north of the proposed site of SBE-1A and the proposed site of SBE-1B and 1,600 feet north of the proposed site of SBE-1C), was under investigation to determine whether groundwater had been affected. Historical maps also show a filling station and auto repair potentially upgradient of the proposed site of SBE-1B, approximately 430 feet to the northeast at Sand Lane and Olympia Boulevard, and a fireworks manufacturing company approximately 1,500 feet to the west. An auto repair shop which historically contained buried gasoline tanks was identified in regulatory databases approximately 530 feet northeast of the proposed site of SBE-1B.

Phase II Results

A 2005 Phase II investigation of the proposed site of SBE-1 included the collection of one soil sample from each of 41 soil borings, 10 groundwater samples, 10 sediment samples and five surface water samples. All samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides and metals. Soil and sediment samples were also analyzed for Total Petroleum Hydrocarbons—

Diesel Range (TPH-DRO). The sampling results revealed elevated concentrations of SVOCs and metals in the soil and sediment samples, likely due to the presence of fill and/or runoff from nearby filled areas. Although two areas of soil with higher concentrations of beryllium and mercury were identified as "hot spots," fill commonly contains highly variable concentrations of metals and SVOCs, and the "hot spots" were most likely attributable to fill materials rather than a spill. The beryllium concentrations in the beryllium "hot spot" did not exceed its NYSDEC Part 375 Soil Cleanup Objective for Unrestricted Use (USCO).The detected soil VOCs generally did not appear to indicate an on-site petroleum spill, and may have been associated with fill materials and/or off-site sources.

Concentrations of several petroleum-related VOCs and several SVOCs exceeded their respective NYSDEC Class GA standards (drinking water standards) in one groundwater sample in the northern portion of the proposed site of SBE-1B; a petroleum sheen, odor and staining were also noted in the corresponding soil boring. Concentrations of metals exceeding Class GA standards were detected in all groundwater samples and, to a lesser extent, in surface water samples. These exceedances were most likely attributable to suspended sediment and/or natural background concentrations. Based on the prior investigations at this site, the locations of these proposed BMPs all have a high potential for contamination above USCOs, likely including certain metals and SVOCs, and for concentrations of certain VOCs above Class GA standards in groundwater.

SBE-2

Small quantities of dumped trash were observed on the periphery of the proposed site of BMP SBE-2. Portions of the proposed site which could not be visually inspected due to dense vegetation and/or a fence may also contain dumped materials. Regulatory databases noted a potential on-site spill. According to the spill report, a caller reported that an oil company repeatedly dumped oil into Cameron's Lake; the spill report was closed due to lack of further information. Another potentially on-site closed-status spill involved a discharge of raw sewage at Windermere Street and Clove Road. Regulatory databases listed an active-status spill involving groundwater contamination with gasoline at a filling station approximately 350 feet southeast of the proposed site of SBE-2 (potentially upgradient). Based on the data and site investigations, the proposed site of BMP SBE-2 has a high potential for contamination.

SBE-3

Dumped materials (trash, metal and construction/demolition debris) were observed in the accessible portions of the proposed site of BMP SBE-3. Portions of the proposed site which could not be visually inspected due to dense vegetation and/or being obscured by residences on the proposed BMP perimeter may also contain dumped materials. Fill material may be associated with the structures adjacent to the proposed site. Regulatory databases identified an auto repair shop approximately 660 feet to the north (potentially upgradient) as a generator of hazardous waste (spent non-halogenated solvents). A spill approximately 480 feet to the northeast (potentially upgradient) reportedly involved fluid (possibly antifreeze) observed in soil, and was closed due to lack of further information. Based on the data and site investigations, the proposed site of BMP SBE-3 has a moderate potential for contamination.

LOWER BAY OUTFALL

Historical Sanborn maps show small dwellings and hotels on South Beach in the early 20th century. Some of these buildings may have been located in the vicinity of the proposed outfall

location along with the associated demolition debris. Regulatory databases identified closed-status spills involving raw sewage, petroleum and, in one case, medical waste impacting Staten Island beaches. However, insufficient information was provided to determine whether any of these spills occurred in the vicinity of the proposed outfall location. Based on the data and site investigations, the proposed outfall corridor site has a moderate potential for contamination.

SUMMARY OF POTENTIAL FOR BMP SITE CONTAMINATION

Table 5.10-1 identifies the potential for contamination at each BMP site based on the above data. Those results are as follows:

- Proposed sites of BMPs SBE-1A, -1B, and -1C: Phase II testing has identified a high potential for soil and groundwater contamination;
- Proposed sites of BMPs SBE-2A, -2B, and -2c: historical uses and the regulatory databases have indicated the need for site testing to identify any potential impacts on soil and groundwater conditions due to a high potential for contamination:
- Proposed site of BMP SBE-3: historical uses and the regulatory databases have indicated a moderate potential for soil and groundwater contamination; and
- Proposed site of the Lower Bay outfall: historical uses and the regulatory databases have indicated the a moderate potential for soil and groundwater contamination.

Table 5.10-1
South Beach Amended Drainage Plan:Conclusions and Recommendations Summary for Hazardous Materials

BMP Number	BMP Name/Location	Potential for Contamination	Recommendations	Notes
SBE-1A, 1B & 1C	South Beach	High	Conduct work in accordance with a CHASP	Testing performed (2005) – elevated M, S (soil), V, S (groundwater)
SBE-2A and 2B	Cameron's Lake	High	Conduct subsurface testing	Minor potential impact from dumping in BMP area, spills with potential to affect BMP
SBE-2C	Cameron's Lake	High	Conduct subsurface testing	Minor potential impact from dumping in BMP area, spills with potential to affect BMP
SBE-3	Whitney Woods	Moderate	Conduct work in accordance with a CHASP	Potential impact from filling and dumping in BMP area, off-site uses with potential to affect BMP
Proposed SBE Tidal Outfall	McLaughlin Street	Moderate	Conduct work in accordance with a CHASP	Spills with minor potential to affect outfall site, potential demolition debris

Notes:
CHASP – Construction Health and Safety Plan
M – metals, S – semi-volatile organic compounds, V – volatile organic compounds, P – pesticides

RECOMMENDATIONS TO BE IMPLEMENTED AS PART OF THE PROPOSED PROJECT

Table 5.10-1 provides recommendations for each of the proposed BMP sites. For the proposed BMP sites where additional subsurface testing is recommended because no or limited Phase II soil or groundwater testing has been performed to date and there is the potential for contamination, Phase II subsurface investigations including the collection and laboratory analysis of soil and groundwater samples would be conducted as part of the proposed project. For all proposed BMP sites where sampling to date has identified the potential for soil or

groundwater contamination, or where future site testing identifies potential soils or groundwater contamination, site-specific Remedial Action Plans (RAPs) and Construction Health and Safety Plans (CHASPs) would be implemented as part of each capital project, as necessary. The RAP and CHASP would specify procedures for managing any identified or unexpectedly encountered contamination (including procedures for stockpiling and off-site transportation and disposal) and appropriate health and safety procedures to be used during construction

In addition, excavated soil at the proposed BMP sites may include urban fill materials, and will be managed in accordance with all applicable regulations. All material that needs to be disposed of (e.g., both petroleum-contaminated soil and excess fill including demolition debris) would be properly handled and disposed of off-site in accordance with all applicable federal, state and City regulations.

Dewatering may also be required during construction. If discharge to sanitary sewers is proposed, testing would need to be performed to ensure that the groundwater would meet DEP sewer discharge requirements. If necessary, the water would be pretreated prior to discharge to the City's sewer system. Should discharge to surface water bodies or to a storm sewer not connecting to a treatment plant be proposed, dewatering activities would be subject to NYSDEC State Pollution Discharge Elimination System (SPDES) requirements.

Lastly, any dumped materials in the areas to be disturbed must be properly disposed of in accordance with all applicable federal, state, and City regulations. If dumped building materials potentially containing asbestos are identified, such materials will be tested for asbestos prior to disposal.

E. CONCLUSIONS

The proposed project would involve the disturbance of soil and groundwater in areas where prior uses and regulatory database searches have indicated a potential for the presence of hazardous materials in the soil and/or groundwater. At some proposed BMP locations this conclusion is based on Phase II testing and in some locations site testing would be performed as part of the capital project to determine if the proposed project would result in any impacts by disturbing soil or groundwater. At all sites where the proposed project may disturb contaminated soil or groundwater, the proposed project would implement a CHASP and RAP to avoid impacts on workers or the community.

All excavated soil would need to be handled and managed in accordance with all federal, state and City 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 discharging 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. In addition, any previously dumped materials would also need to be handled and disposed of in accordance with all applicable regulations (i.e., asbestos containing materials). With these measures in place, the proposed project would not result in potential significant adverse impacts to hazardous materials. ✷

Chapter 5.11: Water and Sewer Infrastructure of the South Beach Drainage Plan

A. INTRODUCTION

Preliminary amended drainage plans have been developed for the South Beach watershed with the objectives of improving water quality, reducing flooding and erosion, and enhancing vegetative communities and wildlife habitats. The proposed project would not introduce new residents or employees that would generate any added demands on water supply, nor would it install any impervious coverage that would generate additional runoff. However, the proposed project would include the installation of sanitary and storm sewers, and this chapter examines the potential effects of the proposed project on water and sewer infrastructure in the South Beach watershed.

B. EXISTING CONDITIONS

SANITARY SEWERS

The South Beach watershed is largely sewered for sanitary service. There are sections of the watershed, in most cases one or two block lengths, where sanitary sewers have not yet been installed. In these areas, septic systems are currently used to provide on-site sanitary wastewater management. The general direction of sanitary sewer flow in the watershed is south, toward the lower elevations of the watershed where an interceptor conveys collected flows to the Oakwood Beach Wastewater Treatment Plant (WWTP), which has a treatment capacity of 40 million gallons per day (mgd).

STORMWATER MANAGEMENT

OVERVIEW

The South Beach watershed is largely urbanized, with some residential and commercial development, and covers about 2.1 square miles. Impervious surfaces (e.g., building rooftops and streets) account for about 33 percent of the watershed. This watershed is largely equipped with sanitary sewers and there are no open stream corridors remaining in the watershed; remnant channels exist at several locations, however. Approximately 20 percent of the watershed has existing storm sewers, and these completed sewer segments are scattered throughout the watershed. There are major trunk sewers along Sand Lane and Quintard Street.

UPPER WATERSHED

The primary drainage mechanism in the upper watershed is storm sewers. In areas without storm sewers, overland flow from streets buildings runs directly into existing streams or wetlands.

Existing surface water features of the upper watershed include two upland waterbodies, Brady's Pond and Cameron's Lake, which capture some of this overland drainage.

LOWER WATERSHED

The primary drainage mechanism in the lower watershed is also storm sewers. In areas without storm sewers, overland flow from streets buildings runs directly into existing streams or wetlands. Existing surface water features of the lower watershed include downstream wetlands with a pond that is in the process of being acquired by DEP, as part of the Bluebelt project. Trunk sewers run along Sand Lane and through Ocean Breeze Park and convey stormwater to outfalls located downstream. One-way flap gates within the outfalls allow discharge to Lower Bay when the water surface elevation in the sewers is greater than that of the bay. However, these gates also block stormwater outflow when there is an extreme high tide, coupled with a rainfall event. During these times of combined high tide and storm events, local properties and streets become flooded by trunk sewer surcharges. As a result of this localized flooding, excess stormwater flows may infiltrate nearby sanitary sewers, resulting in increased flows to the Oakwood Beach WWTP.

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

In the future without the proposed project, the existing drainage patterns in the watershed would remain essentially unchanged through the year 2043. Therefore, the flooding is expected to continue and other benefits of the proposed project with respect to sanitary wastewater and stormwater management would not be achieved.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

SANITARY SEWERS

While the sanitary sewer system is largely built in the South Beach watershed, the proposed drainage plan would build additional sanitary sewer segments that would be completed under future capital improvement projects. With the proposed project, all wastewater generated in the watershed would be conveyed to the Oakwood Beach WWTP for treatment prior to discharge, which is what currently occurs under existing conditions. With the installation of sanitary sewers in the fronting street, property owners who currently have septic systems would then be required to connect to the sanitary collection sewer. In addition, the proposed amended drainage plan would increase the size of some existing sanitary collection sewers from 8 inches to 10 inches in diameter, in order to conform with current DEP standard sewer sizes. The expansion of sanitary service would be limited to street sections one or two blocks in length; remaining sewer segments are scattered throughout the watershed. This added service would not significantly increase sanitary flows to the WWTP, which has adequate capacity (current flows to the plant average about 29 mgd and the permitted capacity is 40 mgd).

The proposed amended drainage plan would also require the relocation of two existing segments of sanitary sewer lines where large extended detention ponds are proposed. These sanitary sewer lines cross the South Beach Bluebelt (SBE-1) and would have to be relocated because of the design of the proposed BMP. The first segment in BMP SBE-1B is an existing 18-inch sanitary sewer in the mapped but unbuilt bed of Quincy Avenue from Wills Place to Wentworth Avenue, which will be routed out of the open water part of the BMP. The other segment is a 27-inch sanitary sewer in the mapped but unbuilt bed of Quincy Avenue from Vulcan Street to Quintard

Street. The sewer would be relocated around the open water part of BMP SBE-1A. With these proposed relocations, the proposed project would avoid any adverse impacts on sanitary sewer service and maintenance that would otherwise occur, without the relocation.

Therefore, the proposed project would not result in potential significant adverse impacts to sanitary sewer infrastructure.

STORMWATER MANAGEMENT

The proposed project would not introduce any new development or impervious surface coverage that would generate runoff. Rather, this project would improve local stormwater management with the implementation of BMPs. The proposed amended drainage plan would provide storm sewers throughout the watershed, with storm sewers that would flow to wetland BMPs, thereby providing flood volume and velocity control along with enhanced ecological conditions through the protection and restoration of wetlands.

Hydrologic and hydraulic modeling of the proposed project was performed for the watershed. In the upper watershed, the proposed drainage plan would provide a storm sewer system that integrates the existing water bodies and stormwater features to create a comprehensive drainage system, with stormwater conveyance and detention. In the lower watershed, modeling shows that the proposed amended drainage plan would lower water surface elevations in the low-lying areas, to a level that provides positive drainage to the BMPs and wetlands, thereby reducing local street flooding. Reductions in street flooding would thus reduce events where sanitary sewers are impacted by street flooding. The proposed project would also relieve flows to the existing trunk sewers during large storm events as some stormwater would flow to the proposed BMPs for extended detention.

The proposed BMPs would be mapped as part of the drainage plan and are designed to handle the City's 5-year storm in the upper watershed and the 10-year storm in the Lower Watershed (the larger design storm in the Lower Watershed is proposed to address tidal influence on the system). They would be important elements of the City's drainage system and, in conjunction with the storm sewers feeding into them, would be key elements in the City's infrastructure.

Therefore, the proposed project would not result in potential significant adverse impacts to stormwater management infrastrucure.

E. CONCLUSIONS

The proposed project would upgrade local sanitary sewers to current design standards and would extend sewer service to areas of the watershed where there is no sanitary service. The extension of this sewer service would not impact the Oakwood Beach WWTP. The proposed project would also provide a comprehensive stormwater management plan for the watershed. This would result in positive impacts, such as reductions in local street and property flooding.

Therefore, the proposed project would not result in potential significant adverse impacts to water and sewer infrastructure. ✷

Chapter 5.12: Solid Waste and Sanitation Services of the South Beach Drainage Plan

Operation and maintenance of the proposed drainage plan would not generate a significant volume of additional solid waste. Solid waste generated from the maintenance of the proposed BMPs would be disposed of in accordance with the City's Solid Waste Management Plan (SWMP). The maintenance debris generated by the proposed BMPs would be primarily comprised of vegetative waste and street accumulated litter. The volume of these materials would not significantly add to the solid waste volumes generated in New York City. Waste materials would then be handled by DEP and disposed of in accordance with all applicable federal, state, and City regulations. If practical and economic, residual tree limbs and branches would be reused, and chipped into mulch. Potential solid waste impacts during construction are presented below in Chapter 6.1, "Impacts During Construction." Therefore, the proposed project would not result in potential significant adverse impacts to the City's solid waste and sanitation services. ✷

Chapter 5.13: Energy of the South Beach Drainage Plan

Operation of the proposed South Beach drainage plan would require minimal energy. The proposed BMPs are natural systems, with the exception of occasional maintenance. Chapter 6.1, "Impacts During Construction," assesses the potential impacts of the proposed project as it relates to energy demands during construction. Therefore, the proposed project would not result in potential significant adverse impacts to energy. ✷

Chapter 5.14: Transportation of the South Beach Drainage Plan

A. INTRODUCTION

Preliminary amended drainage plans have been developed for the South Beach watershed with the objectives of improving water quality, reducing flooding and erosion, and enhancing vegetative communities and wildlife habitats. The proposed project would not generate any vehicular, transit, or pedestrian trips; however, it would require the demapping of a number of street segments within the watershed. This chapter therefore analyzes the potential transportation impacts of the proposed project in the South Beach watershed. Chapter 2.1, "Methodology," describes in greater detail the procedures used in this analysis.

B. EXISTING CONDITIONS

TRAFFIC

The watershed boundaries are generally Hillcrest Avenue and Narrows Road/the Staten Island Expressway to the north, Seaview Avenue and Burgher Avenue to the west, Lily Pond Avenue to the east and Lower Bay to the south. The major collector east/west collector roads through the watershed are Hylan Boulevard across the northern portion of the watershed and Father Capodanno Boulevard along the southern portion of the watershed which provides access to the waterfront beaches. The Staten Island Expressway extends along the northern border of the watershed and is accessible from Hylan Boulevard. There are a few important north/south oriented collector roads including: Quintard Street which extends between an intersection with Hylan Boulevard on the north to Patterson Avenue on the south; Sand Lane which extends between Hylan Boulevard on the north and Father Capodanno Boulevard on the south; and Lily Pond Road which extends between the Staten Island Expressway on the north and Father Capodanno Boulevard on the south. These major collector roads are more heavily traveled and carry larger volumes of traffic during the morning, afternoon and evening peak traffic hours than at other times of the day.

The other streets in the watershed are generally local residential streets some of which dead end and are interrupted by local open spaces and waterbodies such as Brady's Pond and Cameron's Lake in the northern portion of the watershed. The road network around the ponds is characterized by quiet and lightly traveled residential streets. Ocean Breeze Park similarly interrupts many streets in the southern portion of the watershed. The Staten Island Railway also runs east/west across the watershed and interrupts the street grid at certain locations. With few exceptions, the street grid is complete in the upper portion of the watershed (i.e., Hylan Boulevard and above). Segments of the street grid in the lower portion of the watershed have not been completed. One of the principal reasons these street segments have not been completed is the presence of freshwater wetlands that have restricted development of these properties, thus largely eliminating the need for the local access roadways. In addition, these wetlands have also impeded the construction of the street network, given both the physical and regulatory constraints of building roads through these

wetlands, particularly in the absence of any compelling need for the road. (Currently, these wetlands have been or are in the process of being acquired by DEP under the Bluebelt program.) The incomplete street grid is mapped but unbuilt streets that are encompassed by BMPs SBE-1A, -1B and -1C, which cover the area generally south of Patterson Avenue, west of Sand Lane, north of Father Capodanno Boulevard and east of Ocean Breeze Park.

PARKING

There are generally few on-street parking restrictions in this area. Most parking needs are met off-street in residential driveways although some areas of denser residential development do use on-street parking to meet local parking needs. Another exception is along the commercial corridors, such as Hylan Boulevard, where the on-street parking is metered or time restricted along certain segments.

TRANSIT

The South Beach Watershed is served by both rail and bus service. Rail service is provided by the Staten Island Railway and there are two stops in the study area, Old Town Station and Grasmere Station. Bus service is also provided along the major roads such as McLean Avenue, Olympia Boulevard, Steuben Street, Clove Road, Richmond Road and Hylan Boulevard.

PEDESTRIANS

Sidewalks and formal crosswalks are provided throughout much of the watershed although there are segments of streets where no sidewalks are provided. With the exception of the major commercial corridors in the watershed, like Hylan Boulevard, pedestrian traffic is generally light in the watershed.

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

In the future without the proposed project no major changes are expected with respect to local transportation conditions. It is expected that there would be local street improvement projects and modifications in transit (bus) service through the No Build year (2043).

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

TRAFFIC

The proposed project is not expected to result in impacts on traffic conditions for the reasons presented below. Site access would be maintained with the proposed project to all existing privately held properties, where necessary. The watershed is largely built-out under the current zoning, little developable land remains, and no additional large-scale development is expected in the watershed that would generate a large traffic demand on local streets. Acquisition of the remaining vacant land under the Bluebelt program would preserve these lands for Bluebelt purposes which generates no traffic and eliminates additional traffic demands that might otherwise occur on these properties under development densities allowed under the current zoning.

In sum, the proposed BMPs would not conflict with any major east/west collector streets, but would affect only limited segments of local streets (see (see **Figures 5.14-1a and 5.14-1b**)) that would not be necessary since the adjoining lands would be preserved and undeveloped under the Bluebelt

program. Thus, the proposed project would not adversely impact any through or local traffic circulation patterns in the neighborhood, but would preserve some of the lightly traveled local streets that characterize the lower watershed through the land preservation elements of the Bluebelt project.

In addition, although BMP SBE-2: Cameron's Lake and BMP SBE-3: Whitney Woods are proposed in the beds of the mapped but unbuilt Normalee Road and Whitney Avenue, respectively, these mapped street segments are not expected to be constructed in the future without the proposed project. In addition, with the proposed project the existing dead end streets would remain and serve just a few residential homes. Therefore, the proposed project would not result in significant impacts on traffic.

PARKING

The proposed project would not modify any local parking regulations nor would eliminate any existing on-street parking or generate a new added parking demand. Therefore, the proposed project would not result in any impacts on parking.

TRANSIT

The proposed project would not place any added demands on transit facilities in the study 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. Therefore, the proposed drainage plans would not result in significant adverse impacts on transit. The sewer construction aspect of the proposed project would require construction within local streets and rights of way served by public transit. This includes BMP SBE-1 which is near Olympia Boulevard and BMP SBE-2 which is near Clove Road. Chapter 6.1, "Impacts During Construction," addresses the potential for temporary construction period impacts on these transit services.

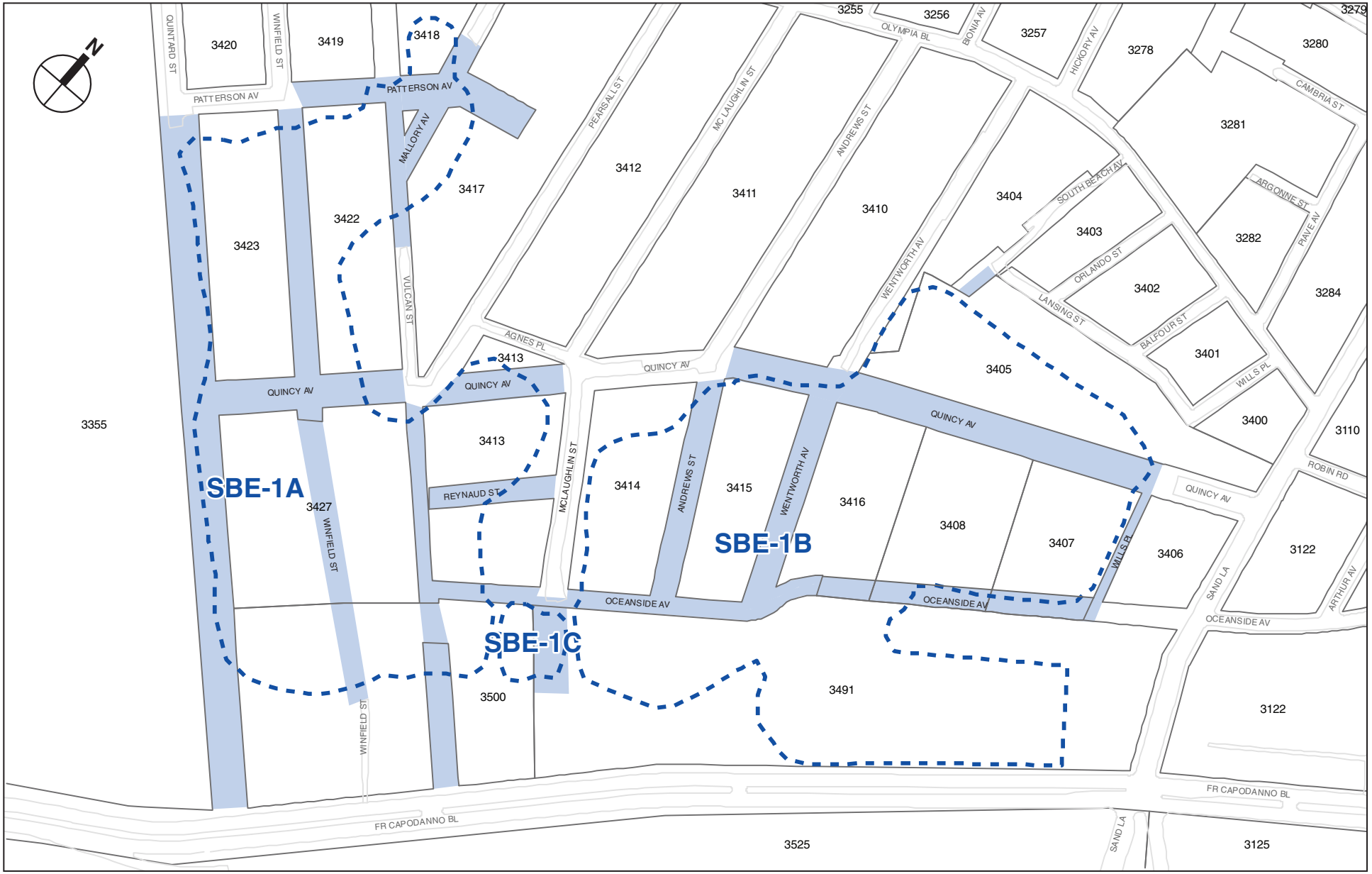
PEDESTRIANS

The proposed project would not impact any pedestrian facilities, such as sidewalks or crosswalks. Therefore, the proposed project would not result in significant impacts on pedestrians.

E. CONCLUSIONS

The proposed project would not significantly affect any collector roads and would reduce vehicular trip generation and the need for certain local streets since the Bluebelt would preserve these sites as BMP wetlands. The proposed project would also not affect local on-street parking, transit systems or pedestrian circulation. Therefore, the proposed project would not result in potential significant adverse impacts to transportation. ✷

4.14.11



Proposed BMP Footprint

Street Area to be Demapped

0 400 FEET

SCALE

Unbuilt Streets to be Demapped in the Lower South Beach Watershed

Figure 5.14-1a

Staten Island Bluebelt Mid-Island Watersheds

Proposed BMP Footprint

Street Area to be Demapped

Unbuilt Streets to be Demapped in the Upper South Beach Watershed

Staten Island Bluebelt Mid-Island Watersheds

Figure 5.14-1b

Chapter 5.15: Air Quality of the South Beach Drainage Plan

Ambient air quality is affected by air pollutants produced by both vehicles (i.e., mobile sources) and fixed facilities (i.e., stationary sources). The proposed drainage plan would not result in any new vehicular traffic or any new significant stationary sources of airborne emissions. Potential air quality impacts during construction are addressed in Chapter 6.1, "Impacts During Construction." Therefore, the proposed project would not result in potential significant adverse impacts to air quality. ✷

Chapter 5.16: Greenhouse Gasses of the South Beach Drainage Plan

The *CEQR Technical Manual* recommends a greenhouse gas analysis for development projects greater than 350,000 gross square feet in size, or projects that have unique energy demands (e.g., power plants, major modifications in transportation). The proposed project would not develop any square footage and would not have any measureable energy demand during operation. In addition, the proposed project would not result in any mobile or stationary sources of air emissions. Thus, no further analysis of greenhouse gas emissions is required. Therefore, the proposed project would not result in potential significant adverse impacts related to greenhouse gasses. ✷

Chapter 5.17: Noise Impacts of the South Beach Drainage Plan

The proposed drainage plan amendments would not result in any new mobile source noises (e.g., vehicular traffic) and would not introduce any new stationary source noises. Noise impacts during construction are addressed below in Chapter 6.1, "Impacts During Construction." Therefore, the proposed project would not result in potential significant adverse impacts to noise. ✷

Chapter 5.18: Public Health of the South Beach Drainage Plan

According to the *CEQR Technical Manual*, public health may be impacted by poor air quality resulting from traffic or stationary sources, hazardous materials in soil or groundwater used for drinking water, significant adverse impacts related to noise or odors, solid waste management practices that attract vermin and pest populations, and actions that exceed federal, state, or City standards.

The proposed project would not result in significant adverse impacts to traffic, air quality, or noise, nor would any applicable federal, state, or City standards be exceeded. The proposed project would also not involve solid waste management practices that would attract vermin or pest populations. In addition, any hazardous materials encountered during construction would be handled in accordance with all federal, state, and City regulations, and in accordance with the protection measures in place within the proposed project. Therefore, the proposed project would not result in potential significant adverse impacts to public health. ✷

Chapter 5.19: Neighborhood Character of the South Beach Drainage Plan

The *CEQR Technical Manual* defines neighborhood character as a number of combined elements that together define a community. These elements include land use, urban design and visual resources, socioeconomics, traffic, air quality and noise. The proposed project would reduce street flooding and improve storm sewer conditions while implementing BMPs that provide both an ecological and stormwater management benefit. These are positive changes for the neighborhood and would help benefit existing residential, commercial, and open space uses in the area. Therefore, the proposed project would not result in potential significant adverse impacts to neighborhood character. ✷

Chapter 5.20: Growth Inducing Impacts of the South Beach Drainage Plan

A. INTRODUCTION

Preliminary amended drainage plans have been developed for the South Beach watershed with the objectives of improving water quality, reducing flooding and erosion, and enhancing vegetative communities and wildlife habitats. This chapter considers the potential effects of the proposed project of growth-inducing aspects in the South Beach watershed. As described in Chapter 2.1, "Methodology," the proposed amended drainage plans have been examined to determine if potential significant adverse environmental impacts within the South Beach watershed would result.

B. EXISTING CONDITIONS

LAND USE AND ZONING CONDITIONS

The South Beach watershed is zoned primarily for lower-density residential uses (R1-2, R2, R3-1, R3-X, R3-2, and R5). There are commercial overlays located along major thoroughfares, including Hylan Boulevard, McClean Avenue, and Oceanside Avenue.

The watershed is urbanized and the developed land use are largely residential uses that comprise a significant portion of the watershed (535 acres or 42.3 percent). Approximately 10.8 percent of the watershed (or 136 acres) is open space, including Ocean Breeze Park, located at the southern portion of the watershed bounded by Quintard Street, Mason Avenue, and Father Capodanno Boulevard.

Within the 1,267 acre watershed, only an estimated 6.8 percent (or 86 acres) is vacant land. Vacant land is concentrated in the southern portion of the watershed between Sand Lane and Ocean Breeze Park. Much of this land is mapped by the NYSDEC as freshwater wetlands and also includes DEP Bluebelt property.

POPULATION GROWTH: 1980 TO 2010

Table 5.20-1 shows population trends in the South Beach watershed between 1980 and 2010. Overall, there was a 27.1 percent increase in the study area's population from 18,923 residents in 1980 and 24,050 residents in 2010. This population growth rate was higher than New York City's 15.6 percent population growth rate, but lower than Staten Island's 33.1 percent population growth rate over the same period.

Table 5.20-1
Total Population: 1980 to 2010

Geography (2010 Census Tracts)	Total Population				Percentage Change			
	1980	1990	2000	2010	1980-1990	1990-2000	2000-2010	1980-2010
CT 20.02	3,044	2,774	3,222	3,258	-8.9	16.1	1.1	7.0
CT 64	3,563	3,317	3,659	3,550	-6.9	10.3	-3.0	-0.4
CT 70	5,831	5,914	7,298	8,525	1.4	23.4	16.8	46.2
CT 74	2,833	2,895	3,644	4,693	2.2	25.9	28.8	65.7
CT 96.01	3,652	3,471	3,843	4,024	-5.0	10.7	4.7	10.2
Study Area	18,923	18,371	21,666	24,050	-2.9	17.9	11.0	27.1
Staten Island	352,121	378,977	443,728	468,730	7.6	17.1	5.6	33.1
New York City	7,071,639	7,322,564	8,008,278	8,175,133	3.5	9.4	2.1	15.6

Note: See Figures 5.20-1 and 5.20-2.
Sources: U.S. Bureau of the Census, 1980, 1990, 2000, and 2010 Census.

Between 1980 and 1990, the study area's population decreased by 2.9 percent. While the inland areas experienced decreases in population, the areas fronting Lower Bay experienced low population growth (1.4 percent growth in Census Tract 70 and 2.2 percent population growth in Census Tract 74).

Contrary to the population decline in the 1980s, the population in the South Beach watershed increased between 1990 and 2000. During this time period, the study area's population increased by 17.9 percent, which was comparable to the county's 17.1 percent growth rate. Each census tract in the watershed experienced an increase in population, ranging from 10.3 percent growth in Census Tract 64 to 25.9 percent growth in Census Tract 74.

Between 2000 and 2010, the population increased by 11.0 percent from 21,666 residents in 2000 to 24,050 residents in 2010. This population growth rate in the study area is higher than the population growth rate in Staten Island (5.6 percent) and New York City (2.1 percent). While Census Tract 64 experienced a decline in population during this time period, the other Census Tracts in the study area increased, with most significant population growth in the areas fronting Lower Bay (16.8 percent growth in Census Tract 70 and 28.8 percent growth in Census Tract 74).

HOUSING GROWTH: 1980 TO 2010

Table 5.20-2 provides data on housing trends in the South Beach watershed, Staten Island, and New York City. Overall, between 1980 and 2010, there was a 38.1 percent increase in the number of housing units (or the addition of 2,470 units) in the study area.

Table 5.20-2
Total Housing Units, 1980 to 2010

Geography (2010 Census Tracts)	Housing Units				Change from 1980 to 1990		Change from 1990 to 2000		Change from 2000 to 2010	
	1980	1990	2000	2010	Number	Percent	Number	Percent	Number	Percent
CT 20.02	1,117	1,104	1,256	1,325	-13	-1.2	152	13.8	69	5.5
CT 64	1,156	1,199	1,340	1,313	43	3.7	141	11.8	-27	-2.0
CT 70	1,898	2,135	2,545	2,944	237	12.5	410	19.2	399	15.7
CT 74	1,097	1,165	1,353	1,785	68	6.2	188	16.1	432	31.9
CT 96.01	1,216	1,403	1,532	1,587	187	15.4	129	9.2	55	3.6
Study Area	6,484	7,006	8,026	8,954	522	8.1	1,020	14.6	928	11.6
Staten Island	119,000	139,726	163,993	176,656	20,726	17.4	24,267	17.4	12,663	7.7
New York City	2,946,410	2,992,169	3,200,912	3,371,062	45,759	1.6	208,743	7.0	170,150	5.3

Note: See Figures 5.20-1 and 5.20-2.
Sources: U.S. Bureau of the Census, 1980, 1990, 2000, and 2010 Census.

Approximately 522 housing units were added to the study area between 1980 and 1990. Higher housing growth rates were experienced in the south and west portions of the study area. During this time period, there was a 12.5 percent increase in housing units in Census Tract 70 and a 15.4 percent increase in Census Tract 96.01.

Between 1990 and 2000, the number of housing units in the study area increased by 14.6 percent from 7,006 housing units in 1990 to 8,026 housing units in 2000. Higher housing growth rates in the study area were in areas fronting Lower Bay. For instance, the number of housing units increased by 19.2 percent in Census Tract 70 and by 16.1 percent in Census Tract 74.

The study area's housing stock increased by 11.6 percent, from 8,026 housing units in 2000 to 8,954 housing units in 2010. Similar to the 1990s, the housing growth rates were higher in areas fronting Lower Bay (31.9 percent in Census Tract 74 and 15.7 percent in Census Tract 70).

HOUSEHOLD GROWTH: 1980 TO 2010

Between 1980 and 2010, the number of households in the study area increased by 38.9 percent (see **Table 5.20-3**). In 2010, there were 8,459 households with an average household size of 2.73 people per household—slightly lower than Staten Island as a whole (2.78 people per household).

Table 5.20-3
Household Characteristics, 1980 to 2010

Geography (2010 Census Tracts)	Households				Percent change from			Average Household Size			
	1980	1990	2000	2010	1980 to 1990	1990 to 2000	2000 to 2010	1980	1990	2000	2010
CT 20.02	1,028	1,036	1,187	1,207	0.8	14.6	1.7	2.65	2.58	2.64	2.61
CT 64	1,084	1,172	1,302	1,255	8.1	11.1	-3.6	3.12	2.83	2.79	2.81
CT 70	1,827	2,025	2,441	2,768	10.8	20.5	13.4	2.97	2.70	2.78	2.91
CT 74	1,056	1,091	1,278	1,702	3.3	17.1	33.2	2.55	2.50	2.71	2.75
CT 96.01	1,095	1,300	1,486	1,527	18.7	14.3	2.8	2.81	2.43	2.37	2.43
Study Area	6,090	6,624	7,694	8,459	8.8	16.2	9.9	2.85	2.62	2.67	2.73
Staten Island	114,485	130,519	156,341	165,516	14.0	19.8	5.9	3.00	2.85	2.78	2.78
New York City	2,792,614	2,819,401	3,021,588	3,109,784	1.0	7.2	2.9	2.49	2.54	2.59	2.57

Note: See Figures 5.20-1 and 5.20-2.
Sources: U.S. Bureau of the Census, 1980, 1990, 2000, and 2010 Census.

Between 1980 and 1990, 534 households were added to the study area, an 8.8 percent increase from 1980. Census Tract 96.01 had the most growth, increasing by 18.7 percent (or by 205 households). Between 1990 and 2000, there was a 16.2 percent increase in the number of households (or 1,070 new households). In comparison, the number of households increased by 7.2 percent in New York City and by 19.8 percent in Staten Island. The number of households increased by 9.9 percent from 7,694 households in 2000 to 8,459 households in 2010.

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

As evidenced by the housing growth, there was substantial development pressure in the watershed over the past two decades. It would be expected that in the future without the proposed project the vacant land would continue to be subject to growth pressure. According to NYMTC projections, the population in the study area is expected to increase by 16.4 percent from 26,356 residents in 2015 to 30,677 residents in 2035.[1] In comparison, the population growth rate over the twenty-year period between 1990 and 2010 was 30.9 percent. Based on NYMTC projections, the number of households in the South Beach watershed would increase by 18.3 percent over a twenty year period from 9,314 households in 2015 to 11,019 households in 2035. This growth rate is lower than the 27.7 percent growth rate between 1990 and 2010.

However, in the future without the proposed project, new construction in the South Beach watershed is expected to be limited due to the availability of developable land—many of the existing wetlands are either state-owned or regulated or City-owned. Much of the vacant land in the watershed is mapped as regulated wetland and development in these areas would require additional discretionary actions (permits), in addition to physical development constraints of the property.

[1] NYMTC projections are for the Transportation Analysis Zones that best represent the South Beach Watershed: 1589, 1591, 1592, 1593, and 1598.

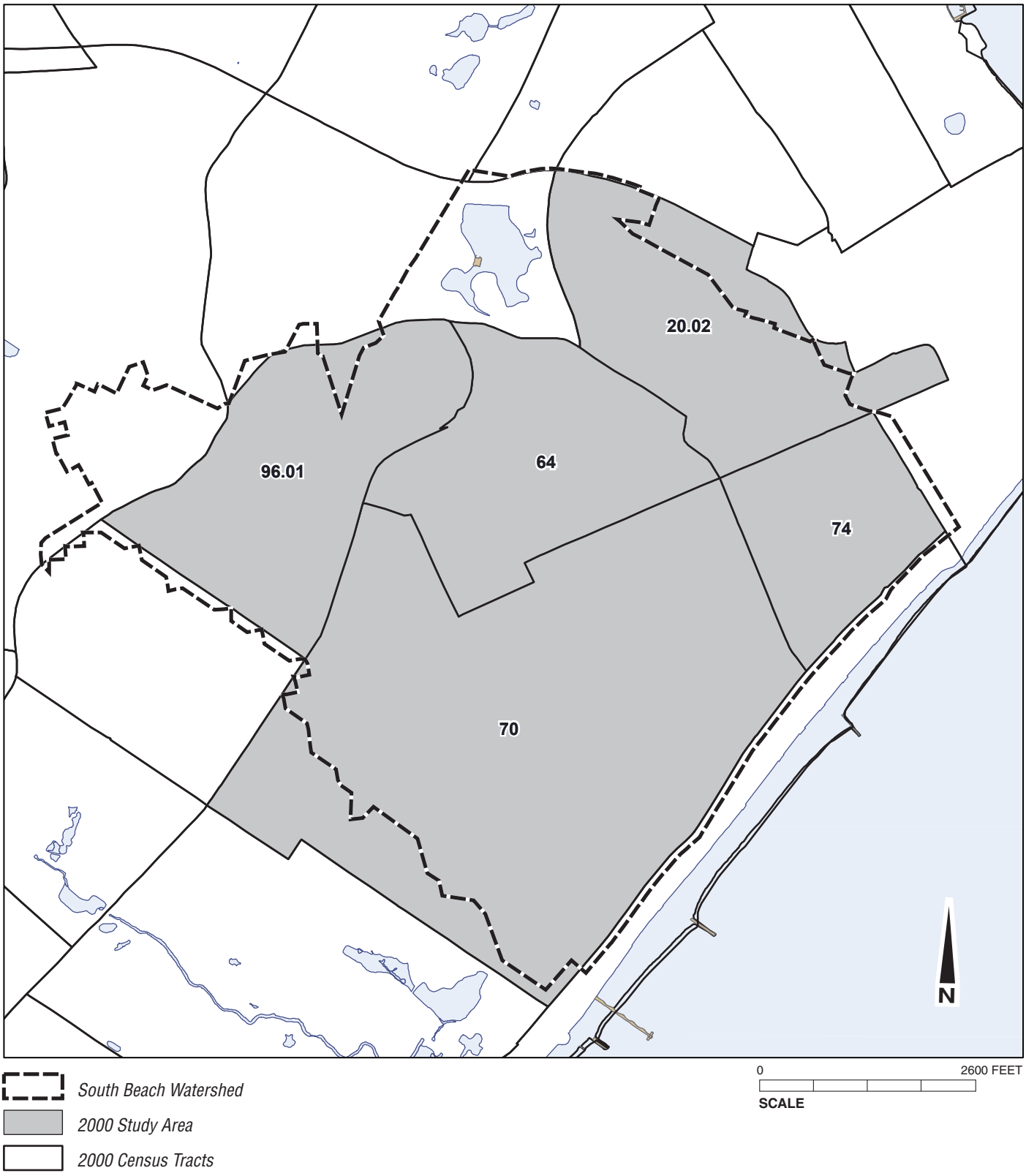
D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

Implementation of the proposed amended South Beach Drainage Plan would provide a stormwater management plan for the watershed and would enhance the natural resources values of the area through habitat restoration and protection. The proposed project does not involve any rezonings, new residential or commercial development, or an increase in development density within the watershed.

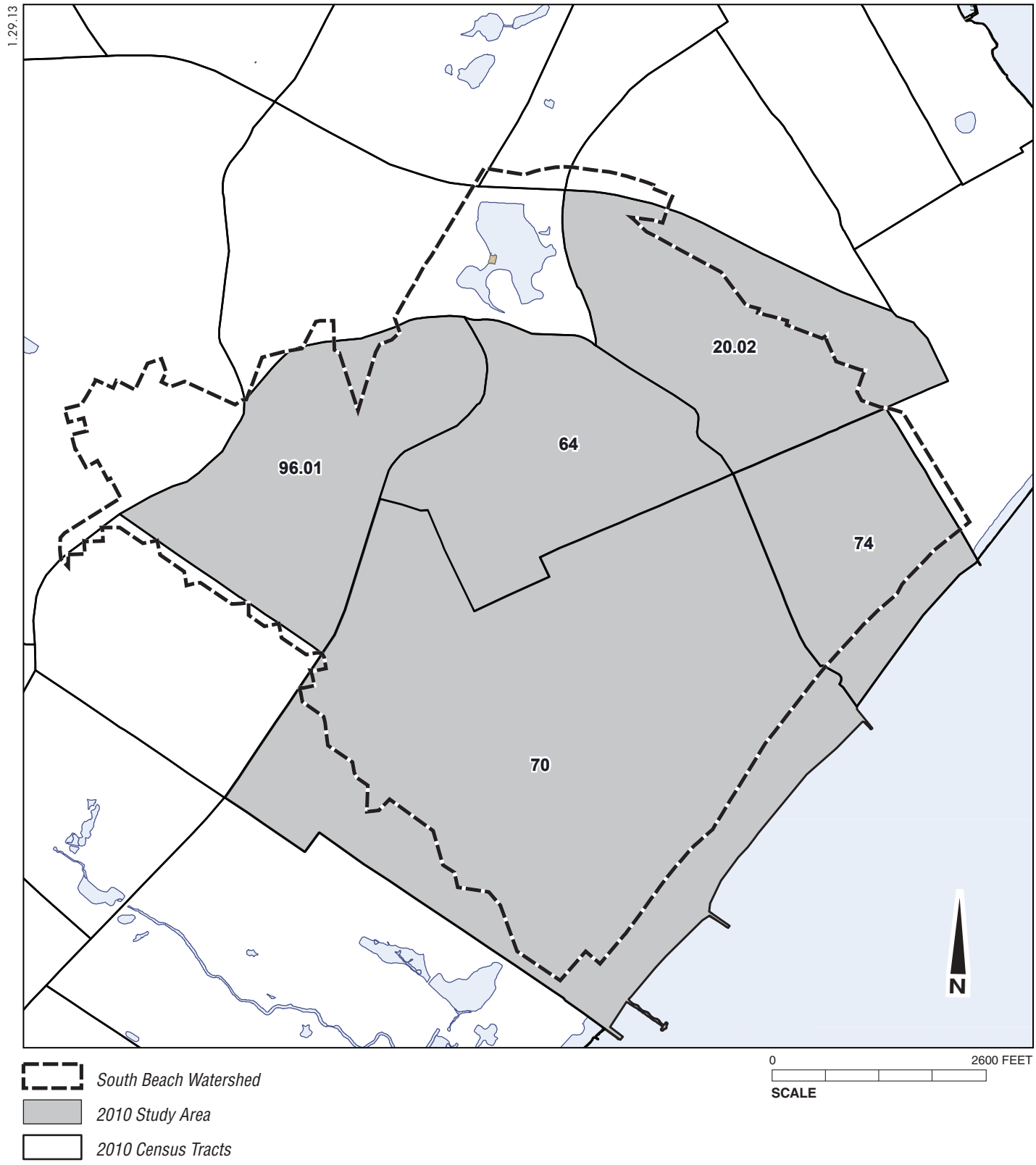
As stated above under "Existing Conditions," there is historical development pressure in the watershed that would be expected to continue in the future without the proposed project were it not for the presence of freshwater wetlands and the otherwise limited supply of vacant land. In addition to the regulatory restrictions that limit development in these wetlands, many of the wetland acres are also preserved as City open space or Bluebelt properties which would also preclude their development. Moreover, the watershed is already provided with substantial infrastructure including sanitary sewers, water supply, developed streets, and rail and bus service. While the proposed project would enhance natural resources in the study area and would preserve wetlands for stormwater management, these actions are not expected to contribute any additional growth pressure. Therefore, the proposed project would not result in potential significant adverse impacts to growth inducing characteristics.

E. CONCLUSIONS

There is historical development pressure in the watershed and what remains of the vacant land includes freshwater wetlands where development is restricted either due to regulations or public ownership (i.e., Bluebelt properties). Much of the watershed is considered urbanized and is already provided with substantial infrastructure including sanitary sewers, water supply, developed streets, and transit service and the proposed project is not expected to generate any additional growth pressure. Therefore, the proposed project would not result in potential significant adverse growth inducing impacts. ✷



2000 Census Tracts:
South Beach Watershed
Figure 5.20-1



2010 Census Tracts:
South Beach Watershed
Figure 5.20-2