

A. INTRODUCTION

According to the 2014 *City Environmental Quality Review (CEQR) Technical Manual*, projects that increase density or change drainage conditions on a large site require a water and sewer infrastructure analysis. Specifically, developments that would result in an exceptionally large demand for water (more than one million gallons per day [gpd]) or that are located in an area that experiences low water pressure require an analysis of potential impacts on the water supply system. Developments located in a combined sewer area in the Bronx, Brooklyn, Staten Island, or Queens exceeding incremental development thresholds of 400 residential units or 150,000 square feet (sf) of commercial, public facility, institutional and/or community facility space require an analysis of potential impacts on the wastewater and stormwater conveyance and treatment system. The Development Site is located in an area of the Bronx that is served by a combined sewer system, and the proposed project would redevelop the Development Site with an incremental increase of 934 units, which is above the threshold of 400 residential units. The proposed project would also include approximately 61,100 sf of retail (an increment of 21,610 sf) and a new 500-seat school of up to approximately 86,608 sf. Therefore, following the guidelines of the *CEQR Technical Manual*, an analysis of the proposed project's potential impacts on the wastewater and stormwater conveyance and treatment system was performed. As detailed in this chapter, the proposed project would not result in significant adverse impacts on water and sewer infrastructure.

B. METHODOLOGY

This analysis follows the *CEQR Technical Manual* guidelines that recommend a preliminary water analysis if a project would result in an exceptionally large demand of water (over one million gpd), or is located in an area that experiences low water pressure (i.e., in an area at the end of the water supply distribution system such as the Rockaway Peninsula or Coney Island). The Development Site is not located in an area that experiences low water pressure, and the proposed project would result in an incremental water demand of 457,779 gpd.¹ While this would represent an increase in demand on the New York City water supply system, it does not meet the *CEQR Technical Manual* threshold requiring a detailed analysis. Therefore, an analysis of water supply is not warranted since it is expected that there would be adequate water service to meet the incremental water demand and that there would be no significant adverse impacts on the City's water supply.

As described above, the Development Site is located in a combined sewer area in the Bronx and the project would include 1,665 affordable residential units (an increase of 934 units from existing conditions), which exceeds the *CEQR Technical Manual* threshold of 400 units.

¹ See **Tables 11-1** and **11-3**, which include calculations of the Development Site's total water demand in existing conditions (376,842 gpd) and in the With Action condition (834,621 gpd).

Therefore, following the guidelines of the *CEQR Technical Manual*, an analysis of the proposed project's potential impacts on the wastewater and stormwater conveyance and treatments system was performed. Existing and future water demand and sanitary sewage generation are calculated based on use rates set by the *CEQR Technical Manual*.² The DEP Flow Volume Calculation Matrix is then used to calculate the overall combined sanitary sewage and stormwater runoff volume discharged to the combined sewer system for four rainfall volume scenarios with varying durations. The ability of the City's sewer infrastructure to handle the anticipated demand from the proposed project is assessed by estimating existing sewage generation rates, and then comparing these existing rates with the With-Action condition, per *CEQR Technical Manual* methodology.

C. EXISTING CONDITIONS

CONVEYANCE SYSTEM

The Development Site is located in a part of New York City served by a combined sewer system that collects both sanitary sewage and stormwater. In periods of dry weather, the combined sewers (sized to convey an amount of sanitary sewage that is based on density levels according to zoning regulations) located in the adjacent streets convey only sanitary sewage. The Development Site includes four parcels (Parcels 1, 3, 5, and 10 of the Bronx Park South Large Scale Plan): Parcels 1 and 3 are served by sewer lines running east along Bronx Park South, East 181st Street³, and East 180th Street, and East 179th Street, connecting to a sewer line running south along Boston Road. Parcels 5 and 10 are served by a sewer line running south along Bronx Street (a demapped street located to the east of the Parcels) and west along Tremont Avenue, where it connects to the Boston Road sewer. The Boston Road sewer then runs south where it connects with Regulator CSO28, located on West Farms Road. Regulators are structures that control the flow of sewage to interceptors, i.e., larger sewers that connect the combined sewer system to the City's sewage treatment system. From Regulator CSO28, flow is conveyed to an interceptor that runs south to the Hunts Point Wastewater Treatment Plant (WWTP), one of the City's 14 WWTPs.

At the Hunts Point WWTP, wastewater is fully treated by physical and biological processes before it is discharged into the East River. The quality of the treated wastewater (effluent) is regulated by a State Pollutant Discharge Elimination System (SPDES) permit issued by the New York State Department of Environmental Conservation (DEC), which establishes limits for effluent parameters (i.e., suspended solids, fecal coliform bacteria, and other pollutants). Since the volume of flow to a WWTP affects the level of treatment a plant can provide, the maximum permitted capacity for the Hunts Point WWTP is 200 million gallons per day (mgd). The average monthly flow to the WWTP over the past 12 months is 120 mgd,⁴ which is well below the maximum permitted capacity.

During and immediately after wet weather, combined sewers can experience a much larger flow due to stormwater runoff collection. To control flooding at the Hunts Point WWTP, the regulators built into the system allow only approximately two times the amount of design dry

² *CEQR Technical Manual*, March 2014, Table 13-2.

³ A portion of East 181st Street extending through Parcel 1 is demapped, and the sewer line runs underneath the parcel; the City has an easement at this location.

⁴ 12-month period through June 2015.

weather flow into the interceptors. The interceptor then takes the allowable flow to the WWTP, while the excess flow is discharged to the nearest waterbody as combined sewer overflow (CSO). The Development Site is located within one CSO drainage area: in wet weather, sanitary flow and stormwater runoff is conveyed to CSO outfall HP-004, located immediately to the north of the Cross Bronx Expressway, where it is discharged into the Bronx River.

SANITARY FLOWS

For purposes of analysis, the amount of sanitary sewage is estimated as all water demand generated by the existing buildings in the Development Site excepting water used by air conditioning, which is typically not discharged to the sewer system. The existing buildings in the Development Site contain a total of 731 residential units, with 39,490 sf of retail space and a 2,250 sf Universal Pre-Kindergarten facility (located on Parcel 3). As shown on **Table 11-1**, the existing buildings generate an estimated 219,503 gpd of sanitary sewage with a total water demand of 376,842 gpd.

Table 11-1
Existing Water Consumption and Sewage Generation

Use	Floor Area/Residents/Seats	Rate ¹	Consumption (gpd)
Residential			
Domestic	2,098 residents ²	100 gpd/person	209,800
Air Conditioning	883,784 sf	0.17 gpd/sf	150,243
Retail			
Domestic	39,490 sf	0.24 gpd/sf	9,478
Air Conditioning	39,490 sf	0.17 gpd/sf	6,713
Community Facility (Early Education Center)³			
Domestic	2,250 sf	0.10 gpd/sf	225
Air Conditioning	2,250 sf	0.17 gpd/sf	383
Total Water Supply Demand			376,842
Total Sewage Generation			219,503
Notes: <ol style="list-style-type: none"> 1. Rates are from the <i>CEQR Technical Manual</i>, Table 13-2. 2. Estimated by multiplying 731 total residential units by 2.87, the average household size for Bronx Community District 6 as of the 2010 Census. 3. For purposes of analysis, the early education center is assumed to consume water and generate sewage at the rate for commercial office space. 			

STORMWATER FLOWS

The four parcels included in the Development Site (Parcels 1, 3, 5, and 10 of the Bronx Park South Large Scale Plan) have a total area of approximately 11.73 acres. The parcels contain building rooftops (including residential buildings on Parcels 1, 3, and 5, and retail and garage buildings on Parcel 10) surrounded by open areas that include paved spaces (walkways and parking areas) and landscaped spaces. The Development Site's parcels contain an estimated total of 243,612 sf of rooftop area (5.59 acres). For purposes of analysis, it is assumed that the open areas on all of the Development Site's parcels contain a proportion of paved area to landscaped area that is similar to that of Parcel 3's open area, which contains roughly 65 percent landscaped area and 35 percent paved area. Therefore, the Development Site is estimated to contain roughly 173,809 sf (3.99 acres) of landscaped space and 93,589 sf (2.15 acres) of paved space. **Table 11-2** summarizes the surfaces and surface areas, as well as the weighted runoff coefficient (the fraction of precipitation that becomes surface runoff for each surface type).

Table 11-2
Existing Surface Coverage

Affected CSO Outfall	Surface Type	Roof	Pavement and Walkways	Other	Grass and Soft Scape	Total
HP-004	Area (percent)	48%	18%	0%	34%	100%
	Surface Area (acres)	5.59	2.15	0	3.99	11.73
	Runoff Coefficient*	1.00	0.85	0.85	0.20	0.70
Notes: * Weighted Runoff Coefficient calculations based on the DEP Flow Volume Calculation Matrix provided in the <i>CEQR Technical Manual</i> , retrieved June 2015.						

D. THE FUTURE WITHOUT THE PROPOSED PROJECT (NO ACTION CONDITION)

As described in Chapter 1, “Project Description,” absent the proposed project it is assumed that the Development Site will continue in active use as in the existing condition. There will be no changes to the wastewater conveyance system serving the Development Site and no alterations to the existing buildings on the Development Site’s parcels. Therefore, the amount of water demand and sanitary sewage generation will remain as shown in Table 11-1, and the surface coverage of the Development Site’s parcels will remain as shown in Table 11-2.

E. THE FUTURE WITH THE PROPOSED PROJECT (WITH ACTION CONDITION)

As described in Chapter 1, “Project Description,” the proposed project would redevelop the Development Site with new buildings containing approximately 1.8 million sf of residential space (a total of 1,665 residential units), approximately 61,100 sf of retail, and a new 86,608 sf school (500 seats) (for an increment of 934 units, 21,610 sf of retail space, and the school). The 2,250 sf Universal Pre-Kindergarten facility is expected to be relocated from Parcel 3 to equivalent space in one of the new buildings constructed on Parcel 1. The proposed project would therefore result in incremental increases in residential, retail, and school space on the Development Site’s parcels, and would consume more water and generate more sewage, as well as alter the surface area coverage of the Development Site. An analysis of the effects of these changes to the Development Site on water and sewer infrastructure is included below.

CONVEYANCE SYSTEM

The proposed project would not alter the conveyance system serving the Development Site. The new buildings that would be developed on the Development Site’s parcels would continue to be served by a combined sewer system with sewer lines running along Bronx Park South, East 181st Street, East 180th Street, Bronx Street, and Tremont Avenue, which all connect to a sewer line running south along Boston Road. From the Development Site, stormwater and wastewater would continue to be directed to Regulator CSO28 and the Hunts Point WWTP, and CSO would continue to be conveyed to outfall HP-004.

The Applicants have met with DEP to review the conveyance system serving the Development Site. Between publication of the Draft and Final EISs, a hydraulic analysis will be undertaken that considers the Development Site’s proposed zoning and the conveyance system’s adequacy in meeting future projected flows with the proposed project. Based on the hydraulic analysis, DEP will identify the potential need for conveyance system upgrades that would ensure the

conveyance system is adequately sized to accommodate wastewater flows from the proposed project.

SANITARY FLOWS

As shown on **Table 11-3**, the proposed project is expected to generate 497,781 gpd of daily sanitary sewage with a total water demand of 834,621 gpd.

Table 11-3
Proposed Project Water Consumption and Sewage Generation

Use	Floor Area/Residents/Seats	Rate ¹	Consumption (gpd)
Residential			
Domestic	4,779 residents ²	100 gpd/person	477,900
Air Conditioning	1,831,483 sf	0.17 gpd/sf	311,352
Retail			
Domestic	61,068 sf	0.24 gpd/sf	14,656
Air Conditioning	61,068 sf	0.17 gpd/sf	10,382
Community Facility (Early Education Center)³			
Domestic	2,250 sf	0.10 gpd/sf	225
Air Conditioning	2,250 sf	0.17 gpd/sf	383
Community Facility (School)			
Domestic	500 seats	10 gpd/seat	5,000
Air Conditioning	86,608 sf	0.17 gpd/sf	14,723
Total Water Supply Demand			834,621
Total Sewage Generation			497,781
Notes: <ol style="list-style-type: none"> 1. Rates are from the <i>CEQR Technical Manual</i>, Table 13-2. 2. Estimated by multiplying 1,665 total residential units by 2.87, the average household size for Bronx Community District 6 as of the 2010 Census. 3. For purposes of analysis, the early education center is assumed to consume water and generate sewage at the rate for commercial office space. 			

The incremental sanitary sewage generated by the proposed project, as compared to the existing buildings in the Development Site, would be 278,278 gpd. This incremental increase in sewage generation would be approximately 0.23 percent of the average daily flow at the Hunts Point WWTP (120 mgd) and would not result in an exceedance of the plant's permitted capacity of 200 mgd. In addition, in accordance with the New York City Plumbing Code (Local Law 33 of 2007), the new buildings that would be constructed with the proposed project would be required to utilize low-flow plumbing fixtures, which would reduce sanitary flows to the plant. Therefore, the proposed project would not result in a significant adverse impact to the City's sanitary sewage conveyance and treatment system.

STORMWATER FLOWS

The proposed project would redevelop the Development Site's parcels with new buildings, which would generally be built with more rectilinear footprints and closer to the lot lines of the site than the existing buildings in order to create cohesive street frontages and stronger streetwalls throughout the Development Site. In addition, the proposed project would reopen several streets within the Development Site: on Parcel 1, East 181st Street would be extended between Bryant Avenue and Boston Road, and the portion of Bryant Avenue between East 181st Street and East 180th Street would be reopened. Similarly, the portion of Bryant Avenue between East 180th Street and East 179th Street, which runs through Parcel 3, would be

reopened. Similar to the existing layout of the parcels, the area between the new buildings Parcels 1, 3, and 5 would contain interior courtyards.

The reconfiguration of the Development Site with the proposed project would alter the surface coverage of the Development Site's parcels. In particular, with the division of Parcel 1 into two blocks through the reopening of East 181st Street and the reorientation of the buildings on Parcel 5 to create frontages on Boston Road and East 180th Street, the proposed project would result in smaller building footprints. As a result, the amount of rooftop area would be reduced to 178,079 sf (4.09 acres). The undeveloped portions of the parcels would contain a similar mix of paved spaces (walkways and parking areas) and landscaped spaces as in the existing configuration of the parcels, and are assumed to contain 65 percent landscaped area and 35 percent paved area. As shown in **Table 11-4**, the proposed project would result in an overall reduction of building rooftop area and an increase in both paved and landscaped areas, therefore the weighted runoff coefficient would decrease to 0.63 (from 0.70 in the existing condition).

Table 11-4
Proposed Project Surface Coverage

Affected CSO Outfall	Surface Type	Roof	Pavement and Walkways	Other	Grass and Soft Scape	Total
HP-004	Area (percent)	35%	23%	0%	42%	100%
	Surface Area (acres)	4.09	2.68	0	4.97	11.73
	Runoff Coefficient*	1.00	0.85	0.85	0.20	0.63
Notes: * Weighted Runoff Coefficient calculations based on the DEP Flow Volume Calculation Matrix provided in the <i>CEQR Technical Manual</i> , retrieved June, 2014.						

Using these sanitary and stormwater flow calculations, the DEP Flow Volume Calculation Matrix was completed for the existing conditions and the proposed project (the With-Action condition). The calculations from the Flow Volume Calculation Matrix help to determine the change in wastewater flow volumes to the combined sewer system from existing to proposed conditions, and include four rainfall volume scenarios with varying durations. The summary tables of the Flow Volume Calculation Matrix are included in **Table 11-5**.

Table 11-5
DEP Flow Volume Matrix: Existing and Build Volume Comparison

Rainfall Volume (in.)	Rainfall Duration (hr.)	Runoff Volume to Direct Drainage (MG)	Runoff Volume to CSS (MG)*	Sanitary Volume to CSS (MG)	Total Volume to CSS (MG)	Runoff Volume to River (MG)	Runoff Volume to CSS (MG)*	Sanitary Volume to CSS (MG)	Total Volume to CSS (MG)	Increased Total Volume to CSS (MG)*
HP-004		Existing				With-Action				HP-004 Increment
		511,010 square feet (11.73 acres)				511,010 square feet (11.73 acres)				
0.00	3.80	0.00	0.00	0.03	0.03	0.00	0.00	0.08	0.08	0.05
0.40	3.80	0.00	0.09	0.03	0.12	0.00	0.08	0.08	0.16	0.04
1.20	11.30	0.00	0.27	0.10	0.37	0.00	0.24	0.23	0.47	0.10
2.50	19.50	0.00	0.56	0.18	0.74	0.00	0.50	0.40	0.90	0.16
Notes: * Assumes no on-site detention or BMPs for purposes of calculations CSS = Combined Sewer System; MG = Million Gallons										

As shown in **Table 11-5**, in all rainfall volume scenarios flow to CSO outfall HP-004 would increase. The increase in flow is attributable to the increase in sanitary flow resulting from the increased residential, retail, and community facility development in the Development Site with the proposed project. Due to the reduction of rooftop area and increase in paved and landscaped areas, the proposed project would result in a slight reduction in fully impervious surface area.

Flow Volume Matrix calculations do not reflect the use of any sanitary and stormwater source control best management practices (BMPs) to reduce sanitary flow and stormwater runoff volumes to the combined sewer system. As noted above, the proposed project would incorporate low-flow plumbing fixtures to reduce sanitary flow in accordance with the New York City Plumbing Code. The buildings would also meet HPD's Enterprise Green Communities criteria, which mandate water conservation.

In addition, stormwater BMPs would be required as part of the DEP site connection approval process in order to bring the new buildings into compliance with the required stormwater release rate. Specific BMP methods will be determined with further refinement of the buildings' design and in consultation with DEP, but may include on-site detention systems such as planted rooftop spaces ("green roofs") and/or vaults.

As discussed above, the Applicants have met with DEP to review the conveyance system serving the Development Site. Between publication of the Draft and Final EISs, a hydraulic analysis will be undertaken that considers the Development Site's proposed zoning and the conveyance system's adequacy in meeting future projected flows with the proposed project. Based on the hydraulic analysis, DEP will identify the potential need for conveyance system upgrades that would ensure the conveyance system is adequately sized to accommodate wastewater flows from the proposed project. The Applicants will continue to meet with DEP to review the results of the hydraulic analysis. Overall, with the incorporation of the appropriate DEP reviewed and approved sanitary flow and stormwater source control BMPs that would be required as part of the site connection approval process, the volume of stormwater runoff as well as the peak stormwater runoff rate from the Development Site would be reduced. Treatment capacity at the Hunts Point WWTP is sufficient to handle wastewater flow resulting from the proposed project. Therefore, the proposed project would not result in significant adverse impacts on sanitary wastewater treatment or stormwater conveyance infrastructure. *