Chapter 14: Infrastructure

A. INTRODUCTION

This chapter analyzes the potential impacts of the proposed project on the city's infrastructure systems. As defined by the *City Environmental Quality Review (CEQR) Technical Manual*, the City's "infrastructure" comprises the physical systems supporting its population, including water supply, wastewater treatment, and stormwater management. Other infrastructure components, such as solid waste management, energy, and transportation, are addressed separately under CEQR and are assessed in separate chapters of this EIS.

Given the size of New York City's water supply system and the City's commitment to maintaining adequate water supply and pressure, few actions have the potential to cause significant adverse impacts on this system. According to the *CEQR Technical Manual*, actions that could affect water pressure and would therefore need detailed assessment include actions that would have exceptionally large demand for water (power plants, large cooling systems, etc.); large developments (e.g., those that use more than one million gallons per day); or actions taking place in locations that have weaknesses in the local water supply distribution systems (e.g., creating a large draw of water at locations at the end of the water system where water pressure is low or at locations near pressure boundaries). Therefore, because of its large size, the proposed project is analyzed for potential impacts on the city's water supply system.

The *CEQR Technical Manual* states that detailed analysis of wastewater treatment is needed for actions with very large flows that have the potential for significant adverse impacts on sewage treatment. Therefore, the volume of wastewater that would be generated by the proposed project is analyzed in relation to the State Pollutant Discharge Elimination System (SPDES)-permitted capacity of the Newtown Creek Water Pollution Control Plant (WPCP), which services the project site. Modeling studies were also performed to estimate the potential impact of the proposed project on the number and annual volume of combined sewer overflow (CSO) discharges from the Newtown Creek WPCP collection system. Details of this analysis are included in Appendix D1. Water quality modeling (see Appendix D2) was also conducted to assess the proposed project's potential impacts on water quality of the East River and Newtown Creek from additional sewage flow to the Newtown Creek WPCP and from CSOs within the Brooklyn sewershed for the Newtown Creek WPCP.

In accordance with the *CEQR Technical Manual*, a detailed analysis of stormwater management is warranted if a proposed action involves certain types of industrial activities (e.g., manufacturing, processing, or raw materials storage); would greatly increase the amount of paved area; would be served by a separate storm system that would involve construction activities; or would involve the construction of a new stormwater outfall. The proposed project would involve the construction of new stormwater outfalls to the East River and a new separate storm system to serve the project site. Therefore, the proposed project is analyzed for potential impacts on the city's stormwater management system.

PRINCIPAL CONCLUSIONS

The following assessment concludes that although the proposed project would create new demand for water and treatment of sewage, the existing municipal services could handle these increases in demand, and no significant adverse infrastructure impacts are expected to result from the proposed project. The proposed project would result in a small increase in water demand that would not have a significant adverse impact on the city's water supply. An increase in sanitary sewage resulting from the proposed project is neither anticipated to adversely impact the Newtown Creek WPCP nor cause it to exceed its design capacity or SPDES permit flow limit.

Because the proposed project would result in an increase in pervious surface that would result in a decrease in surface runoff entering the East River and would incorporate stormwater best management practices (BMPs), the proposed project would not result in significant adverse impacts with respect to stormwater.

The modeling undertaken to analyze the projected effects of the proposed project on CSOs indicates that the proposed project's new sanitary wastewater generation is anticipated to slightly increase CSO discharges to the East River and tributaries of Newtown Creek but would result in reduced stormwater discharges. With the new storm sewers in place, a portion of the site's stormwater currently reaching the combined sewers would discharge directly to the river after receiving treatment. The results of the modeling analyses indicate that the proposed project would result in one additional CSO discharge event at two individual outfalls.

The water quality modeling results indicate that the increase in CSO volumes projected for the proposed project would not result in a significant adverse impact on the water quality of the East River or Newtown Creek. Therefore, CSO discharges associated with the proposed project would not result in a significant adverse impact on the city's sanitary sewage systems or on water quality for the receiving waters.

As described in Chapter 23, "Mitigation," the New York City School Construction Authority (SCA) may locate an approximately 100,000-square-foot public elementary and intermediate school within the community facility space in the Refinery complex. The inclusion of a public school would not result in any significant adverse infrastructure impacts.

B. EXISTING CONDITIONS

WATER SUPPLY

New York City's water supply system consists of an extensive network of reservoirs and aqueducts extending as far north as the Catskill region, and a grid of distribution pipes to deliver water from the primary transportation conduits to points of use. Approximately 1.2 billion gallons per day (gpd) of water are consumed by New York City through this water supply system. Consumption can reach up to 1.5 billion gpd during the summer months. Potable water for the project site is provided by the New York City water supply system, which consists of a network of aqueducts that bring water from upstate reservoirs. There are no sole source aquifers beneath this area of Brooklyn, and neither the groundwater beneath Brooklyn nor the waters of the East River are used as a source for potable water or other uses, such as irrigation or industrial processes.

Most of New York City obtains water from three surface water supply systems—Delaware, Catskill, and Croton—operated by the New York City Department of Environmental Protection (DEP). These systems form a network of reservoirs, aqueducts, and tunnels extending as far as 125 miles north of the city. The system has 18 collecting reservoirs, two balancing reservoirs, several dams, three major aqueducts, two large water distribution tunnels, a third major tunnel under construction and partially in use, and a system of water mains and other facilities. The watersheds of the three systems cover almost 2,000 square miles, with 19 reservoirs and three controlled lakes, which have a storage capacity of 550 billion gallons. The water flows to the city through aqueducts, reaching most consumers by gravity alone, although some four percent of the city's water must be pumped to its final destination.

One of the three surface water systems, the Croton system, collects water from watershed areas in Westchester and Putnam Counties and delivers it to the Jerome Park Reservoir in the Bronx. From there it is distributed to the Bronx and Manhattan through the New Croton Aqueduct via City Tunnel No. 1. The remaining two surface water systems, the Delaware and Catskill systems, collect water from watershed areas in the Catskill Mountains and deliver it to the Hillview Reservoir in Yonkers. From there, it is distributed to the city through two tunnels: City Tunnel No. 2, which goes through the Bronx, Queens, and Brooklyn (and from there through the Richmond Tunnel to Staten Island); and City Tunnel No. 3, which currently serves the Bronx, upper Manhattan, and Roosevelt Island. The construction of City Tunnel No. 3 began in 1996 and is scheduled for completion in 2020. The addition of City Tunnel No. 3 is intended to improve the city's water supply while allowing for the inspection and repair of Tunnels 1 and 2. City Tunnel No. 3, which will serve Midtown Manhattan, Lower Manhattan, Brooklyn, and Queens, is anticipated to be a supplemental water source to the proposed action area.

Within the city, a grid of underground distribution mains distributes water to consumers. Large mains—up to 96 inches in diameter—feed smaller mains, such as the 8-, 12-, and 20-inch mains that distribute water to individual locations. These mains also provide water to fire hydrants along many of the city's streets. Water pressure throughout the city's water supply system is controlled by pressure regulators.

The general water supply source for the Williamsburg area is currently served by City Tunnel No. 2. There is an existing 20-inch water main in Kent Avenue, an 8-inch water main in South 5th Street, and a 12-inch water main in Grand Street, which are primary supply sources for the project site.

The existing buildings on the project site are vacant, with the exception of a small security office. Therefore, the on-site water demand is currently negligible.

SANITARY SEWAGE AND WASTEWATER TREATMENT

According to the *CEQR Technical Manual*, for assessment purposes, estimates of an area's daily sanitary sewage generation are equivalent to the domestic water usage rates. Wastewater from air conditioning systems is not included in the overall volumes used for analysis, as minimal volumes of wastewater are generated from the recirculation and evaporation processes involved in the air cooling process. As described above, the project site is vacant except for a small security office. Therefore, the amount of sanitary sewage currently generated is negligible.

New York City's sewer system consists of a grid of sewers beneath the streets that send wastewater flows to 14 different treatment plants, known as "water pollution control plants," or "WPCPs," that have a combined capacity to treat a total of approximately 1.77 billion gallons of

sewage per day. The areas served by each of these plants are called "drainage basins." Most of this system is a "combined" sewer system—it carries both sanitary sewage from buildings and stormwater collected in catch basins and storm drains. However, some areas of the city, primarily in Queens and Staten Island, operate with separate systems for sanitary sewage and stormwater. In addition, small areas of Staten Island, Brooklyn, and Queens use septic systems to dispose of sanitary sewage. Some developments in Staten Island also use small privately owned and operated sewage treatment plants to treat sanitary sewage.

Sewers beneath the city's streets collect sewage from the streets' buildings. Collection sewers can be one to two feet in diameter on side streets, and three or four feet in diameter under larger roadways. They connect to trunk sewers, generally five to seven feet in diameter, which bring the sewage to interceptor sewers. These large interceptor sewers (often up to 10 or 12 feet in diameter) bring the wastewater collected from the various smaller mains to the WPCPs for treatment.

The project site is served by combined sewers that collect both "dry-weather" wastewater (primarily sanitary sewage as well as wastewater from industries) and stormwater. During dry weather, combined sewers function as sanitary sewers, conveying all flows to the WPCPs for treatment. During wet weather, however, large volumes of rainfall runoff (10 to 50 times the dry-weather flow) enter the system through catch basins along the city's streets. If all this combined sanitary and runoff wastewater were conveyed to the treatment plants, it would exceed the WPCPs' design capacity, as the plants are designed to handle only twice their average design dry-weather flow for limited periods. To prevent the WPCP treatment process from being overwhelmed, "regulators" are built into the combined sewers to act as relief valves. These are chambers set to allow two times the average design dry-weather flow into the interceptor. During storms, if a greater amount of wastewater reaches the regulator, the excess is directed to outfalls into the local waterway (e.g., the East River, etc.). In the vicinity of the project site, there are several combined sewer overflow outfalls discharging into the East River. During such overflow periods, a portion of the untreated sanitary sewage entering or already in the combined sewers discharges into the waterway along with the stormwater and debris washed from the streets. This untreated overflow is known as "combined sewer overflow," or "CSO." Combined sewer overflow is a concern because the untreated discharge contains pollutants from street runoff, floating debris (also called "floatables," and usually consisting primarily of street litter), various pollutants from industrial facilities (both pollutants discharged into the sewer system and pollutants in the runoff from these facilities), and untreated domestic and commercial sewage that has the potential to impair the water quality of the receiving waterbody.

The project site is located within the Brooklyn sewershed for the Newtown Creek WPCP, located at 320 Freeman Street in Greenpoint, Brooklyn. The Newtown Creek WPCP serves northern Brooklyn and a small area of northeastern Queens, as well as Lower Manhattan and part of Manhattan's East Side. The Newtown Creek Brooklyn sewershed contributes an estimated 39 percent of the dry weather flow for the Newtown Creek WPCP. In 2007, the Newtown Creek Brooklyn sewershed contributed an average dry weather flow of approximately 87 million gallons per day (mgd) to the Newtown Creek WPCP.

The Newtown Creek WPCP is fed by two interceptor sewers, one in Kent Avenue and the other in Morgan Avenue. Wastewater generated at the project site flows via the Kent Avenue interceptor into the city's sewer system and is treated at the Newtown Creek WPCP, which then outlets to the East River. The Newtown Creek WPCP is the largest wastewater treatment facility in the city, with an SPDES-permitted capacity of 310 million gallons per day (mgd). SPDES

permits are issued by the New York State Department of Environmental Conservation (NYSDEC). For the 12-month period ending in August 2009 (the latest 12-month period for which data from the plant are available), the plant had a daily average actual flow of 253 mgd, well below the permitted level of 310 mgd. As stated above, the plant handles greater volumes during storm events due to stormwater inflows to the plant.

The 52-acre Newtown Creek WPCP is currently undergoing a major upgrade, which would bring the plant into compliance with secondary treatment requirements mandated by the Clean Water Act pertaining to wastewater that flows to the plant from the surrounding drainage area. According to DEP, these upgrades are expected to be completed by 2013.

Currently, the majority of stormwater runoff generated within the project site is discharged directly to the East River by overland flow. Approximately 0.85 acres of the project site discharges stormwater runoff (i.e., rooftop runoff) to the combined sewer. Under existing conditions, approximately 3.1 million gallons per year of stormwater runoff are discharged from the project site to the combined sewer.

WATER CONSERVATION

During the 1990s, the city's WPCPs came under increased scrutiny from federal and state agencies with oversight powers, primarily because the plants exceeded the dry weather flow allowed in their respective SPDES permits. As a result, the City instituted a variety of water conservation measures intended to reduce dry weather flow to these facilities. Fire hydrants opened by neighborhood residents in the summer for use as makeshift sprinklers were equipped with locks. All new fixtures in the city, in existing and new structures, are required to be of a low-flow design (Local Law No. 29, 1989). The City also implemented a metering program, installing water meters at thousands of properties where water fees had previously been based on property frontage rather than usage, thereby providing a new financial incentive for consumers to conserve. Water rates were increased significantly, increasing incentives to conserve for both those with new meters and old. The City also implemented leak detection programs to identify and repair leaks in the water distribution system. In addition, once the construction of City Tunnel No. 3 is complete, DEP would be able to conduct its first inspections and repairs of Tunnel Nos. 1 and 2 since they were activated. Other technologies such as gray water systems—where water is recycled within a building for non-potable uses—were explored but never instituted by the City.

The programs instituted have, on the whole, been successful in that they have reduced water demand and the load on the city's treatment plants. Often this reduction has been on the order of several million gallons per day. Such are the circumstances at the Newtown Creek WPCP, where flows have declined substantially since the early 1990s. DEP projects that over the next decade the savings from these conservation measures would exceed (or offset) any increase in water demand from consumers (e.g., population growth).

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

As described in Chapter 2, "Analytical Framework," it is expected that the project site would be redeveloped with commercial and industrial uses absent the proposed project in 2020. These would include a storage facility, a building materials storage yard, a new distribution facility, and a catering hall/restaurant.

WATER SUPPLY

As shown in Table 14-1, in the future without the proposed project (the "No Action" condition), total water usage on the project site would be 42,905 gpd. This small incremental demand would not be large enough to significantly affect the city's water system.

Table 14-1
Projected Average Daily Water Demands (gpd) in the No Action Condition

Use	Floor Area (gsf)	Estimated employees	Domestic Water Consumption Rate	Domestic Water Consumption (gpd)	Air Conditioning Water Use Rate	Air Conditioning Water Use (gpd)	Total Water Demand (gpd)
Industrial distribution space	106,300	106	10 gpd per employee	2,650	0.1 gpd/sf	10,630	13,280
Building materials storage (land area)	61,000	3	10 gpd per employee	75	0.1 gpd/sf	6,100	6,175
Building materials storage (office building)	5,000	2	10 gpd per employee	50	0.1 gpd/	500	550
Storage space	60,000	4	10 gpd per employee	100	0.1 gpd/sf	6,000	6,100
Catering hall/restaurant*	40,000	67	10 gpd per meal	10,000	0.17 gpd/sf	6,800	16,800
			TOTAL	**12,875**		**30,030**	**42,905**

Notes: * Assumes 1,000-seat catering hall serving an average of 1,000 meals per day.
sf=square feet.
gsf=gross square feet.
Source: Rates are from the *CEQR Technical Manual.*

SANITARY SEWAGE AND WASTEWATER MANAGEMENT

Sewage flows at the project site (which are assumed to be the same as the domestic water demand) from the development that would occur absent the proposed project would be approximately 12,875 gpd.

As discussed above, DEP is currently upgrading the Newtown Creek WPCP. Construction for the long-term WPCP upgrade has been ongoing since 1998 and will continue through 2013. When all of the upgrades are completed at the Newtown Creek WPCP, it will be able to provide secondary treatment to 700 mgd of peak flow during wet weather.

The dry weather flow for the entire Newtown Creek WPCP drainage area in 2020 in the No Action condition is estimated at approximately 234.8 mgd (see Appendix D1). This projected flow is well below the Newtown Creek WPCP's permitted daily flow limit of 310 mgd, and would not be expected to adversely affect compliance of the Newtown Creek WPCP effluent with the SPDES permit limits. The average dry weather flow (sanitary flow) to the Newtown Creek WPCP from the Brooklyn sewershed in 2020 in the No Action condition is projected to be 91.6 mgd (see Appendix D1).

D. THE FUTURE WITH THE PROPOSED PROJECT

As described in Chapter 1, "Project Description," the proposed project would result in the development of up to 2,400 residential units, 127,537 gross square feet (gsf) of retail/commercial space, 98,738 gsf of office space, and 146,451 gsf of community facility space.

WATER SUPPLY

As shown in Table 14-2, in the future with the proposed project, total water usage on the project site would be 1,278,049 gpd, an increase of 1,235,144 gpd from the No Action condition. This small incremental demand, which represents approximately 0.01 percent of the city's average daily water demand, is not large enough to significantly impact the ability of the city's water system to deliver water.

Table 14-2
Projected Average Daily Water Demands (gpd) in the Future With the Proposed Project

Proposed Use	Size	Domestic Water Consumption Rate	Domestic Water Consumption (gpd)	Air Conditioning Water Use Rate	Air Conditioning Water Use (gpd)	Total Water Demand (gpd)
Residential	2,442,305 gsf (2,400 units)	112 gpd/person	749,952	0.17 gpd/sf	415,192	1,165,144
Retail	127.537 gsf	0.17 gpd/sf	21,681	0.17 gpd/sf	21,681	43,362
Community Facility	146,451 gsf	0.17 gpd/sf	24,897	0.17 gpd/sf	24,897	49,794
Office	98,738 gsf	25 gpd/person	9,875	0.10 gpd/sf	9,874	19,749
Totals	**2,815,031 gsf**	**N/A**	**806,405**	**N/A**	**471,644**	**1,278,049**

Notes: Since the *CEQR Technical Manual* does not provide a rate for air conditioning water use in residential buildings, the retail rate was applied as a conservative measure.
gsf=gross square feet
Source: Rates based on the *CEQR Technical Manual*.

The proposed project would provide a new 12-inch private water loop along South 2nd and South 3rd Streets. The developer would construct and install the new water lines. This proposed water main would serve the fire hydrants on the site as well as the buildings. As described in Chapter 1, "Project Description," the applicant is also considering a variety of sustainable design features to optimize the performance of the proposed buildings and their relationship to the environment. These could include water conservation measures, such as low-flow toilets, that would reduce water demand and sewage output.

It is therefore concluded that the proposed project would not create significant adverse impacts upon the city's water supply or local water pressure.

SANITARY SEWAGE AND WASTEWATER MANAGEMENT

Sanitary sewage flows as a result of the proposed project would be approximately 806,405 gpd, which represents about 0.3 percent of the average wastewater flows at the Newtown Creek WPCP and 0.26 percent of its SPDES-permitted flows. This increase in sanitary sewage resulting from the proposed project is not anticipated to adversely impact the Newtown Creek WPCP, nor cause it to exceed its design capacity or SPDES permit flow limit.

Additionally, there are three regulators (R06, R06A and R07) that would serve the proposed project's sanitary flows (see Figure 14-1). Sanitary flows for both the No Action and future with the proposed project conditions were compared to the dry-weather capacity at these regulators as determined in both the modeling analysis and in DEP's Regulator Improvement Program (RIP)

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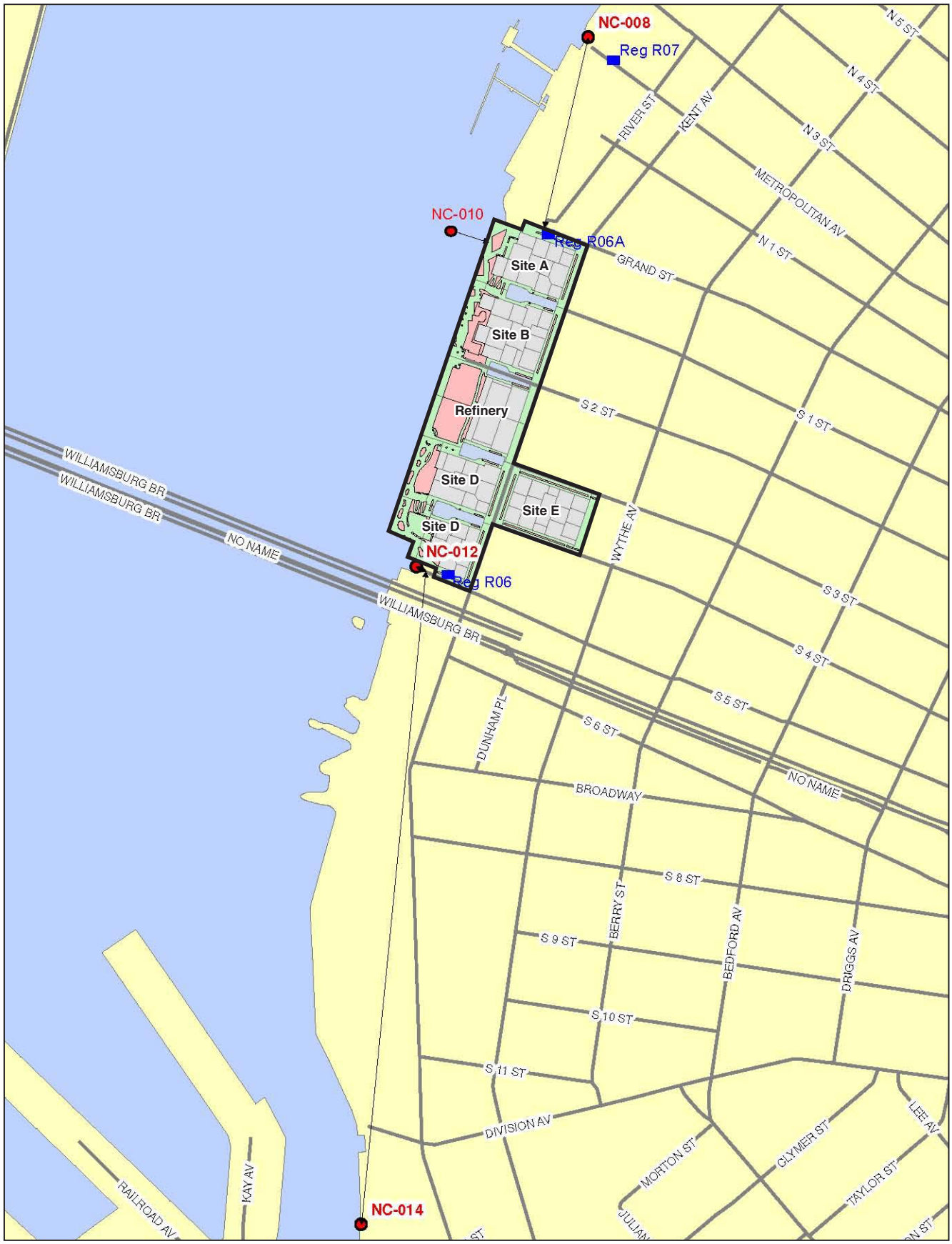


Project Site Boundary

Existing Outfall and Regulator Locations

Figure 14-1

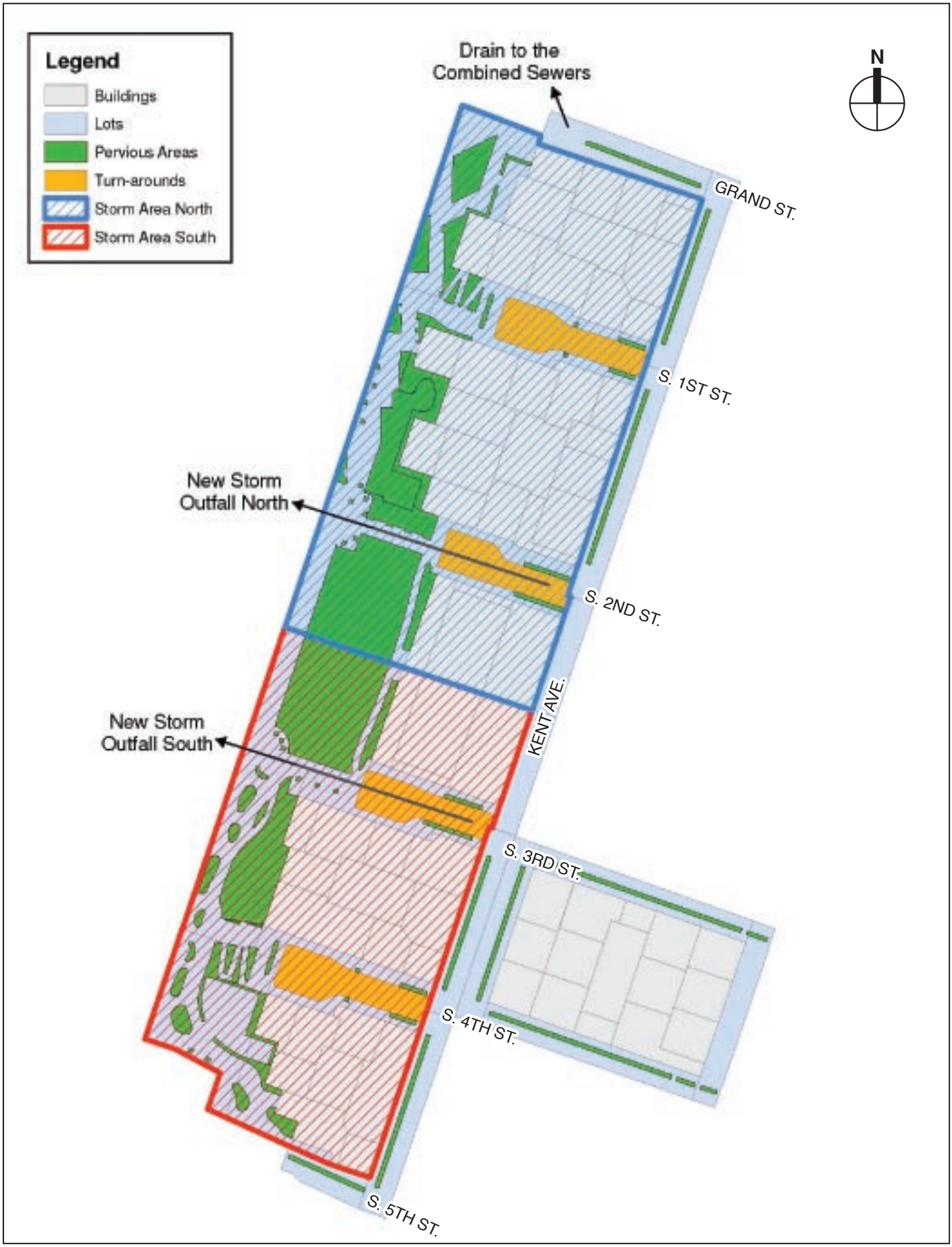
reports. It was determined that there would be ample dry-weather capacity at these three regulators to handle sanitary flows for both the No Action and future with the proposed project conditions under both the modeling analysis and RIP capacities. It should be noted that No Action dry-weather flow conditions include estimated sanitary demand from the development anticipated as a result of the Greenpoint-Williamsburg rezoning. Therefore, the proposed project would not result in significant adverse impacts to the city's sanitary sewage and wastewater management systems.

STORMWATER MANAGEMENT

As part of the project, a new sewer system would be constructed on the project site that would separate stormwater and sanitary sewage flow. The developer would construct and install the new sewer lines. The new storm sewer would remove stormwater generated within the project site from the combined sewer system, minimizing the potential for stormwater to affect CSOs and adversely affect East River water quality. The proposed project would include the construction of two new stormwater outfalls on South 2nd and South 3rd Streets. All the stormwater from Site A, Site B, and the portion of the Refinery that is on the northern half of the waterfront parcel of the site would drain to the South 2nd Street proposed stormwater outfall. Similarly, stormwater from Site C, Site D, and remaining part of the Refinery, which is the southern half of the waterfront parcel, would drain to the South 3rd Street proposed stormwater outfall (see Figure 14-2). In total, the two new outfalls would have an annual stormwater discharge of approximately 9.2 million gallons. These two new outfalls would be privately constructed and owned by the developer and would be designed with stormceptor units to provide pollutant capture for solids, floatables, and other particulate pollutants. At this time, the exact location of the stormceptor units is undetermined. All sanitary flow from these sites would be connected to the existing combined sewers in Kent Avenue, Grand Street, and/or South 5th Street.

Approximately 1.3 acres associated with Site E, along with the sidewalks on Kent Avenue, Grand Street, and South 5th Street would drain to the combined sewer system, as it does under existing conditions. A stormwater detention facility would be incorporated onto the upland parcel of the site to restrict flow to the combined sewer system based on DEP rules and criteria for site connection. The proposed project would result in an increase in the pervious surface on the sidewalks along Kent Avenue, Grand Street, and South 5th Street due to the addition of new tree pits. Therefore, the proposed project would result in lower annual stormwater flow to the combined sewer system. Annual stormwater flow from Site E and the nearby sidewalks to the combined sewer system would be approximately 2.4 million gallons with the proposed project, compared to approximately 2.7 million gallons in the No Action condition.

The proposed project would provide approximately four acres of public open space comprising an approximately one-acre lawn between the Refinery and the waterfront, as well as a waterfront esplanade and connections to the upland streets. The proposed project would result in an increase in the portion of project site covered by pervious surface from approximately 4 percent under the existing and No Action conditions to approximately 17 percent. This increase in pervious surface within the project site would reduce the rate and volume of stormwater discharge to the East River. The proposed project would result in a decrease of approximately 0.2 million gallons per year of stormwater entering the East River as a result of the decrease in impervious surfaces (see Appendix D1).



Stormwater Drainage with the Proposed Project

Stormwater BMPs implemented as part of a Stormwater Pollution Prevention Plan (SWPPP) to be developed for the proposed project would regulate the quality and rate at which stormwater is discharged from the project site through the new separate storm sewer (described in more detail below). Stormwater discharged to the receiving waterbodies via separate storm sewers would be treated to ensure compliance with NYSDEC standards, including the SPDES General Permit for Construction Activity GP-0-08-001 requirements for the SWPPP that would include post-construction stormwater management practices. DEP would also review the SWPPP measures for consistency with DEP requirements.

Therefore, the proposed project would not result in significant adverse impacts with respect to stormwater.

COMBINED SEWER OVERFLOWS

While the proposed project would increase sanitary flows by 0.8 mgd, it would also divert stormwater to two new outfalls, which would alleviate some burden on the combined sewer's capacity during wet weather. Approximately 1.3 acres associated with Site E, along with the sidewalks on Kent Avenue, Grand Street, and South 5th Street would drain to the combined sewer system, as it does under existing conditions. Though the increased sanitary flows would be relatively constant, the reduced stormwater flows would occur only during wet weather and would vary depending upon the amount of runoff. Since more runoff is generated during larger storms, the greatest benefit would occur during the largest storms, with lesser benefits during smaller storms when the increased sanitary flow reduces capacity in the system. The incremental change to sewer capacity and CSOs depends both on the amount of additional sanitary flow and the size of the storms that are experienced.

An analysis of the potential impact of the proposed project on wastewater flows generated at the project site, as well as annual discharges of CSOs and stormwater to adjacent waterbodies, was prepared. The modeling analysis indicates (see Appendix D1) that, given the hourly rainfall record (JFK 1988) that is consistent with an average annual CSO condition, the proposed project would increase CSO volumes by 2.3 mg /yr overall to the Newtown Creek Brooklyn sewershed, a small change of approximately 0.1 percent compared to the sewershed volume in the No Action condition. On a waterbody-by-waterbody basis, CSO volumes would increase by 1.3 mg/yr, 0.1 mg/yr, and 0.9 mg/yr to the East River, English Kills, and Wallabout Channel, respectively. These increases of approximately 0.69 percent for the East River, 0.04 percent for English Kills, and less than 0.3 percent for Wallabout Channel are very small relative to the total annual discharge. There would be no increase in overall CSO volumes to Newtown Creek and Maspeth Creek.

On an outfall-by-outfall basis, the largest difference from conditions in the No Action condition would occur at outfall NC-014 (discharging to Wallabout Channel approximately 0.5 miles to the south of the project site, just south of Division Avenue), where the CSO volume is expected to increase by 0.8 mg/yr (a 0.27 percent change). The CSO from outfall NC-008 (located to the north of the project site at Metropolitan Avenue and discharging to the East River) would be expected to increase by 0.6 mg/yr. Outfall NC-012 adjacent to the project site at South 5th Street would experience an annual increase of 0.6 mg/yr. At all other locations, incremental changes in CSO volumes would be negligible.

U.S. Environmental Protection Agency (EPA) guidance[1] defines a "CSO event" as a storm event that causes an overflow from the combined sewer system; for example, a single storm that causes 50 outfalls to overflow is considered one event (not 50). In accordance with EPA's definition, the results of the analysis indicate that the proposed project would not increase the annual number of events that cause CSO discharges from the Newtown Creek Brooklyn sewershed from the 66 CSO events per year in the No Action condition.

Although the frequency of CSO events for the Newtown Creek WPCP collection system would not increase as a result of the proposed project, results of the analysis indicate that CSO frequency would increase slightly (one additional discharge event per year versus the No Action scenario) at two individual outfalls: NC-008 and NC-013, both within ½ mile of the site. In the future with the proposed project condition, these outfalls would be expected to overflow 37 and 26 times annually, respectively. Table 14-3 presents the increase in CSO volume and frequencies at these outfalls. A map showing the locations of these outfalls is included as Figure 4 in Appendix D1.

Table 14-3
Outfalls With Increased CSO Volumes/Frequencies

Outfall	2020 No Action		2020 Future with the Proposed Project (Incremental Difference to 2020 No Action)	
	CSO Volume (mg /yr)	CSO Events Number/Year	Additional CSO Volume (mg /yr)	Additional CSO Frequency At Individual Outfalls[2] Number/Year
NC-014 (Wallabout Channel Outfall)	288.9	28	0.8	0
NC-012 (East River Outfall)	25.0	25	0.6	0
NC-008 (East River Outfall)	23.7	36	0.6	1
NC-013 (Wallabout Channel Outfall)	29.9	25	0.1	1

Source: *Impact of Domino Sugar Rezoning on Wet-Weather Discharges*, HyrdoQual, Inc., October, 2009.

As described in Chapter 11, "Natural Resources," modeling was conducted using the Newtown Creek Model (NCM) to assess potential impacts on water quality (i.e., incremental change) of the East River and Newtown Creek from additional sewage flow to the Newtown Creek WPCP and from CSOs within the Newtown Creek Brooklyn sewershed as result of the proposed project. The summary of the water quality modeling is provided in Appendix D2. The results of the water quality modeling indicate that for the increase in CSO volumes projected for the future with the proposed project, increases in the concentrations of total suspended solids and coliform, and total nitrogen, phosphorus, copper, lead, and zinc, as well as the decrease for dissolved oxygen concentration, would be minor and would remain within the allowable concentrations for NYSDEC Class 1 water quality standards. Therefore, the modeled CSO discharges for the proposed project would not result in a significant adverse impact on the city's sanitary sewage systems or on water quality for the receiving waters.

BEST MANAGEMENT PRACTICES

The proposed project would incorporate BMPs into the proposed design, which would result in reductions to the estimated generation rates for stormwater runoff. The two new outfalls that would be privately constructed and owned by the developer would be designed with stormceptor units to provide pollutant capture for solids, floatables, and other particulate pollutants. The

[1] Combined Sewer Overflows, Guidance for Permit Writers, Office of Wastewater Management, USEPA. EPA 832-B-95-008.

proposed project would also provide approximately four acres of public open space comprising an approximately one-acre lawn between the Refinery and the waterfront, as well as a waterfront esplanade and connections to the upland streets. The proposed project would result in an increase in the portion of project site covered by pervious surface from approximately 4 percent under the existing and No Action conditions to approximately 17 percent. This increase in pervious surface within the project site would reduce the rate and volume of stormwater discharge to the East River.

As noted above, an SWPPP would be required for the project site that incorporates feasible measures to reduce runoff rates below the baseline levels and implement stormwater management techniques to address quality concerns associated with the uncontrolled discharge of stormwater runoff into the East River. NYSDEC would review and approve the SWPPP. DEP would also review the SWPPP for consistency with sewer system rules, requirements, and standards. At such time, detailed site design information would be provided in the SWPPP. BMPs that may potentially be incorporated into the SWPPP would focus on the following strategies:

Reduce Consumption. Reducing water consumption lessens the demand on the city's water supply system, and as the majority of water consumed on-site is discharged as sanitary sewage off-site, consumption demand reductions translate directly into lower demand loading on the combined sewer system. BMPs to reduce consumption include using ultra low flow plumbing fixtures and designing landscapes for vegetation that requires minimal or no irrigation.

Supply Substitution. Supply substitutions to retain, reuse, and recycle water on-site, including harvesting rainwater for landscape irrigation and other non-potable supply requirements.

Stormwater Volume. BMPs for stormwater management focus on limiting the volume of on-site runoff to the sewer system, reducing the discharge rates for on-site runoff to the sewer system, and providing on-site water quality treatment of runoff discharges. The uncontrolled discharge of surface runoff contributes to CSO events and the associated water quality issues. Methods for capturing and retaining stormwater on-site include harvesting for irrigation and permanent water features; on-site retention; and green roofs.

Stormwater Discharge Rate. Many of the strategies for reducing the volume of on-site runoff to the sewer system can also reduce the rate of discharge. For example, while green roofs typically do not capture the entire rainfall amount, the initial rain saturates the substrata so that excess runoff may not begin to drain from the roof until after the rainfall has ended. Simple mechanical mechanisms, such as rooftop detention, that restrict the amount of water which can enter downspouts are effective at slowing down the rate of discharge.

Stormwater Quality. BMPs for improving the quality of on-site runoff to the sewer system include minimizing the use of fertilizers and herbicides based on plant selection in landscape areas and green roofs, as well as other on-site features, such as vegetated swales, that can effectively filter many contaminants.

PUBLIC SCHOOL OPTION

As described in Chapter 23, "Mitigation," SCA may locate an approximately 100,000-square-foot public elementary and intermediate school within the community facility space in the Refinery complex. At this time, the school program has not been determined. For the purposes of analysis, it is assumed that a school of this size could accommodate approximately 700 elementary and intermediate students. Using the estimated rates of use provided in the *CEQR*

Technical Manual, the school facility would use an average of 21,000 gpd of water based on 30 gpd per seat, and an additional approximately 10,000 gpd for air conditioning during warm weather. The school's water usage would be less than the total amount of water usage projected for the space as a different type of community facility use (estimated to be approximately 34,000 gpd based on 0.17 gpd/square foot (sf) for domestic use and 0.17 gpd/sf for air conditioning). Therefore, the inclusion of a school would not result in significant adverse impacts to the city's water supply system or water pressure in the surrounding area.

The school's sewage generation, conservatively assumed to be equal to water use, would average 21,000 gpd, which would be slightly more than the estimated 17,000 gpd for a different community facility use. This increase in sewage flow would represent a minimal percentage of the Newtown Creek WPCP's capacity of 310 mgd. Therefore, the inclusion of a school in the Refinery complex would not be expected to adversely impact the Newtown Creek WPCP, nor cause it to exceed its design capacity or SPDES permit flow limit.

The inclusion of a public school in the Refinery complex would neither materially affect the amount of pervious surface on the project site, nor would it result in changes to the proposed project's stormwater BMPs. The school would also not have the potential to affect CSO discharges associated with the project site. Therefore, the school would not result in any significant adverse impacts related to stormwater or CSOs. ✷