

CHAPTER 14: INFRASTRUCTURE

14.1 Overview

The Proposed Action would introduce a substantial number of new residents, employees and visitors to the Project Area, which would create an increase in the demand for water and sewage disposal and treatment over Existing Conditions. Water and sewage disposal services to the Project Area, as defined in Chapter 1, “Project Description,” are provided by the City of New York. This chapter presents and assesses the potential impacts of the operations of the Proposed Action on this infrastructure. For the purposes of this DEIS, the term infrastructure refers to water supply, sewage treatment, and stormwater management. The analysis examines the functioning and capacity of infrastructure within the Project Area.

As in most urbanized areas, a water supply system, a stormwater drainage and sanitary sewer network are available in this area.

The Proposed Action would alleviate existing grading and drainage problems in Front Street and thus improve surface water ponding in the street. In addition, appropriately sized municipal pipes will be provided in the bed of Front Street to carry sanitary sewage and stormwater, and to provide water to the Project Area. The Proposed Action would not cause a significant adverse impact on sanitary sewer disposal or treatment, or on water supply and delivery. Modifications to the stormwater system would be designed to accommodate tributary areas, both within and outside the Project Area limits, in accordance with the New York City Department of Environmental Protection (NYCDEP) Drainage Plan.

Stormwater from the Homeport Site is now directed to Upper New York Bay. Stormwater from this site would be captured in the future and sent to the existing municipal sewer network. The amount of stormwater carried away from the Homeport Site is only a small percentage of the overall stormwater flow now reaching the municipal sewer network. This nominal, fractional increase in flow would affect the existing combined sewer overflows (CSO) proportionately. As detailed below, the Proposed Action would not result in significant adverse impacts to the water supply, sanitary sewer system, or stormwater discharge for the Project Area.

14.2 Methodology

CEQR Technical Manual methodologies have been applied in evaluating the potential infrastructure effects of the Proposed Action. Usage rates presented in the *CEQR Technical Manual* have been utilized to estimate the water demand and sewage generation for the Existing, No Build and Build Conditions. The benchmark used to determine whether or not the Proposed Action would have a significant adverse impact is the difference between the No Build and Build Conditions.

The study area contains all property, including lands under water, pier structures and the bulkhead, bounded generally by Hannah Street to the north, the SIR tracks and Bay Street to the west, Bay/Edgewater Streets to the south, and the U.S. Pierhead line to the east.

14.3 Existing Conditions

14.3.1 Water Supply

The water supply system of New York City is operated by NYCDEP out of three watersheds: Croton, Delaware, and Catskill. The water supply system for New York City relies primarily on gravity to supply approximately 1.2 billion gallons per day (gpd) of water, via a system of reservoirs, aqueducts, and tunnels. A Citywide underground distribution network in the form of water mains further distributes water to consumers and fire hydrants. The water supply is primarily channeled via three tunnels, City Tunnels No. 1, 2 and 3 (Stage 1).¹ City Tunnel No. 2 travels through the Bronx, Queens and Brooklyn, and finally through the Richmond Tunnel in order to reach Staten Island. The Catskill/Delaware watershed is the primary source of the water that is distributed to Staten Island consumers.

Locally, there is an eight-inch water main in the bed of Front Street and various sized water mains in the east/west oriented streets between Front Street and Bay Street (from Wave Street to Thompson Street). Existing water usage within the Project Area has been estimated and is shown in Table 14-1.

14.3.2 Sanitary Sewer System

The municipal sewer system in New York City is comprised of a network of underground sewers that move wastewater to 14 treatment plants known as “water pollution control plants,” or WPCPs. Catchment areas are the areas that are served by each of the City’s 14 WPCPs. Most of the City’s sewer network is combined, in that it carries both sanitary sewage and stormwater loads. Portions of the municipal collection system in the region of the Proposed Action collect stormwater and sanitary sewage separately. The municipal sewer network, via gravity, discharges to the final conveyance pipe, an interceptor sewer that conveys its contents to the closest pump station, and from that point, to the WPCP via force main.

During wet weather, rainwater runoff flows may inundate the WPCPs, depending upon the size of the storm. To minimize this inundation, regulator chambers (relief valves) are built into the combined sewer system to shunt excess flow to the closest surface waterbody outfall. This is referred to as a combined sewer overflow (CSO) outlet. The City’s WPCPs are designed to treat double the amount of average dry weather flow so as to accommodate surges from minor storms.

Staten Island is served by two WPCPs, Oakwood Beach and Port Richmond. The Port Richmond facility serves the North Shore and is located at 1801 Richmond Terrace. The Project Area is entirely within the service area of the Port Richmond WPCP; thus, Project

¹ While Stage 1 of City Tunnel No. 3 is complete, the extension of this tunnel is currently under construction in Brooklyn and Queens.

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Area sanitary sewage and stormwater is treated at the Port Richmond WPCP. Treated wastewater (effluent) is then discharged into the adjacent waters of the Kill van Kull. The WPCP operates under a State Pollution Discharge Elimination System permit (SPDES Permit No. NY0026107) issued by the New York State Department of Environmental Conservation (NYSDEC) to regulate the amount and quality of effluent from the plant. The Port Richmond WPCP is designed to treat a monthly flow of 60 million gallons per day (mgd). The average flow to this facility, approximately 35 mgd, is historically much less than the design flow.²

Specifically, the Project Area is served by a mixture of sanitary sewers, storm sewers, and combined (sanitary/storm) sewers. As described above, flows from these sewers, carried by gravity, eventually discharge to an interceptor sewer by first passing through a regulator chamber. In cases of wet weather flows that exceed the design capacity of the interceptor sewer, the regulator chamber shunts the excess directly to the CSO outlet, through a series of side chambers, weirs/orifices, etc. into the Upper New York Bay. During dry weather flows, the interceptor sewer conveys its contents to the Hannah Street Pumping Station, located at the foot of Hannah Street near Pier 6. From the pumping station, flows are conveyed via a force main to the Port Richmond WPCP.

Within the Homeport Site and on adjacent piers, sanitary flows are collected in separate sanitary sewers and conveyed to interceptor sewers which route their contents to the Hannah Street Pumping Station. The properties west of Front Street function similarly. The existing amount of sanitary sewage generated by the Project Area has been estimated and is shown in Table 14-1.

14.3.3 Stormwater

Stormwater in the City streets within the Project Area is collected by catch basins and routed to the regulator chambers. According to available records, within the Homeport Site and on adjacent piers and aprons that front the piers, most of the precipitation that falls is discharged directly into the Upper New York Bay without entering the municipal sewer system.

The Project Area is served by a diverse network of sanitary sewers, storm sewers, and combined (sanitary/storm) sewers. Flows from these sewers are carried by gravity to eventual discharge points in an interceptor sewer while first passing through a regulator chamber. In cases of wet weather flows that exceed the design capacity of the interceptor sewer, the regulator chamber shunts the excess directly to the CSO outlet, through a series of side chambers, weirs/orifices, etc. into the Upper New York Bay.

² USEPA Clean Water Needs Survey, 1996

Table 14-1: Estimated Sewage Generation and Water Usage for Project Area, Existing Condition

	Square feet of Development, by Use Type			Sewage (gpd)	Water (gpd)
	Institutional	Manufacturing ²	Commercial ³		
Homeport Site¹	282,300	--	--	47,991	95,982
Projected Development Sites	--	8,628	66,715	19,970	32,778
Project Area Total	282,300	8,628	66,715	67,961	128,760

Notes:

¹ Includes square footage of active buildings on the Homeport Site (only six out of eight are active); assumes retail/public use rate for water usage (domestic and air conditioning)/sewage generation.

² Manufacturing use assumes 1 gallon per square foot of development for domestic water use, 0.17 per square foot for air conditioning water use, and 0.17 per square foot for sewage generation.

³ Existing commercial uses assume retail/public use rate for water usage (domestic and air conditioning)/sewage generation.

Source: The Louis Berger Group, Inc. 2006

14.4 No Build Condition

14.4.1 Water Supply

In 2015, without the Proposed Action in place, the conditions of the overall water supply to New York City are not expected to change significantly. The City is committed to maintaining adequate water supply and pressure to all users. The City also has a comprehensive water conservation program in place that includes water metering and requirements for use of low-flow fixtures in new construction and renovation. Additionally, the City has an ongoing leak detection program and locking fire hydrants aimed at saving water. NYCDEP has projected that the savings in water utilization from these conservation measures will outpace the increased demand expected in the next decade. Additionally, Stage 2 of City Water Tunnel No. 3 is under construction. When completed, Tunnel No. 3 will improve the overall water supply system and allow maintenance of the two existing water tunnels to occur.

In the No Build Condition, several facilities that currently utilize the Homeport Site on a temporary basis will be relocated, including the New York City Police Department (NYPD) Staten Island Taskforce, New York City Fire Department (FDNY) Marine Company No. 9, New York City Department of Transportation (NYCDOT) Marine Repair Unit, and the Richmond County State Supreme Court, leaving the Site vacated. These facility relocations are independent of and unrelated to the Proposed Action. As a result, the No Build water utilization rate in the Project Area will decrease relative to Existing Conditions.

It is assumed in the No Build Condition that the existing uses in the remainder of the Project Area (west of Front Street between Wave and Thompson Streets) will remain. None of the Projected Development Sites within the Project Area, as defined in Chapter 2, "Analytical Framework," would be developed in the No Build Condition. However, there will be an increase in water demand relating to any background growth that may occur within the region, including the ten anticipated development projects identified in

Chapter 2. Estimated water demand under the No Build Condition is approximately 32,778 gpd, or approximately 95,982 gpd (71 percent) less than Existing Conditions.³

14.4.2 Sanitary Sewer System

Without the Proposed Action, the amount of sewage generated in the Project Area will decrease since the uses currently present on the Homeport Site will be relocated and the structures housing them removed. There will, however, be an increase in demand on the municipal sewer system relating to any background growth that may occur within the region, plus the ten anticipated development projects. The existing grading and drainage problems that exist along Front Street would not be resolved in the No Build Condition since the Proposed Action would not be in place. Estimated sewage generation under the No Build Condition is approximately 19,970 gpd, or approximately 47,991 gpd (74 percent) less than Existing Conditions.

14.4.3 Stormwater

While the details of demolition are not currently known, the amount of impervious surface area will remain essentially the same in the No Build Condition as in Existing Conditions. The structures that temporarily house the NYPD, NYCDOT, FDNY and Supreme Court uses will be removed and the paved surfaces that the buildings stand on will likely remain. Stormwater that will fall on impervious surfaces within the Project Area will be conveyed to Upper New York Harbor in the same manner discussed under the existing conditions section.

14.5 Build Condition

14.5.1 Water Supply

While design of the infrastructure improvements that accompany the Proposed Action are not yet finalized, it is anticipated that a new 20-inch water main would be installed in the bed of Front Street to replace the existing eight-inch main (this is subject to review and acceptance by NYCDEP). The demand for water would increase due to the additional demand generated by the Proposed Action. As indicated in Table 14-2, the Project Area's estimated water consumption would be approximately 246,354 gpd with the Proposed Action in place. This amount represents an increase of approximately 117,594 gpd (91 percent) over Existing Conditions and approximately 213,576 gpd (652 percent) over the No Build Condition. The new 20-inch water main that would be installed in the bed of Front Street would have the available capacity to supply this volume of water to the Proposed Action. This amount of water represents a small fraction of the overall supply for the City or for Staten Island.

³ As the No Build Condition assumes a vacant and vacated Homeport Site, the estimated water usage amount (and sewage generation amount) under the No Build Condition is equal to that of the Projected Development Sites under Existing Conditions (or the total existing amount of water usage/sewage generation less the Homeport Site contribution).

14.5.2 Sanitary Sewer System

Sanitary sewage from the Proposed Action would be collected and routed to the new and existing municipal sewers in the bed of Front Street. The estimated amount of sanitary sewage generated by the Proposed Action would be approximately 200,825 gallons per day (see Table 14-2). This is approximately 132,864 gpd (196 percent) above the existing generation level and approximately 180,855 gpd (906 percent) above the anticipated No Build level. (Note: the numbers for water consumption are higher than the numbers for sanitary sewage since the calculations in the *CEQR Technical Manual* take into account factors such as evaporative loss to air conditioning, landscape use, etc.)

The Proposed Action includes extensions of the existing municipal sewer lines found beneath the Front Street extension. Sanitary sewage generated by the Proposed Action would be directed to the municipal sewer network beneath Front Street. Existing built municipal sewers in Front Street, including storm, sanitary and combined, would be upgraded to be consistent with the NYCDEP Drainage Plan. In addition, modifications would be made to the Drainage Plan and submitted to the NYCDEP in the form of an Amended Drainage Plan, to reflect the changes to mapped City streets and modifications to the existing municipal sewers that are part of the Proposed Action.

Separate sanitary and storm municipal sewer systems would be designed for the Proposed Action, in a manner consistent with the intent of the NYCDEP Drainage Plan. Sanitary flows from residential connections within the Project Area limits would be conveyed to separate sanitary sewers, which eventually discharge their contents to the existing interceptor beneath Front Street. Interceptor flows are conveyed northward to the Hannah Street Pumping Station, which ultimately discharges to the Port Richmond WPCP.

14.5.3 Stormwater

While design for the parcels on the Homeport Site is not finalized, the use of more pervious surfaces would be incorporated in the open spaces and parking areas. By use of features such as bioswales and permeable pavement, the amount of stormwater requiring disposal from this site into the municipal sewer network would be minimized as a result of the Proposed Action. Stormwater that does not percolate into the pervious surfaces, which will be inherent in the design of the open space and parking areas, would be captured and directed to the new area sewer network. This would result in an increase in the amount of stormwater reaching the municipal sewer network. According to preliminary analysis being prepared by the infrastructure engineering consultant, the expected peak flow increase of approximately 325 cubic feet per second (cfs) for a 10-year design storm would be a 12 percent increase in the peak flow that is currently handled by the municipal sewer network and CSOs within the Project Area. (This estimate is based upon the assumption that the flows from the Project Area will not be detained and, therefore, is conservative.) Recent discussions with the NYCDEP have indicate there are plans to upgrade the capacity of three of the four existing CSO outfalls within the Project Area, to accommodate the flows anticipated from the Proposed Action. These plans are being incorporated into the Amended Drainage Plan. The increase in

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peak stormwater flows and additional sanitary flow volumes from the Proposed Action would contribute to CSO overflow volumes.

Stormwater falling on the properties west of Front Street would be captured and diverted into the sewer network similar to the Existing Condition. As necessary, designs to develop these parcels would be subject to review by the Building Department and NYCDEP. This review would evaluate stormwater drainage and disposal plans and would assure the application of Best Management Practices and stormwater detention and control, considered appropriate for the given development.

Additionally, one of the goals of the Proposed Action is to improve grading and drainage in Front Street to prevent ponding of stormwater.

The proposed design capacity of the new stormwater system would accommodate tributary areas, both within and outside the Project Area limits, in accordance with the NYCDEP Drainage Plan. The new stormwater pipes would be sized to handle non-detained flows, although it is believed that future development projects may be required to detain stormwater on-site.⁴

Stormwater from the both the redeveloped Homeport Site and the properties west of Front Street would discharge into the regulator chambers in the area. It should be noted that the flow volumes presented in this section do not take credit for stormwater detention. It should be further noted that the upstream drainage basin areas that contribute to the interceptor sewer/CSOs may be measured in terms of hundreds and even in some cases thousands of acres each. Although the Project Area is large by urban development standards (+36 acres), it is negligible in terms of percent contribution that will be made to the interceptor sewer/CSO(s).

It is expected that there would be a total of six CSO outfalls required for the Proposed Action (two new and four existing, three of which will require upgrading). Discussions with the NYCDEP will be required to determine the level to which the design must adhere to the previously established Drainage Plan to avoid over-design of the outfall structures. For example, the existing box culvert in Canal Street may have capacity to handle stormwater flows in both the pre-development and post-development scenario. Conversely, the existing culvert at Water Street is undersized and would need to be replaced.

⁴ Any and all future development projects, including those associated with the Proposed Action, would be subject to review by NYCDEP.

Table 14-2: Estimated Sewage Generation and Water Usage for Project Area, Build Condition

	Number of Residents	Square feet of Development, by Use Type			Sewage (gpd)	Water (gpd)
		Commercial (Other) ¹	Commercial (Retail) ²	Commercial (Office)		
Homeport Site	663	135,000	40,000 ³	75,000	132,356	170,456
Projected Development Sites	545	--	43,700	--	68,469	75,898
Project Area Total	1,208	135,000	83,700	75,000	200,825	246,354

Notes:

¹ "Commercial Other" use includes proposed restaurant/banquet hall use and sports complex uses. A rate of 0.17 gpd per square foot of development was used for water (domestic and air conditioning)/sewage estimates.

² Commercial retail use utilizes the water (domestic and air conditioning)/sewage generation rates for retail/public use.

³ Includes 10,000 square-foot proposed farmer's market use (assumes general retail use generation rate of 79 lbs per employee).

Source: The Louis Berger Group, Inc. 2006.

14.6 Conclusion

The Proposed Action would increase water consumption within the Project Area by approximately 213,576 gpd (652 percent) over the No Build Condition. This amount of water is insignificant when compared to the overall supply for New York City or Staten Island. Thus, the Proposed Action would not result in any significant adverse impacts to the water supply available for the Project Area.

Relative to the No Build Condition, the Proposed Action would increase the amount of sanitary sewage generated within the Project Area by approximately 180,855 gpd (906 percent), and over the Existing Condition by approximately 132,864 gpd (196 percent) above. Existing and proposed facilities would be able to accommodate these flows. Thus, the Proposed Action would not result in any significant adverse impacts to sanitary sewage facilities.

The Proposed Action would improve grading and drainage in Front Street to prevent ponding of stormwater. Stormwater from the Homeport Site would be captured in the future and sent to the existing sewer network. Stormwater from this site is now directed to Upper New York Bay. The design of the Homeport Site would incorporate the use of more pervious surfaces in the open spaces and parking areas. By use of features such as bioswales, the amount of stormwater requiring disposal from this site into the municipal sewer network would also decrease as a result of the Proposed Action. Thus, the amount of stormwater requiring disposal is reduced. The amount of stormwater that would be transported from the Homeport Site is only a small percentage of the overall stormwater flow now reaching the municipal sewer network. This fractional increase in flow would exacerbate the existing CSO to that degree, but would not result in a significant adverse impact to stormwater facilities.