A. INTRODUCTION

This chapter assesses the potential effect of the Proposed Actions on the City's water supply, wastewater treatment, and stormwater management infrastructure. New York City's water and sewer network is fundamental to the operation, health, safety, and quality of life of the City and its surrounding environment. Ensuring these systems have adequate capacity to accommodate land use or density changes and new development is critical to avoid environmental and health problems such as sewer back-ups, street flooding or pressure reductions.

According to *City Environmental Quality Review* (CEQR) *Technical Manual* guidelines, a water and sewer infrastructure preliminary assessment is required for the Proposed Actions as it would increase population density by, as described in detail in **Chapter 1, "Project Description,"** facilitating a proposal by the Applicant, to develop a new mixed-use, predominantly residential, development on the project site. As proposed by the Applicant, the approximately 1,044,452 gross square feet (gsf) mixed-use development would consist of approximately 1,400 dwelling units, 1,887 gsf of local retail space, approximately 22,638 gsf of community facility space, 525 accessory parking spaces, and 41,363 sf of publicly accessible open space on the approximately 164,392 sf (3.8 acre) project site. As the Proposed Actions would also affect the adjacent Lot 49, it is assumed that this property would also be redeveloped resulting in a 219,296-gsf building encompassing the entirety of the 34,853 sf of lot area. Lots 1 and 49 are henceforth referred to as Projected Development Site 1 and Projected Development Site 2, respectively.

In addition to the approvals being sought from the City, the Applicant's Proposed Project will also require approvals from the U.S. Army Corps of Engineers (USACE) and the New York State Department of Environmental Conservation (NYSDEC) for a proposed internal storm drain to be located at the northeast corner of the site. This internal storm drain is permitted by NYSDEC and would be owned and maintained by the property owner in perpetuity. However, due to the topography of the site some stormwater would flow to the existing DEP separated stormwater infrastructure in 26th Ave. As there is no existing storm sewer fronting the Project Area, a storm sewer extension will be required in order for the development to make a stormwater site connection to the DEP sewer system. This connection would follow DEP requirements.

B. PRINCIPAL CONCLUSIONS

According on the methodology set forth in the *CEQR Technical Manual*, the analysis finds that the Proposed Actions would not result in a significant adverse impact on the City's water supply, wastewater and stormwater conveyance and treatment infrastructure.

Water Supply

The anticipated water usage as a result of the Proposed Actions is expected to total 401,036 gallons per day (gpd) over water demand under existing conditions. This incremental demand would represent less than 0.1 percent of the City's overall water supply and would be distributed over the 4.57-acre Project

Area. As changes of this magnitude would not be large enough to have a significant adverse impact on the City's water system, the incremental demand with the Proposed Actions would not adversely affect the City's water supply or system water pressure.

Sanitary (Dry Weather) Flows

The Bowery Bay water pollution control plant (WPCP), which is designed to treat a dry weather flow of 150 million gallons per day (mgd), handled an average of 104 mgd of sewage flow between December 2019 and November 2020. Based on rates in the *CEQR Technical Manual*, the Proposed Actions has the potential to result in an increase of 0.39 mgd of sanitary sewage flow. This incremental increase in sanitary flow would represent approximately 0.26 percent of the Bowery Bay WPCP's designated State Pollution Discharge Elimination System (SPDES) capacity. Pursuant to CEQR methodology, as the projected increase in sanitary sewage would not cause the Bowery Bay WPCP to exceed its operational capacity or its SPDES-permitted capacity, the Proposed Actions would not result in significant adverse impacts to sanitary sewage conveyance and treatment.

Stormwater (Wet Weather) Flows

The Proposed Actions would include improvements to stormwater infrastructure to support the new development, including the construction of a new internal storm drain to enable direct discharge of Project Area stormwater flows into the East River and therefore would decrease the amount of stormwater flows generated on the Project Area that could contribute to combined sewer overflow (CSO) events. Based on the analysis conducted in accordance with the *CEQR Technical Manual*, with the infrastructure improvements and Best Management Practices (BMP) implemented on Projected Development Site 1 by the Applicant, it is concluded that the Proposed Actions would not result in significant adverse impacts on stormwater conveyance and treatment infrastructure.

C. METHODOLOGY

According to the *CEQR Technical Manual,* a preliminary water supply infrastructure analysis is needed if the project would result in an exceptionally large demand for water (e.g., more than one mgd), or is located in an area that experiences low water pressure (i.e., areas at the end of the water supply distribution system such as the Rockaway Peninsula or Coney Island). As the Project Area is not located in an area that experiences low water pressure and the Proposed Actions would not result in an incremental water demand exceeding one mgd, a detailed analysis is not warranted. However, the Proposed Actions' total water demand is calculated for purposes of determining the sewage generated by the proposed development. **Table 10-1** shows the applicable RWCDS water consumption and wastewater generation rates utilized for this assessment.

The Project Area is located in an area that is primarily served by combined sewers. A preliminary sewer assessment is warranted if a project exceeds 100 residential units or 100,000 sf of commercial/public and/or institution/community facility uses in a separately sewered area zoned R6 and M1-1 (i.e., zoning districts noted in Table 13-1 of the *CEQR Technical Manual* as "all remaining zoning designations, including commercial, manufacturing and mixed-use districts"); 400 residential units or 150,000 sf of commercial/public and/or institution/community facility use in a combined sewer area; or if a project would involve the construction of a new stormwater outfall that requires Federal and/or State permits. As the Proposed Actions meets the *CEQR Technical Manual* thresholds, a preliminary sewer assessment is warranted and is provided in this chapter.

TABLE 10-1
Water Consumption and Wastewater Generation Rates

Land Use	Rate	
	Domestic	**Air Conditioning**
Warehouse	10,000 gpd per acre multiplied by 1.00 zoning district factor for M1-1[1]	0.17 gpd/sf
Residential	100 gpd/Resident[2]	N/A
Retail	0.24 gpd/sf	0.17 gpd/sf
Community Facility[3]	0.1 gpd/sf	0.17 gpd/sf

Source: Consumption rate obtained from the *CEQR Technical Manual* Table 13-2 "Water Usage and Sewage Generation Rates for Use in Impact Assessment" unless noted otherwise.
Notes:
[1] Rate for industrial/manufacturing, vehicle/open storage, and automotive uses in M1-1 districts from the 2014 *Astoria Cove FEIS*.
[2] Based on Queens Community District (CD) 1 housing occupancy rate of 2.33 persons per dwelling unit.
[3] Community facility uses *CEQR Technical Manual* rates for commercial office space.

The preliminary sewer assessment is undertaken by calculating existing and future water demands and sanitary sewage generation based on use generation rates as set forth in Table 13-2 of the *CEQR Technical Manual* and other approved sources. The estimated amount of sewage generated from the proposed development conservatively includes all of the Project Area's water consumption excluding air conditioning, which is typically not discharged into the sewer system. The New York City Department of Environmental Protection (DEP) Flow Calculation Matrix is then used to calculate the sanitary sewage and stormwater runoff volume discharged to the sewer system for four rainfall volume scenarios with varying durations. Stormwater runoff volumes are determined by estimating the project site's pervious and impervious surfaces. If a proposed project is located within multiple CSO subcatchment areas, the Flow Calculation Matrix is completed for each CSO subcatchment area.

The ability of the City's sewer infrastructure to handle the proposed development's anticipated demand is assessed by estimating existing water demand and storm and sewage generation rates and then comparing the estimates for the future with and without the Proposed Actions. As shown in **Figure 10-1**, the Project Area's total 199,245 sf of lot area (approximately 4.57 acres) is located within Subcatchment Area BB-046. **Figure 10-2** shows the existing sanitary sewer system serving the Project Area and the proposed sanitary site connection to the existing system. This sanitary site connection would be reviewed and approved by DEP's BWSO's Site Connection unit and Bureau of Wastewater Treatment prior to implementation. **Figure 10-3** shows the existing storm sewer system in the vicinity of the Project Area and the internal storm drains proposed at Development Site 1.

The analysis of the existing and No-Action conditions is based on the existing sanitary and stormwater conveyance and treatment systems serving the Project Area. As both development sites are currently vacant, it is assumed that no sanitary sewage is generated nor is there a demand for water supply in the existing condition while sanitary sewage and water demand generated by the No-Action warehouse uses were estimated based on the rates identified in **Table 10-1** above. Under both existing and No-Action condition, the majority of stormwater runoff is conveyed to the Bowery Bay WPCP via an existing interceptor pipe located under 26th Avenue while portions of the Project Area adjacent to the shorefront discharge stormwater directly to the East River as overland flow. In instances of heavy combined flows that cause the regulator to divert flows (i.e., storm events), a portion of the combined flow is discharged to the East River via existing CSO outfalls.

The analysis of With-Action sanitary and stormwater conveyance and treatment systems assumes several improvements to infrastructure on and adjacent to the Project Area (see **Figures 10-2 and 10-3**). In the

Figure 10-1

Project Location and DEP Subcatchment Areas

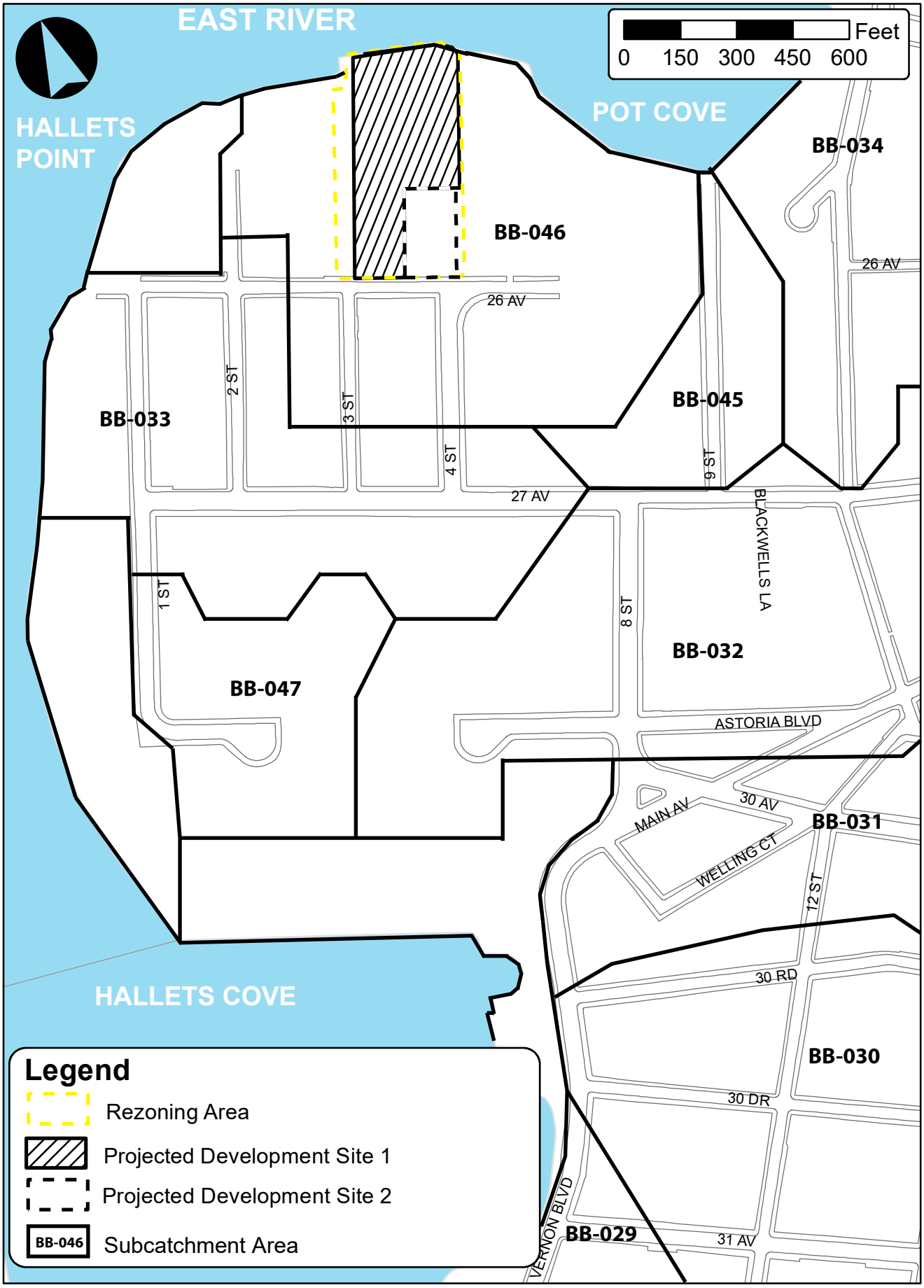
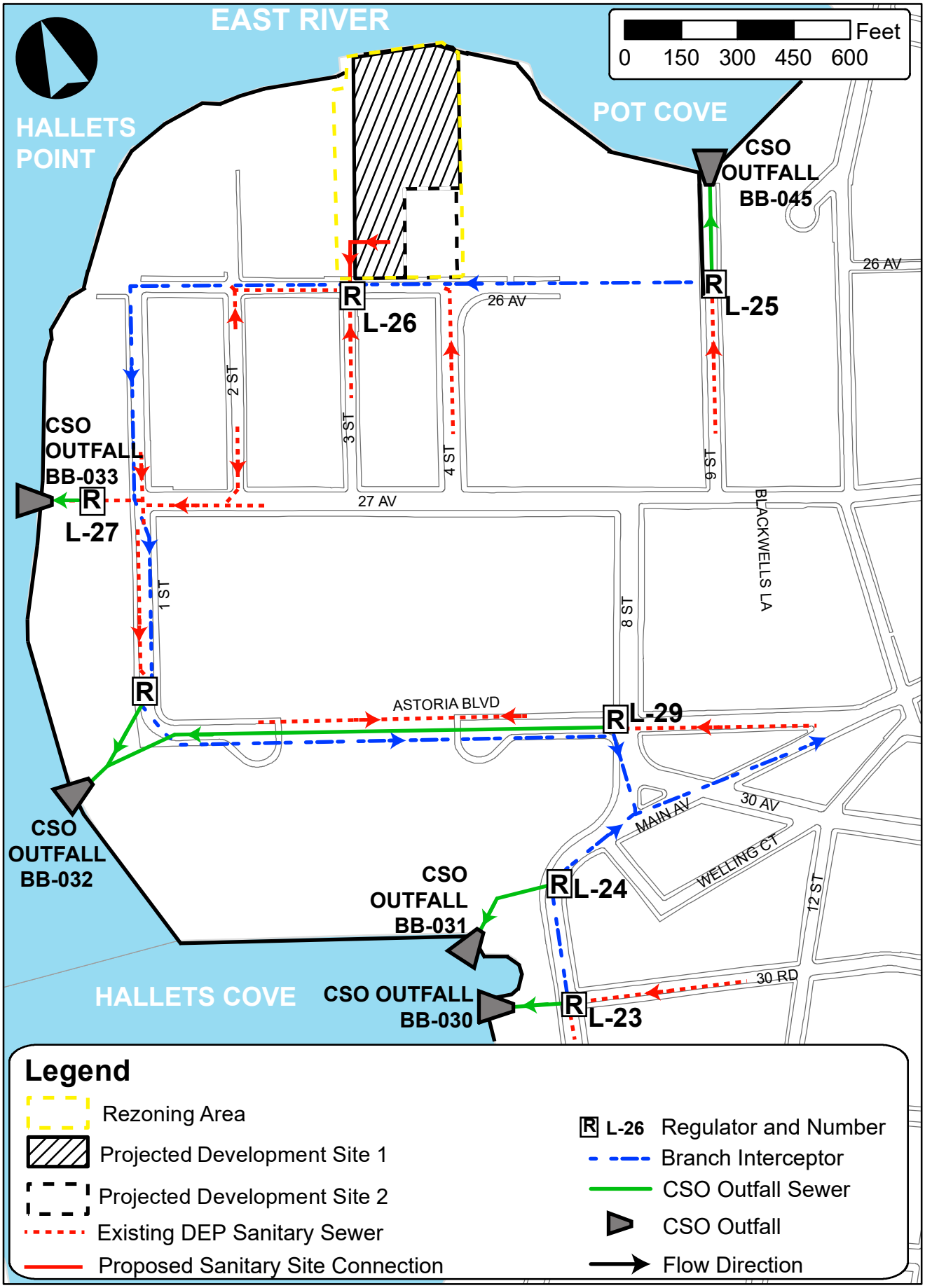


Figure 10-2

Existing and Proposed Sanitary Sewer System



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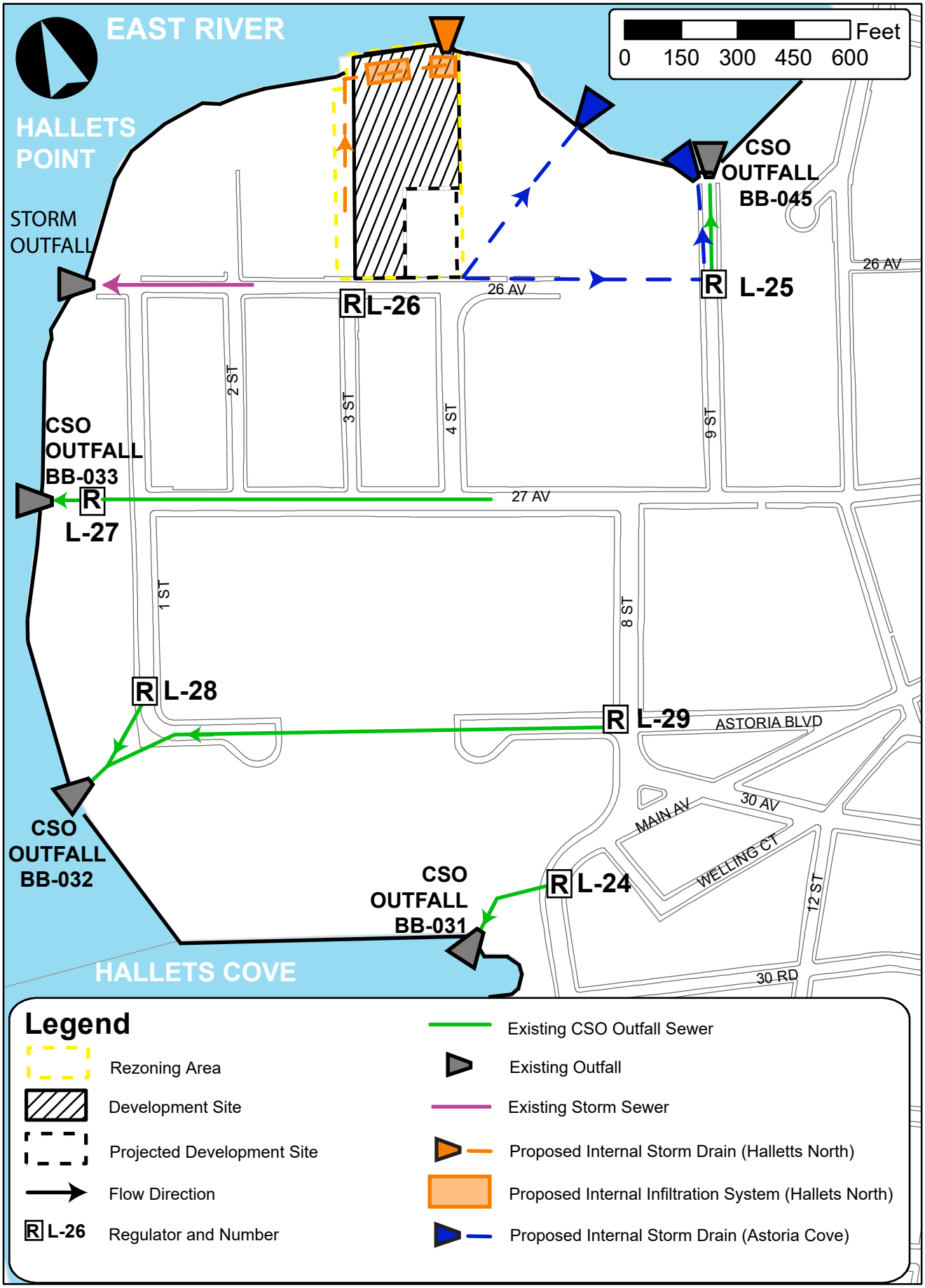
Existing and Proposed Storm Sewer System



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future with the Proposed Actions, a new sanitary site connection would be installed along the southern portion of 3rd Street, connecting to the existing interceptor pipe located under 26th Avenue, which would convey sanitary flow generated on the Project Area to the Bowery Bay WPCP. This sanitary site connection would be reviewed and approved by DEP's BWSO's Site Connection unit and Bureau of Wastewater Treatment. In addition, a new subsurface stormwater detention system and DEP site connection at the southern end of the site would convey a portion of the stormwater flow generated on the project site to the existing DEP stormwater system below 26th Avenue, particularly roadway runoff from the southern segment of the demapped portion of 3rd Street. While it hasn't been determined how much project generated runoff would be directed to the DEP stormwater infrastructure in 26th Avenue, the proposed internal storm drain and infiltration system would be designed to process the majority of this runoff. To be conservative though, it has been assumed that up to 40 percent of project generated runoff would be directed to the existing DEP stormwater infrastructure under 26th Avenue. The remaining approximately 60 percent of stormwater flow (i.e. roof and elevated surface runoff) would be conveyed to the East River via two infiltration systems along the elevated shoreline and a new internal storm drain located at the northeast corner of Projected Development Site 1. This new internal storm drain would be owned and maintained by the Applicant. Proposed rain gardens and bioswales along the shoreline would also mitigate surface runoff. **Table 10-2** below compares the method of sanitary and storm discharge for the proposed development under No-Action conditions and With-Action conditions.

TABLE 10-2
Summary of Sanitary and Storm Discharges and CSO Subcatchment Areas

Area Designation	No-Action Condition		With-Action Condition	
	Sanitary Sewage	Stormwater Runoff	Sanitary Sewage	Stormwater Runoff
CSO Subcatchment Area BB-046				
Projected Development Sites 1 & 2	No sanitary discharge	Interceptor pipe and/or discharge to the East River via CSO outfall pipe after regulator	Sanitary site connection directly into Interceptor sewer	Direct discharge to the East River via new storm outfall pipe

Note: See Figure 10-2 and Figure 10-3.

D. EXISTING CONDITIONS

Water Supply

The New York City water supply system comprises a network of reservoirs, lakes, and aqueducts extending north and west of the City and a pipe network that distributes water within the City. Because the Hudson, Harlem, and East Rivers are not potable water sources, New York City obtains nearly all of its water from the Delaware, Catskill, and Croton watersheds, which are located within 125 miles of the City. Water from the watersheds is stored at 19 reservoirs and three control lakes, having a combined capacity of approximately 580 billion gallons. The water is then carried into the City by a number of aqueducts. The water enters the City via City Tunnel 1 (which runs through the Bronx, Manhattan, and Queens) and City Tunnel 2 (which runs through the Bronx, Queens, and Brooklyn). The partially complete City Tunnel 3 serves the Bronx, Manhattan, and Queens, and, when fully complete, will terminate in Brooklyn. Staten Island obtains its water via the Richmond Tunnel, which is an extension of City Tunnel 2.

Once in the City, the three aqueducts distribute water into a network of water mains. Water mains up to 96 inches in diameter feed the smaller mains, which deliver water to their final destination. These are the same mains that provide water to fire hydrants. Nearly all of the water reaches its consumers by gravity

alone, although some four percent (generally located at the outer limits of the system where in-line pressure is lowest, at high elevations, or at a pressure extremity such as Far Rockaway) is pumped to its final destination. Pressure regulators throughout the City monitor and control the water pressure.

City water mains exist in the streets fronting the Project Area, including an 8-inch water main under 3rd Street, a 20-inch water main under 4th Street, a 12-inch water main under 26th Avenue and a 20-inch water main in 27th Avenue (see **Figure 10-4**). Previously, these mains provided water service to the industrial buildings formerly occupied the Project Area. As noted above, both sites are currently vacant (Projected Development Site 1 is a vacant lot and Projected Development Site 2 is occupied by a vacant former warehouse building). Therefore, no water consumption is assumed in the existing condition.

Wastewater

According to the *CEQR Technical Manual*, wastewater is considered to include sanitary sewage, wastewater generated by industries, and stormwater. Water used for air conditioning generates a negligible amount of wastewater as very little, if any, is discharged to the sewage system and nearly all of it is recirculated or evaporated in the cooling and heating process.

The majority of New York City's wastewater treatment system comprises the sewer network beneath the streets and the 14 WPCPs located throughout the City. The majority of New York City's sewers are combined sewers since they receive both sanitary wastewater and stormwater runoff. Wastewater generated in a "drainage basin" (the area served by a WPCP) is conveyed through a network of combined sewers to the WPCP.

During dry weather, the WPCP primarily treats sanitary sewage. The average daily flow during dry weather is known as the average "dry-weather flow." WPCPs have treatment capacities set at twice their dry weather design flow for a limited amount of time. However, because the majority of New York City's sewers are combined sewers, they also receive stormwater and rainwater runoff from impermeable surfaces that generally contain pollutants such as oil and floatable debris. During wet weather, stormwater enters the combined sewer system along with sanitary sewage, and both are treated at a WPCP. During wet weather, rainfall runoff can reach ten to 50 times the dry weather flow, which is well above the WPCP design capacity. To avoid flooding the WPCPs, built-in regulators act as relief valves to direct the excess water to an outfall. During storm events, sanitary sewage entering or already in the combined sewer system, as well as stormwater and debris, can be discharged, untreated, into the nearest body of water. This untreated overflow is known as "combined sewer overflow" (CSO).

The project site is located in Queens CD 1 and is served by the Bowery Bay WPCP. The Bowery Bay WPCP is located adjacent to LaGuardia Airport in Astoria, Queens and treats wastewater through full secondary physical and biological processes before the wastewater is discharged into the East River. Secondary treatment includes the removal of a minimum of 85 percent of biological oxygen demand and total suspended solids from the effluent. The quality of the effluent from this WPCP is regulated by a SPDES permit issued by the NYSDEC. The permit specifies the maximum limit for effluent parameters that include suspended solids, fecal coliform bacteria, and other pollutants. The treatment capacity of the Bowery Bay WPCP is limited to a maximum of 150 mgd. As shown in **Table 10-3**, from December 2019 through November 2020, the Bowery Bay WPCP treated between 95 mgd and 122 mgd, averaging approximately 104 mgd with approximately 46 mgd available capacity.

Figure 10-4

DEP Water Mains

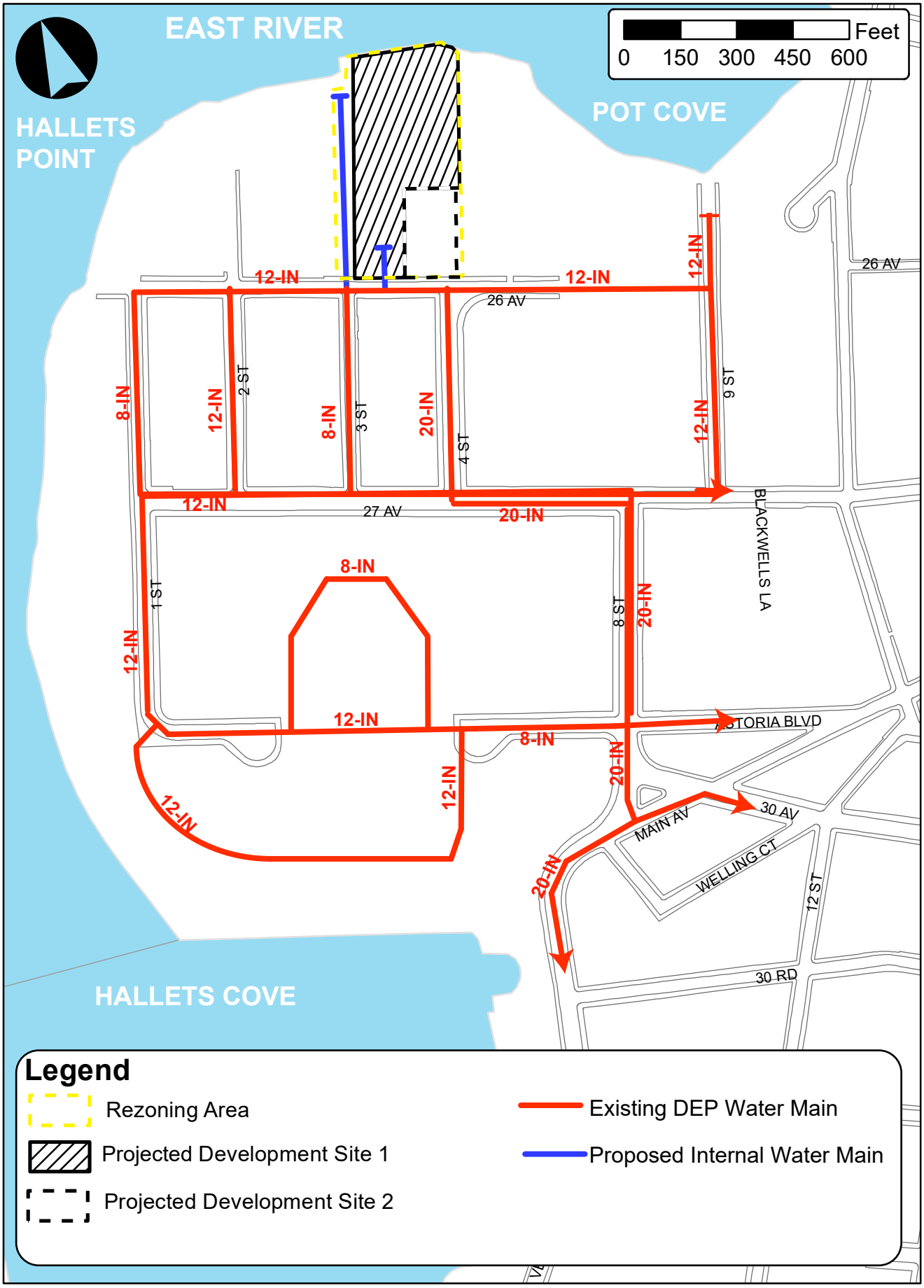

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TABLE 10-3
Monthly Average Dry Weather
Flows from the Bowery Bay WPCP

Year	Month	Bowery Bay WPCP (mgd)
2019	December	122
2020	January	95
	February	105
	March	106
	April	110
	May	95
	June	94
	July	104
	August	106
	September	100
	October	105
	November	102
Annual Average		***104***

Source: DEP

The Project Area and the immediate surrounding area are served primarily by combined sewers, with an existing interceptor pipe beneath 26th Avenue receiving the majority of existing Project Area stormwater. Existing sewers in the immediate surrounding area flow to regulators L-25 (CSO BB-045) and L-26 (CSO BB-046). Projected Development Sites 1 and 2 are located entirely within Subcatchment Area BB-046 (see **Figure 10-1**).

Consistent with *CEQR Technical Manual* methodologies, the amount of sanitary sewage generated from existing uses is conservatively estimated as all water consumption except that used by air conditioning, which is typically not discharged to the City sewer system. Therefore, as Projected Development Sites 1 and 2 are currently vacant, no wastewater is generated under existing conditions. As a result, under existing conditions no wastewater flows to Subcatchment Area BB-046 from the Projected Development Sites.

Stormwater and Drainage Management

Stormwater runoff from impermeable surfaces on the Projected Development Sites is collected and conveyed by the City's combined sewer system to the Bowery Bay WPCP, with the exception of a small amount of overland flow that runs directly into the East River. During dry weather, regulators built into the combined sewer system direct flows to interceptor sewers leading to the WPCP. However, during storm events the regulators are calibrated to allow only a portion of the combined wastewater and stormwater into interceptor sewers (approximately twice the dry weather design flow for the WPCP). The remaining overflow is discharged into the East River.

For combined sewer areas, the analysis of stormwater management typically focuses on the body of water into which the combined overflow is discharged during a CSO event—in this case, the East River. However, actions that do not involve the addition of impermeable surfaces (or those that do not direct additional volume to combined sewers) are not usually considered to have a potential to increase CSO occurrences.

In the existing condition, the total lot area of the Project Area consists of approximately 199,245 sf, comprised predominantly of pervious surfaces such as grass and softscape or, in the case of Projected Development Site 1, dirt. As shown in **Table 10-4**, Site 1 is comprised entirely of permeable surfaces, with

grass and softscape comprising the total surface area. Conversely, the existing, vacant warehouse building on Site 2 is built roughly to the lot lines resulting in 100 percent of the surface area being roof.

TABLE 10-4
Existing Stormwater Runoff to the Bowery Bay WPCP

	Surface Type	Roof	Pavement and Walks	Other	Grass and Softscape	Total
Projected Development Site 1	Area (%)	0.0	0.0	0.0	100	100%
	Surface Area (sf)	0.0	0.0	0.0	164,392	164,392
	Runoff Coefficient[1]	1.0	0.85	0.85	0.20	0.20
Projected Development Site 2	Area (%)	100	0.0	0.0	0.0	100%
	Surface Area (sf)	34,853	0.0	0.0	0.0	34,853
	Runoff Coefficient[1]	1.0	0.85	0.85	0.20	1.00

Source: Estimates from site survey and aerial photographs
Notes: [1] Runoff coefficients for each surface type as per the DEP.

For this analysis, standard DEP runoff coefficients were used to calculate the amount of stormwater runoff using storm events with rainfall averaging from 0.00 to 2.50 inches over durations of 3.80 to 19.50 hours. The Project Area is predominantly comprised of pervious surfaces (approximately 83 percent) that have lower runoff coefficients. As such, a weighted runoff coefficient for both sites was utilized. **Table 10-5** shows the existing combined stormwater runoff for existing conditions on the Project Area. As indicated in the table, the project site currently generate between 0.02 and 0.11 mgd of stormwater within the Bowery Bay WPCP subcatchment area for different rainfall intensities.

TABLE 10-5
Existing Combined Stormwater Runoff and Wastewater Generation to the Bowery Bay WPCP

	Rainfall Volume (inches)	Rainfall Duration (hours)	Total Area (acres)	Weighted Runoff Coefficient	Stormwater Runoff to CSS (MG)	Sanitary to CSS (MG)[1]	Total Volume to CSS (MG)
Projected Development Sites 1 & 2	0.00	3.80	4.57	0.34	0.00	0.00	0.00
	0.40	3.80	4.57	0.34	0.02	0.00	0.02
	1.20	11.30	4.57	0.34	0.05	0.00	0.05
	2.50	19.50	4.57	0.34	0.00	0.00	0.11

Notes: CSS = combined sewer system; MG = million gallons
[1] Derived from **Table 10-2**.

Individual development projects are required to manage on-site stormwater runoff in accordance with DEP conditions to ensure that a development properly regulates its stormwater runoff corresponding to the City's five-year storm. Currently, the Projected Development Sites contains vacant land and a vacant warehousing/manufacturing building. Since Projected Development Site 2 contains older warehousing and manufacturing uses (i.e., pre-dating DEP requirements), there are currently no on-site stormwater detention or other control systems.

Water Conservation and WPCP Load Reduction

During the 1990s, the City instituted a range of water conservation measures in response to excess flow to the City's WPCPs that exceeded the dry weather flow allowed in their respective SPDES permits. Measures included equipping fire hydrants with locks to prevent illegal uses and requiring that all new

plumbing fixtures in the City (including replacements in existing structures and new fixtures in new structures) 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. This metering provided a new financial incentive to identify and repair leaks in the water distribution system. These programs have reduced water demand and load in the City's WPCPs. At many WPCPs, this reduction has been in an order of magnitude of several million gallons per day.

E. THE FUTURE WITHOUT THE PROPOSED ACTIONS (NO-ACTION CONDITION)

In the future without the Proposed Actions, anticipated growth in the vicinity of Queens CD 1, and development that would occur on the Projected Development Sites without the Proposed Actions would result in additional demand for water, wastewater production, and stormwater runoff. As described in **Chapter 1, "Project Description,"** without the Proposed Actions the future development on Project Development Site 1 would consist of an approximately 172,612-gsf warehouse with 82 accessory parking spaces while the existing, vacant warehouse building currently developed on Projected Development Site 2 would be re-occupied in its current dimensions.

Several infrastructure improvements have been proposed as part of the Astoria Cove project which was approved in 2014 and is adjacent to the Project Area. These improvements include new sanitary and storm sewers under 26th Avenue, 4th Street, and 9th Street, as well as two additional storm outfalls. As such, sufficient sewer infrastructure would be present to serve any additional sanitary or stormwater runoff volumes generated by the Astoria Cove project. The nearby Halletts Point Rezoning project, approved by the City in 2013, is not located within Subcatchment Area BB-046 and, therefore, it is not expected to contribute sanitary or stormwater runoff volumes to the sewer infrastructure serving the Project Area. Currently there are no known water or sewer infrastructure improvement projects planned by DEP within the fronting streets.

Water Supply

As shown in **Table 10-6**, in the future without the Proposed Actions, the new water consumption that would occur on both Projected Development Sites due to the anticipated 201,362 gsf of new and re-occupied warehouse development would be approximately 46,226 gpd over the existing condition described above (0.047 gpd). Given this level of consumption, this incremental demand of approximately 0.047 mgd would not be large enough to significantly affect the ability of the City's water system to deliver water in the future without the Proposed Actions.

TABLE 10-6
Water Consumption and Wastewater Generation in the Future without the Proposed Actions

	Existing Conditions[1]			No-Action Conditions			Net Change		
Land Use	Size	Domestic Water/ Wastewater Generation (gpd)	A/C (gpd)	Size	Domestic Water (gpd)	A/C (gpd)	Size	Domestic Water (gpd)	A/C (gpd)
Warehouse	28,750 sf	0	0	201,362 sf	46,226	34,231	172,612 sf	46,226	34,231
Total Water Consumption		0 (0.0 mgd)			46,226 (0.047 mgd)			46,226 (0.047 mgd)	
Total Wastewater Generation		0 (0.0 mgd)			80,458 (0.08 mgd)			80,458 (0.08 mgd)	

Notes: Refer to **Table 10-1** for rate assumptions. A/C = air conditioning
[1]Assuming no wastewater generation or water demand as existing lot and building are vacant.

Wastewater

In the future without the Proposed Actions, additional sanitary discharges would be conveyed to the Bowery Bay WPCP.

As indicated above in **Table 10-6**, in the future without the Proposed Actions, approximately 80,458 gpd (0.08 mgd) of wastewater would be generated and conveyed to the Bowery Bay WPCP. This level of incremental wastewater generation over existing conditions would be well within the 40 mgd average available capacity of the WPCP. Therefore, the Bowery Bay WPCP is expected to continue to operate within its design capacity.

Stormwater and Drainage Management

In the future without the Proposed Actions, stormwater runoff (except for a small amount of overland flow directly conveyed to the East River) would continue to be collected and directed through the existing combined sewer system and then conveyed to the Bowery Bay WPCP for treatment. As noted above, future development on the Projected Development Sites absent the Proposed Actions would consist of a new warehouse building on Projected Development Site 1 while the existing warehouse building on Projected Development Site 2 would be re-occupied with warehouse uses. As Projected Development Site 1 is currently a vacant lot, the permeable surface would be reduced as a result of the new development. As noted previously, DEP requires stormwater detention in compliance with the applicable drainage plan for new developments if the developed site's storm flow exceeds the allowable flow of the drainage plan. As a result of these requirements, given that Project Area is predominantly covered with impervious surfaces currently and does not provide detention, it is expected that there would be a reduction in uncontrolled runoff in the future without the Proposed Actions.

Assuming that the area of impermeable surfaces within the Project Area would only undergo changes on Projected Development Site 1, and since there would be small increases in sanitary flow to the combined sewer resulting from the new development, it is anticipated that no significant change in the frequency or duration of CSO events would occur as a result of development within the Project Area in the future without the Proposed Actions.

F. THE FUTURE WITH THE PROPOSED ACTIONSS (WITH-ACTION CONDITION)

In the future with the Proposed Actions, the water supply, wastewater treatment, and stormwater management systems are expected to support the Proposed Actions without incurring significant adverse impacts to those infrastructure systems. The Proposed Actions would result in substantial development that would not occur in the future without the Proposed Actions. As indicated in **Chapter 1, "Project Description,"** a reasonable worst-case development scenario (RWCDS) has been developed in conjunction with the Proposed Actions. With the Proposed Actions, the Proposed Project would include approximately 1,400 dwelling units (approximately 1,031,117 gsf), 1,887 gsf of retail space, and approximately 22,638 gsf of community facility space on Projected Development Site 1. Additionally, approximately 41,363 square feet of new publicly accessible open space and approximately 525 accessory parking spaces would be provided. Although not under the control of the Applicant, Projected Development Site 2 could be developed with up to 265 DUs (204,296 gsf), 15,000 gsf of retail, and 115 parking spaces.

Water Supply

As shown in **Table 10-7**, the Proposed Actions would generate a total water supply demand of approximately 401,036 gpd (0.401 mgd), an increase of 320,578 gpd (0.321 mgd), compared to demand in the future without the Proposed Actions. Future demand from the Proposed Actions would represent less than 0.1 percent of the City's water supply demand. Though not included in this analysis, in the 2031 future condition, it is anticipated that air conditioning technology would improve and would require less water, resulting in a further decrease in future water consumption by the future development. Therefore, the Proposed Actions would not result in significant adverse impacts on the City's water supply system.

As discussed above, the existing water distribution network through this area generally consists of eight- to 20-inch diameter water mains. While no water main improvement projects are currently proposed by the City in the area immediately adjacent to the Project Area, an internal water main under 3rd Street and additional redundant connections are included as part of the Proposed Project (see **Figure 10-4**). These internal water mains will be owned and maintained by the property owner in perpetuity and would be constructed in coordination with DEP.

Given the relatively minor incremental increase in water consumption as compared to the City's overall water supply, as well as the Project Area location in an area of Queens well-served by water infrastructure and anticipated future improvements in air conditioning technology, the incremental demand with the Proposed Actions is not expected to adversely affect the City's water supply or system water pressure.

TABLE 10-7
Water Consumption and Wastewater Generation in the Future without and With the Proposed Actions

	Future Without the Proposed Actions			Future With the Proposed Actions			Incremental Changes with the Proposed Actions		
Land Use	**Size**	**Domestic Water/ Wastewater Generation (gpd)**	**A/C (gpd)**	**Size**	**Domestic Water/ Wastewater Generation (gpd)**	**A/C (gpd)**	**Size**	**Domestic Water/ Wastewater Generation (gpd)**	**A/C (gpd)**
Residential	0 Residents	0	0	3,880 Residents	388,000	0	+3,880 Residents	+388,000	0
Warehouse	201,362 sf	46,226	34,231	0	0	0	-201,362 sf	-46,226	-34,231
Commercial Retail	0	0	0	16,887 sf	4,053	2,871	+16,887 sf	+4,053	+2,871
Community Facility	0	0	0	22,638 sf	2,264	3,848	+22,638 sf	+2,264	+3,848
Water Consumption Subtotals		8,196	6,069		394,317	6,719		+386,121	+650
Sewage Generation Subtotal		8,196			394,317			385,241 (0.385 mgd)	
Total Water Consumption		14,265 (0.014 mgd)			401,036 (0.401 mgd)			+386,771 (0.387 mgd)	
Total Wastewater Generation		8,196 (0.009 mgd)			394,317 (0.394 mgd)			+386,121 (0.386 mgd)	

Notes: Refer to **Table 10-1** for rate assumptions.

Wastewater

Based on DEP consultation, in the future with the Proposed Actions, the Applicant would connect to existing sanitary sewers under 26th Avenue via a sanitary site connection. This sanitary site connection would be reviewed and approved by DEP's BWSO's Site Connection unit and Bureau of Wastewater Treatment. Wastewater from the project site would flow via the new sanitary site connection to the Bowery Bay WPCP. The capacity of the plant would not change as a result of the Proposed Actions, and the facility would continue to operate within its SPDES-permitted capacity of 150 mgd. As shown in **Table 10-7** above, the Proposed Actions would generate approximately 394,317 gpd (0.394 mgd) of sanitary sewage. The sewage generated by the proposed project would result in an incremental increase of 386,121 gpd (0.386 mgd) over No-Action conditions.

With an existing average dry weather flow of 104 mgd to the Bowery Bay WPCP (see **Table 10-5**) and the addition of less than 0.4 mgd of sanitary sewage in the With-Action condition, the Bowery Bay WPCP would continue to have ample reserve capacity with this anticipated new demand. Pursuant to CEQR guidelines, since the demand associated with the Proposed Actions would be well within the capacity of the treatment plant, no significant adverse impacts to the City's wastewater treatment services would occur.

Stormwater and Drainage Management

Currently, the majority of stormwater runoff from the project site is collected and conveyed by the City's combined sewer system to the Bowery Bay WPCP. (As noted above, a minor portion of stormwater runoff currently discharges directly to the East River as overland flow due to the shorefront nature of the site.) During dry weather, regulators built into the combined sewer system direct flows to interceptor sewers

leading to the WPCP. However, during storm events, the regulators are calibrated to allow a portion of the combined wastewater and stormwater into interceptor sewers and the remaining overflow is discharged into the East River through the existing BB-033 outfall located at 27th Avenue, southwest of Projected Development Site 1 (see **Figure 10-2**). In the future with the Proposed Actions, the Applicant would construct a separate stormwater infiltration system along the elevated shoreline that would convey approximately 60 percent of runoff generated by the site to a new internal storm drain at the northeastern corner of Projected Development Site 1 to enable direct discharge of clean, site generated stormwater flows to the East River (see **Figure 10-3**). This outfall would be constructed and maintained by the Applicant and would be permitted by both NYSDEC and the USACE. Stormwater generated on-site would be treated for water quality prior to discharge. A DEP Site Connection at the southern end of the site would capture and convey the remaining, approximately 40 percent of runoff to the existing DEP stormwater system below 26th Avenue. As there is no existing storm sewer adjacent to the Project Area, a storm sewer extension (following the Amended Drainage Plan or as a Drainage Proposal) will be required in order for the development to make a stormwater site connection to the DEP sewer system. Both the new internal storm drain and DEP connection would be developed in coordination with DEP to insure compliance with DEP requirements. In addition, rain gardens and bioswales have been proposed along the redeveloped shoreline in an effort to mitigate plaza surface runoff.

As indicated above, the Project Area totals approximately 199,245 sf (approximately 4.57 acres) of lot area containing a variety of built features. As a result of the Proposed Actions, the weighted runoff coefficient in all parts of the Project Area would change due to the introduction of paving, landscaped areas, and new building construction. For conservative analysis purposes, it is estimated that roofs would comprise approximately 54 percent of the surface area in Projected Development Site 1 and 100 percent of the surface area in Projected Development Site 2, which have the highest stormwater runoff coefficient. The remainder of Site 1's total lot area would be 23 percent pavement and walks, 15 percent grass or softscape, and 8 percent "other." (In this case, "other" is characterized by riprap that would be added along the shoreline in the vicinity of Projected Development Site 1, as well as permeable pavers.) As such, the future With-Action condition would result in increases in roof and pavement/walkway areas and decreases in pervious surface areas when compared to existing conditions.

As detailed above, approximately 60 percent of stormwater runoff generated on Projected Development Site 1 would be managed through the proposed internal infiltration systems and direct internal storm drain to the East River, both of which would comply with DEP and/or NYSDEC regulations for water quality treatment and quantity management. As such, under the With-Action condition, the remaining 40 percent of stormwater flows generated on Projected Development Site 1 would be conveyed to the Bowery Bay WPCP or discharged to the East River via existing CSO outfalls, dependent on the storm event, and would contribute to combined flow volumes. (To be conservative, 100 percent of runoff from Projected Development Site 2 is assumed to flow to existing DEP infrastructure.) Increased volumes and flows conveyed from the Projected Development Site 1 would be limited to approximately 50.5 percent of total stormwater runoff (weighted average from Sites 1 and 2) and the sanitary volumes generated on both sites.

Based on the existing condition and proposed site plans, the DEP Flow Calculation Matrix was completed for existing and With-Action conditions. The calculations from the Flow Calculation Matrix help to determine the change in wastewater volumes to the combined sewer system from existing conditions to the future conditions with the Proposed Actions. Runoff volumes were calculated for four rainfall volume scenarios with varying durations. As previously stated, approximately 60 percent of stormwater runoff from Projected Development Site 1 would flow directly to the East River via the proposed internal storm drains, which would be owned and maintained by the Applicant. The remaining stormwater runoff

(approximately 40 percent) would contribute to combined sewer system volumes in the subcatchment area.

Table 10-8 shows the estimated With-Action flow volumes to the combined sewer system. As shown in the table, depending on the rainfall volume and duration, the total volume to the combined sewer system could be between 0.06 and 0.46 million gallons (MG) for both development sites, combined. Compared to existing volumes to the combined sewer system this would represent an increase of 0.06 MG to 0.35 MG during storm events, with an increase of 0.06 MG during dry weather (see **Table 10-9**). However, it should be noted that the Flow Volume Matrix calculations do not reflect the use of any best management practices to reduce sanitary flows such as low-flow fixtures as mandated by New York City Local Law 33.

TABLE 10-8
Combined Stormwater Runoff and Wastewater Generation Flow Volume to the Combined Sewer System—Future With-Action Condition

	Rainfall (inches)	Duration (hours)	Total Area (acres)	Weighted Runoff Coefficient	Runoff Volume Direct Drainage (MG)	Stormwater Runoff to CSS (MG)	Sanitary to CSS (MG)[1]	Total Volume to CSS (MG)
Projected Development Site 1	0.00	3.80	3.77	0.83	0.00	0.00	0.05	0.05
	0.40	3.80			0.02	0.01	0.05	0.06
	1.20	11.30			0.06	0.04	0.15	0.19
	2.50	19.50			0.13	0.08	0.27	0.35
Projected Development Site 2	0.00	3.80	0.8	1.00	0.00	0.00	0.01	0.01
	0.40	3.80			0.00	0.01	0.01	0.02
	1.20	11.30			0.00	0.03	0.03	0.06
	2.50	19.50			0.00	0.06	0.05	0.11

Notes: CSS = combined sewer system; MG = million gallons
[1] Derived from **Table 10-7.**

TABLE 10-9
Combined Stormwater Runoff and Wastewater Generation Flow Volumes to the Combined Sewer System – Existing vs. With-Action Condition

	Rainfall (inches)	Duration (hours)	Total Volume to Combined Sewer System (MG)		
			Existing Conditions	With-Action Condition	Increment
Projected Development Sites 1 & 2	0.00	3.80	0.00	0.06	0.06
	0.40	3.80	0.02	0.08	0.06
	1.20	11.30	0.05	0.25	0.20
	2.50	19.50	0.11	0.46	0.35

Notes: MG = million gallons

Stormwater Best Management Practices (BMPs)

A NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001) is required for any development that would involve soil disturbance of one or more acres. In accordance with NYSDEC SPDES (GP-0-10-001), a Stormwater Pollution Prevention Plan (SWPPP) consisting of both temporary erosion and sediment controls and post-construction stormwater management practices would be prepared by the Applicant. Water quality treatment would need to be designed to meet the

NYSDEC design criteria and treat stormwater runoff from the project site via the new internal storm drain that would be constructed as part of the proposed development on Projected Development Site 1.

Post-construction stormwater management measures that would be integrated into the proposed development as part of the SWPPP could include measures such as underground detention, infiltration practices, and vegetated areas. In addition, stormwater management would be implemented through the use of BMPs such as those described in the NYC Green Infrastructure Plan or other green technologies, including blue and green roofs, subsurface detention and infiltration, porous pavement, enhanced tree pits, and rain cisterns, would help manage stormwater flows depending on site conditions. As noted previously, stormwater infiltration areas are proposed along the elevated shoreline while rain gardens and bioswales to capture surface runoff have been incorporated into the proposed shore public walkway and esplanade.

Proposed Actions and Associated Infrastructure Improvements

The Proposed Actions would result in the demapping of an unbuilt section of 3rd Street from 26th Avenue to the waterfront public access area. The demapped street segment would be built as a privately owned, publicly accessible street and would accommodate new water and sewer infrastructure. Third Street would have a width of 50 feet, including a 22-foot travel way and two 13-foot wide sidewalks.

As the Proposed Actions would increase density in the area, an amended drainage plan (ADP) is required by DEP to be prepared. An ADP would be prepared by the Applicant and submitted to DEP for review and approval. Per consultation with DEP, it is expected that new internal storm drains, internal sanitary site connection, and internal water main would be required within the demapped portion of 3rd Street as part of the Proposed Project. The internal storm drains and internal water main will be owned and maintained by the owner of the property in perpetuity. The ADP will determine the required stages of the sewers to serve the area. The new sewers would be designed in accordance with the DEP ADP for the area and would be built to meet all DEP requirements.

Based on the analysis, the required BMP measures that would be implemented at the Projected Development Site 1 and considering the improvements associated with the Proposed Project, it is concluded that the Proposed Actions would not result in significant adverse impacts to wastewater and/or stormwater conveyance and treatment infrastructure.