Chapter 12: Water and Sewer Infrastructure

A. INTRODUCTION

This chapter evaluates the potential for the proposed project to result in significant adverse impacts on the city's water supply, as well as its wastewater and stormwater conveyance and treatment infrastructure. As described in Chapter 1, "Project Description," the proposed project would result in a mixed-use development comprising residential and neighborhood retail uses and publicly accessible waterfront open space. These new uses, project-generated residents, employees, and other users would change the project site's water consumption, sewage generation, and stormwater runoff as compared to conditions in the future without the proposed project.

PRINCIPAL CONCLUSIONS

This analysis finds that the proposed project would not result in any significant adverse impacts on the city's water supply, wastewater or stormwater conveyance and treatment infrastructure.

WATER SUPPLY

The project would generate an incremental water demand of 627,004 gallons per day (gpd) as compared to the future without the proposed project. This represents a 0.06 percent increase in demand on the New York City water supply system. Based on the projected incremental demand, it is expected that there would be adequate water service to meet the proposed project's incremental water demand, and there would be no significant adverse impacts on the city's water supply.

SANITARY (DRY WEATHER) FLOWS

The proposed project would generate an incremental 627,828 gpd of sanitary sewage over the future without the proposed project. This incremental volume in sanitary flow would represent approximately 0.57 percent of the average daily flow to the Bowery Bay Wastewater Treatment Plant (WWTP) which serves the project site. This volume would not result in an exceedance of the Bowery Bay WWTP's capacity, and therefore would not create a significant adverse impact on the city's sanitary sewage treatment system. New sanitary sewer infrastructure would also be constructed as a part of the proposed project.

STORMWATER (WET WEATHER) FLOWS

Generally, the overall volume of stormwater runoff and the peak stormwater runoff rate from the project site is anticipated to increase due to the replacement of the existing surface parking areas with buildings; however, approximately 2.35 acres of publicly accessible open space, including a lawn at 27th Avenue Plaza and a waterfront esplanade along the East River would be created as part of the proposed project. With the incorporation of new separate stormwater outfalls to the

East River and selected BMPs within the project site, the stormwater runoff volumes from the proposed project would not result in any significant adverse impacts to the city's stormwater conveyance system.

B. METHODOLOGY

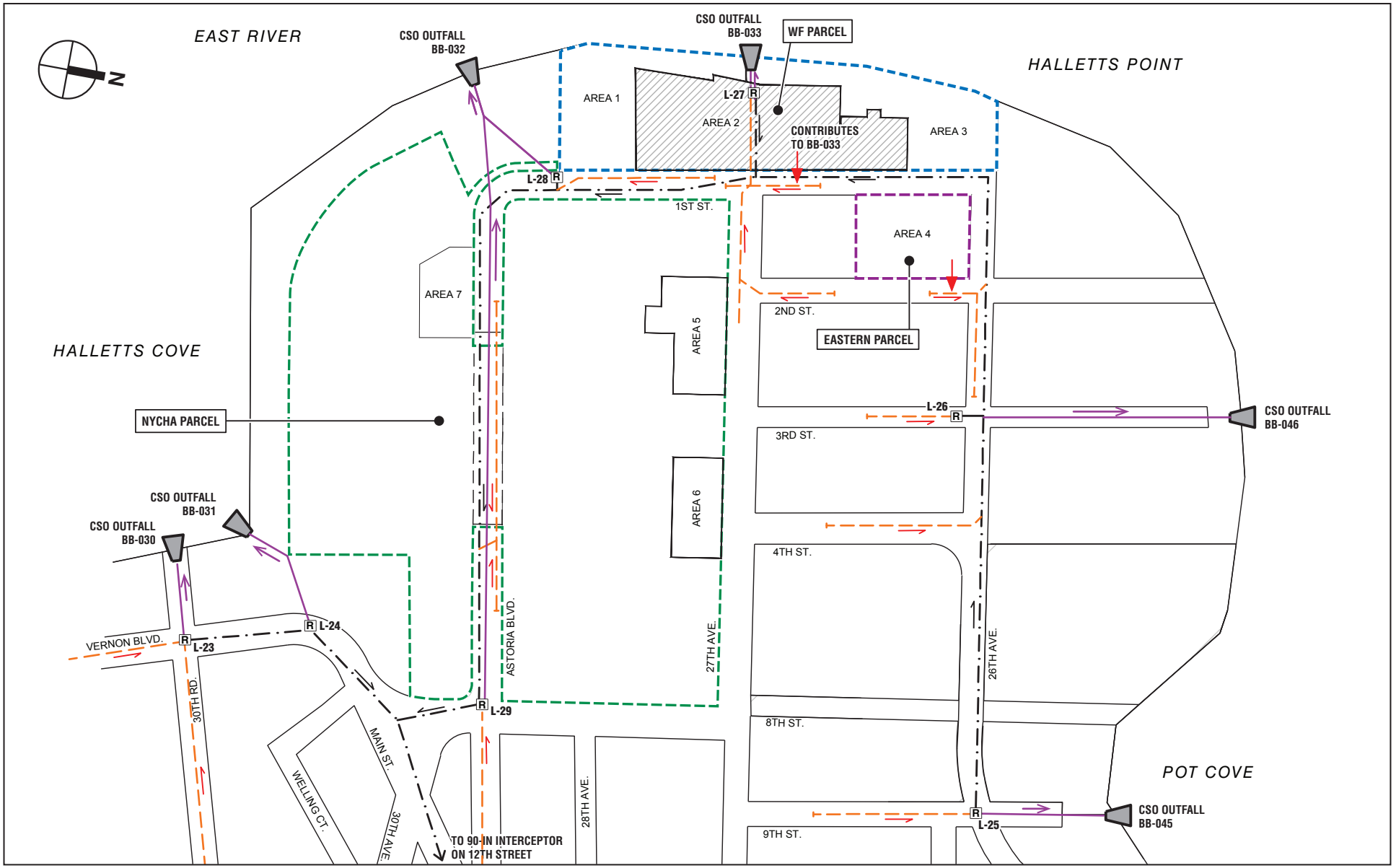
This analysis follows the methodologies set forth in the 2012 *City Environmental Quality Review* (*CEQR) Technical Manual.* According to the *CEQR Technical Manual,* a preliminary water supply analysis would be needed if a project would result in the exceptionally large demand for water of over 1 million gallons per day (mgd) or is located in an area that experiences low water pressure (i.e., at the end of the water supply distribution system such as the Rockaway Peninsula or Coney Island). The proposed project site is not located in an area that experiences low water pressure and would not result in an incremental water demand exceeding 1 mgd. Therefore, further analysis of the project's effects on water supply is not warranted; however, the proposed project's total water demand is calculated for purposes of determining the sewage generated by the proposed project.

The project is located in an area which has separate sanitary and storm sewer systems as well as some combined sewer areas. A preliminary sewer assessment is warranted if a project exceeds 25 residential units or 50,000 square feet (sf) of commercial/public and institution/community facility use in a separately sewered area zoned R1; 400 residential units or 150,000 sf of commercial/public and 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. The proposed project meets these *CEQR Technical Manual* thresholds; therefore, a preliminary sewer assessment is warranted and is provided in this chapter.

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*. The estimated amount of sewage generated from the proposed project conservatively includes all of the project site's water consumption excluding air conditioning, which is typically not discharged into the sewer system. The New York City Department of Environmental Protection (DEP) Volume 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 Combined Sewer Overflow (CSO) subcatchment areas, the DEP volume matrix is completed for each CSO subcatchment area.

The ability of the city's sewer infrastructure to handle the proposed project's anticipated demand is assessed by estimating existing water demand, storm and sewage generation rates and then comparing the estimates with the future with and without the proposed project. The proposed Development Areas/Future Building Sites within the Waterfront (WF), Eastern, and New York City Housing Authority (NYCHA) Parcels are located within CSO Subcatchment Areas BB-032 and BB-033, as designated in **Table 12-1** below and shown on **Figures 12-1** and **12-2**, which show the existing and proposed sanitary sewer system serving the project site.

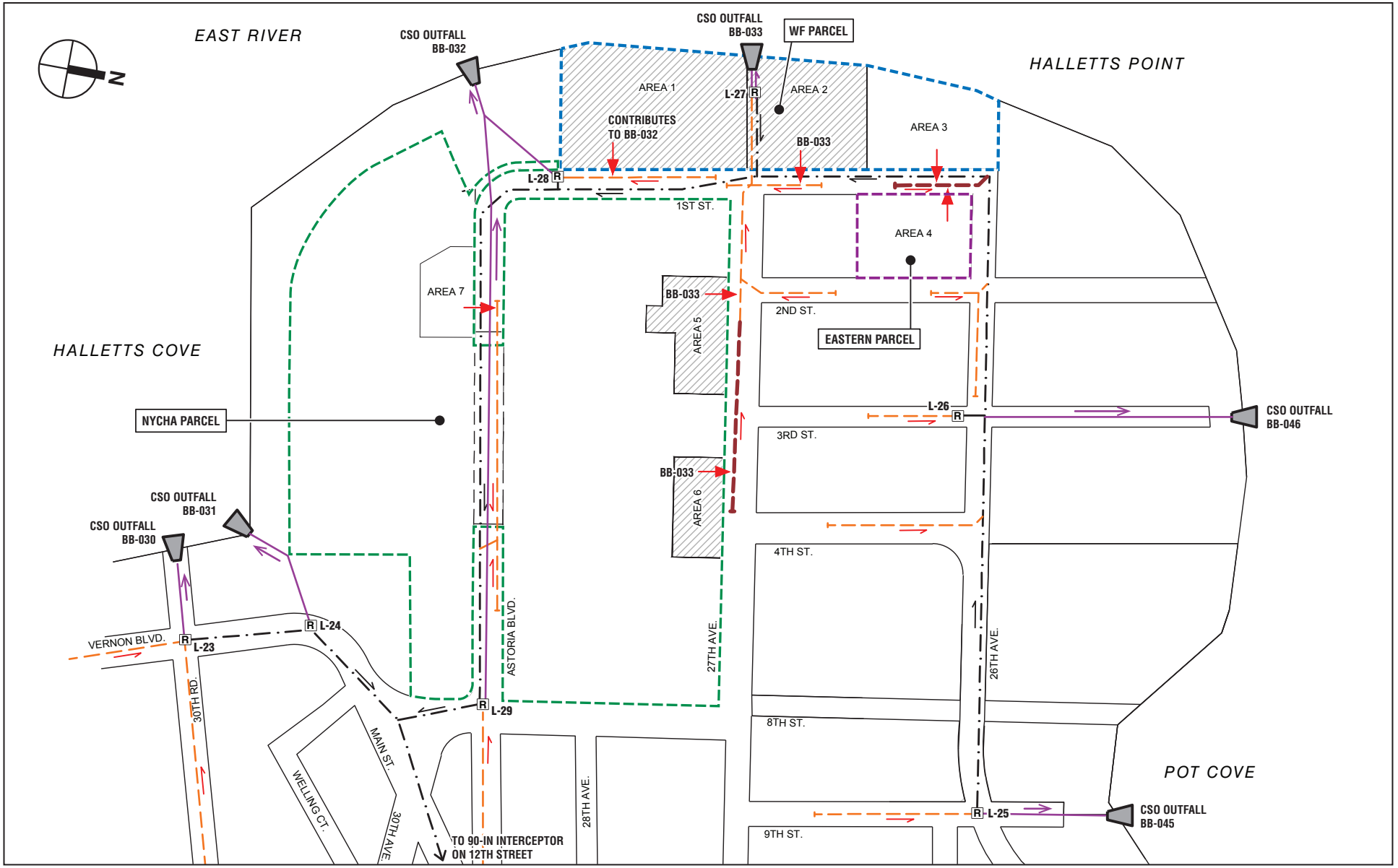
Areas 1, 2 and 3 in their entirety comprise the WF Parcel; Area 4 comprises the Eastern Parcel; and Areas 5, 6, and 7 comprise the NYCHA Parcel.



HALLETTS POINT

Existing Sanitary Sewer System

Figure 12-1



Existing DEP Sanitary Sewer
Proposed Sanitary Sewer
Branch Interceptor
CSO Outfall Sewer
Regulator and Number
CSO Outfall
Proposed Point of Connection (approximate)
Flow Direction
Project Area with Sanitary Discharge to Sanitary Sewer
Project Area with Sanitary Discharge to Interceptor Sewer
Eastern Parcel
WF Parcel
NYCHA Parcel

HALLETTS POINT

Proposed Sanitary Sewer System

Figure 12-2

Table 12-1
CSO Subcatchment Areas Designation

CSO Subcatchment Area BB-032 (Extension of Astoria Boulevard)	
Area Designation	**Future Building Site**
Area 1	Building Sites 4 & 5
Area 7	Building Site 8
CSO Subcatchment Area BB-033 (Extension of 27th Avenue)	
Area Designation	**Future Building Site**
Area 2	Building Site 3
Area 3	Building Site 2
Area 4	Building Site 1
Area 5	Building Site 6
Area 6	Building Site 7

Currently and in the future, Areas 1 to 7 discharge stormwater directly to surface water by means of separate storm outfalls or by connection to the CSO outfall after the regulator chamber. For sanitary discharge, all of the sites either discharge to the sanitary sewer or to the interceptor sewers. Therefore none of the sites in the current or proposed condition discharge to combined sewers.

Table 12-2 below describes the method of sanitary and storm discharge for each area in more detail.

Table 12-2
Summary of Sanitary and Storm Discharges and CSO Subcatchment Areas

Area Designation	Existing Condition		Proposed Condition	
	Sanitary Sewage	**Stormwater Runoff**	**Sanitary Sewage**	**Stormwater Runoff**
CSO Subcatchment Area BB-032				
1	No sanitary discharge	Direct discharge to the East River via overland flow and CSO outfall pipe after regulator	Sanitary sewer	Direct discharge to the East River via two new private separate storm outfalls
7	No sanitary discharge	Direct discharge to the East River via overland flow and CSO outfall pipe after regulator	Sanitary sewer with connection directly into Interceptor sewer	Direct discharge to the East River (connects to CSO outfall after regulator)
CSO Subcatchment Area BB-033				
2	Sanitary sewer	Direct discharge to the East River via overland flow and Separate Storm Outfall	Sanitary sewer	Direct discharge to the East River via a new private separate storm outfall
3	No sanitary discharge	Direct discharge to the East River via overland flow and Separate Storm Outfall	Sanitary sewer with connection directly into Interceptor sewer	Direct discharge to the East River via a new private separate storm outfall
4	Sanitary sewer	Direct discharge to the East River via Separate Storm Outfall	Sanitary sewer with connection directly into Interceptor sewer	Direct discharge to the East River via existing separate storm outfall
5	No sanitary discharge	Direct discharge to the East River via Separate Storm Outfall	Sanitary sewer	Direct discharge to the East River via existing separate storm outfall
6	No sanitary discharge	Direct discharge to the East River via Separate Storm Outfall	Sanitary sewer	Direct discharge to the East River via existing separate storm outfall

Notes: See **Figures 12-1**, **12-2 and 12-4**. Note that the size and shape of the areas listed in this table change from existing to proposed conditions, as shown in **Figures 12-1 and 12-2**.

C. EXISTING CONDITIONS

WATER CONSUMPTION

City water mains exist in the streets fronting the project area (see **Figure 12-3**). These mains provide water service to the existing buildings within the Eastern and WF Parcels. Approximately 73,500 sf of floor area within the existing buildings are operational while the remaining floor area on the project site is vacant or underutilized and thus does not contribute to existing water consumption. The existing water consumption does not include areas where no project development would occur, i.e., on the Hallet's Cove Playground, Whitey Ford Field, or other portions of the NYCHA Astoria Houses Campus not located within the building sites. **Table 12-3** summarizes the estimated water demand from the existing uses on the project site.

Table 12-3
Existing Water Consumption

Use	Size (Sf)[1]	Rate[2]	Consumption (gpd)
Manufacturing			
Domestic	73,513	0.10 gpd/sf	7,351
Air Conditioning	73,513	0.17 gpd/sf	12,497
		TOTAL	**19,848**

Notes:
1. "Size" only includes floor area that is currently operational; approximately 141,548 sf of a total 215,061 sf in the existing buildings on the Eastern and WF Parcels is currently vacant.
2. Commercial sewage generation rates were used to determine the water consumption for existing manufacturing uses.
Source: Rates from the 2012 *CEQR Technical Manual.*

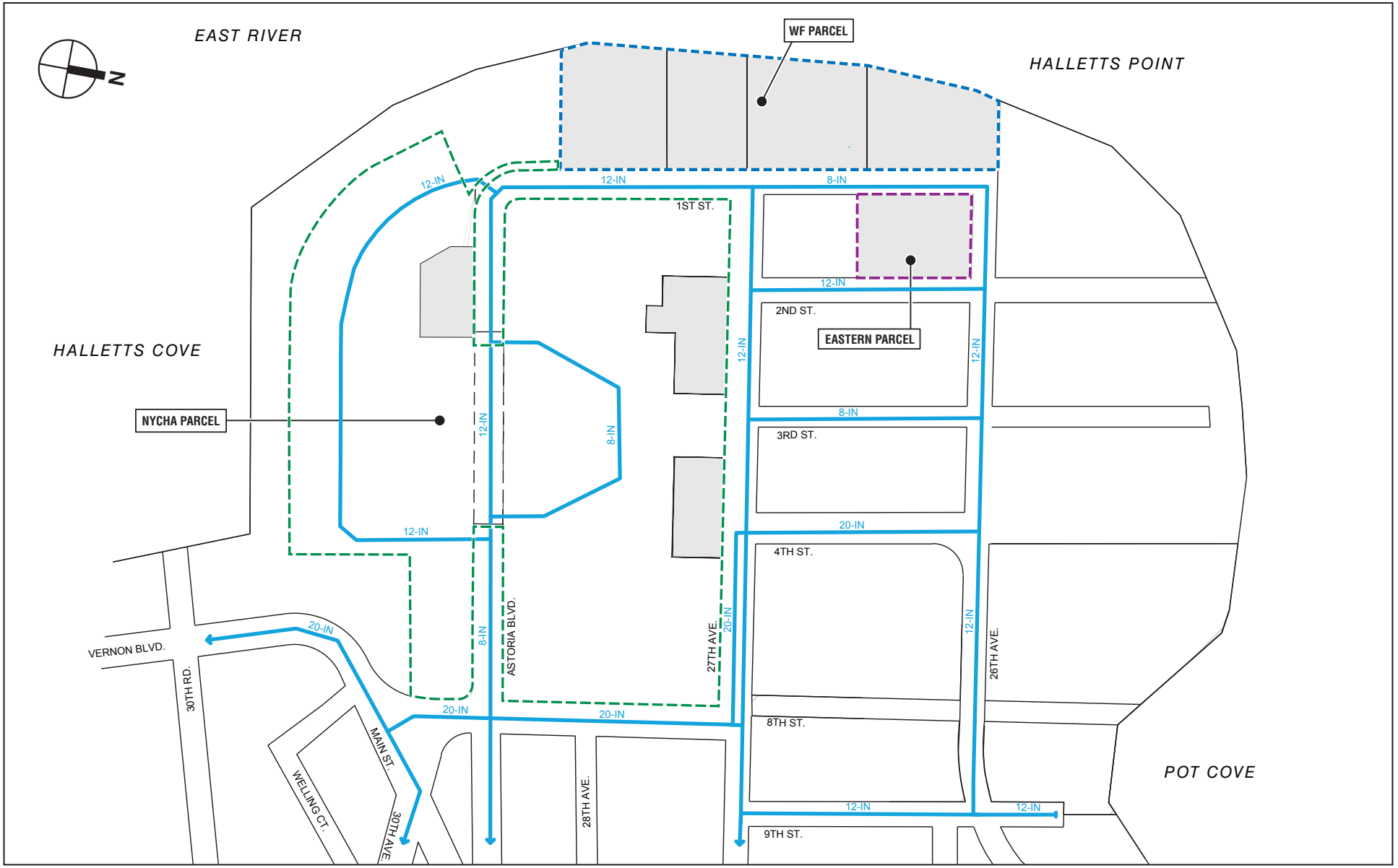
WASTEWATER

SEWER SYSTEM

The project site and the immediate surrounding area are served by a separate storm and sanitary sewer system with some unsewered and combined sewer sections. Existing sanitary and combined sewers in the immediate surrounding area flow to regulators L-27 (CSO BB-033), L-28 (CSO BB- 032) and L-29 (CSO BB-032) (see **Figure 12-1**). The separate storm system that serves the site consists of storm sewers in 26th and 27th Avenues that discharge directly via separate storm outfalls into the East River (see **Figure 12-4**).

In periods of dry weather, New York City's combined and sanitary sewer systems convey only sanitary sewage to its WWTPs. During and immediately after wet weather, the combined sewers can experience a much larger flow due to stormwater runoff collection. To control flooding at the WWTPs, where combined sewage is treated, regulators are built into the system to allow only approximately two times the amount of design dry weather flow into the interceptors. The interceptor takes the flow to the WWTP, while the excess flow to the regulators is discharged to the nearest waterbody as CSO.

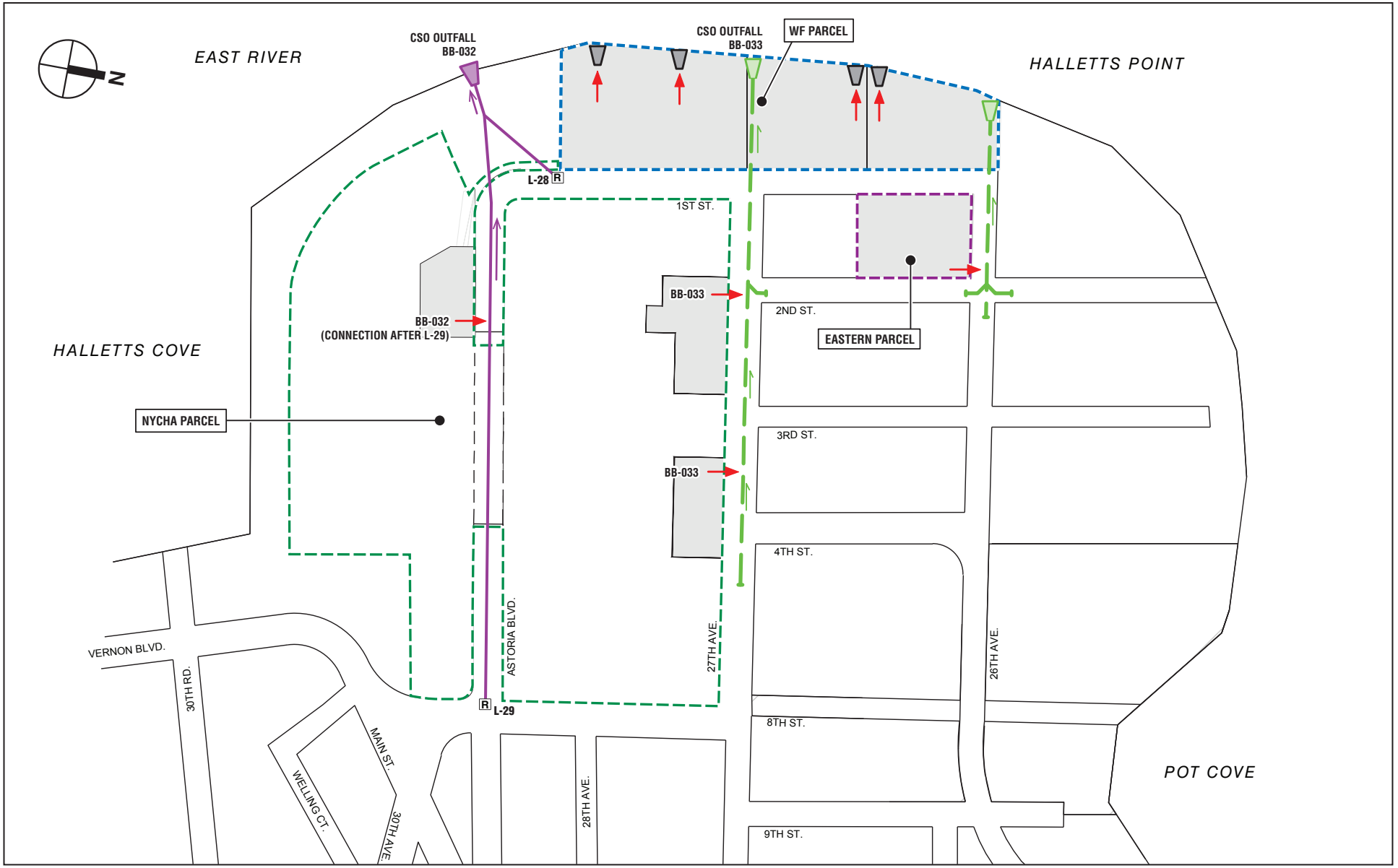
The Bowery Bay WWTP is located adjacent to LaGuardia Airport in Astoria, Queens and treats wastewater through full secondary physical and biological processes before the wastewater is discharged into the East River. Secondary treatment includes the removal of a minimum of 85 percent of biological oxygen demand and total suspended solids from the influent. The quality of effluent from this WWTP is regulated by a New York State Pollutant Discharge Elimination



HALLETTS POINT

DEP Water Mains

Figure 12-3



HALLETTS POINT

Existing and Proposed Storm Sewer System

Figure 12-4

System (SPDES) permit issued by New York State Department of Environmental Conservation (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 WWTP is limited to a maximum of 150 mgd. The average daily flow over the past 12 months (February 2012 through January 2013) is 111 mgd, which is below the maximum permitted level.

SANITARY (DRY WEATHER) FLOWS

Consistent with *CEQR Technical Manual* methodologies, the amount of sanitary sewage generated from the existing building uses is conservatively estimated as all water consumption except that used by air conditioning, which is typically not discharged to the city sewer system. The overall estimated amount of daily sanitary sewage currently generated is 7,351 gpd as computed in **Table 12-3**.

STORMWATER (WET WEATHER) FLOWS

Table 12-4 describes the surface types of Areas 1 to 7 in existing conditions. The weighted runoff coefficient, which represents the percentage of precipitation that becomes surface runoff, is also calculated.

Table 12-4
Existing Surface Types/Areas

Area Designation	Surface Type	Surface Areas (sf)/ Percent Coverage	Weighted Runoff Coefficient
CSO Subcatchment Area BB-032			
Area 1	Pavement	47,493/85%	**0.82**
	Other Surface	5,349/10%	
	Grass	2,786/5%	
	Total	**55,628/100%**	
Area 7	Pavement	14,663/53%	**0.55**
	Grass	12,842/47%	
	Total	**27,504/100%**	
CSO Subcatchment Area BB-033			
Area 2	Building Roofs	114,961/90%	**0.98**
	Pavement	12,812/10%	
	Total	**127,772/100%**	
Area 3	Pavement	47,503/85%	**0.75**
	Grass	8,542/15%	
	Total	**56,045/100%**	
Area 4	Building Roofs	54,547/82%	**0.97**
	Paved Surfaces	12,296/18%	
	Total	**66,843/100%**	
Area 5	Pavement	15,910/38%	**0.44**
	Grass	26,328/62%	
	Total	**42,238/100%**	
Area 6	Pavement	25,363/88%	**0.77**
	Grass	3,557/12%	
	Total	**28,920/100%**	

D. THE FUTURE WITHOUT THE PROPOSED PROJECT

In the future without the proposed project, current operations and uses on each of the building sites would not change. Most of the building sites would remain vacant or underutilized. Currently, there are no known water or sewer infrastructure improvement projects planned by DEP within the fronting streets. Therefore, water and sewer infrastructure conditions in the future without the proposed project would remain as described above for existing conditions.

The nearby proposed Astoria Cove project is not located within the CSO Subcatchment Areas BB-032 or BB-033, therefore, it is not expected to contribute sanitary or stormwater runoff volumes to the sanitary or storm sewer infrastructure serving the proposed project.

E. PROBABLE IMPACTS OF THE PROPOSED PROJECT

WATER CONSUMPTION

The existing buildings would be demolished and the existing parking uses on all building sites would be removed and replaced by the proposed project. **Table 12-5** summarizes the overall projected water consumption on the building sites in the future with the proposed project.

Table 12-5
Future With the Proposed Project Water Consumption

Use	Population	Size (sf)	Rate	Consumption (gpd)
Residential				
Domestic	6, 187 (people)[1]	NA	100 gpd/person	618,700
Retail				
Domestic	NA	68,663	0.24 gpd/sf	16,479
Air Conditioning	NA	68,663	0.17 gpd/sf	11,673
			TOTAL	**646,852**

Notes:
1. The number of residents was calculated based on 2,644 units. A Queens Community District 1 rate of 2.34 residents per unit was applied.

Source: Rates from *2012 CEQR Technical Manual*

The cumulative water demand from the proposed project would be 646,852 gpd. The incremental water demand over the No Build condition generated by uses that would be introduced by the proposed project would be 627,004 gpd.

As discussed above, the existing distribution network through the Halletts Point peninsula generally consists of 8- to 20-inch diameter water mains. There are no proposed water main improvements within the city streets adjacent to the project sites, however, water mains that are located within those streets and constructed prior to 1945 could be subject to replacement due to construction of new sewer infrastructure for the proposed project sites. Any water main replacement work would be coordinated with DEP.

WASTEWATER

SANITARY SEWER SYSTEM IMPROVEMENTS

It is expected that as part of the proposed project, the Applicant would be responsible for the construction of new sanitary sewers in segments of 27th Avenue and 1st Street adjacent to the

Eastern and WF parcels as shown in **Figure 12-2**. These new sewers would be designed and constructed to tie-in to the existing sanitary sewer in 27th Avenue and the branch interceptor in 1st Street. The design of these sewers and the modification of related existing sewer appurtenances would be coordinated with DEP.

STORMWATER SYSTEM IMPROVEMENTS

Currently, there are two stormwater outfalls located adjacent to the project site: a 36-inch storm sewer and outfall on 27th Avenue and a 48-inch outfall at 26th Avenue. The proposed project would include construction of four new stormwater outfalls for the proposed development sites to enable direct discharge of stormwater flows to the East River (see **Figure 12-4**). These outfalls would be constructed by the Applicant and permitted by NYSDEC and United States Army Corps of Engineers (USACE), and stormwater generated on-site would be treated for water quality prior to discharge.

SANITARY (DRY WEATHER) FLOWS

The estimated amount of sanitary sewage generated by the proposed project would be 635,179 gpd. The incremental sanitary sewage over the No Build condition generated by the proposed project would be 627,828 gpd. This amount would represent approximately 0.57 percent of the average daily flow of 111 mgd at the Bowery Bay WWTP, and would not result in an exceedance of the Bowery Bay WWTP's capacity. Therefore, the proposed project would not result in a significant adverse impact on the city's sanitary sewage treatment system. In addition, per the New York City Plumbing Code (Local Law 33 of 2007) low-flow fixtures would be required to be implemented and would help to reduce sanitary flows from the new buildings.

STORMWATER (WET WEATHER) FLOWS

As a result of the proposed development, the weighted runoff coefficient in all Areas 1 to 7 would change (see **Table 12-6**) with some reduced due to introduction of more landscaped areas, and some increased due to more pavement or buildings. All stormwater would be managed through separate stormwater outfalls to the East River (Area 7 would connect to a CSO pipe after the regulator chamber) and comply with DEP and/or NYSDEC regulations for water quality treatment and quantity management.

Based on the existing and proposed site plans, the DEP Flow Volume Calculation Matrix was completed for the Existing and Build conditions. The calculations from the Flow Volume Calculation Matrix help to determine the change in wastewater volumes to the combined sewer system from existing conditions to the future with the proposed project. Runoff volumes were calculated for four rainfall volume scenarios with varying durations. The summary tables, taken from the DEP Flow Volume Calculation Matrix, are included in **Table 12-7**.

Although included in the calculations above, please note that sanitary discharge from Areas 3, 4 and 7 discharge directly to an interceptor sewer and would therefore not contribute to CSO. Also, 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 NYC Local Law 33.

Table 12-6
Proposed Surface Types/Areas

Area Designation	Surface Type	Surface Areas (sf)/ Percent Coverage	Weighted Runoff Coefficient
CSO Subcatchment Area BB-032			
Area 1	Building Roofs	63,656/55%	**0.84**
	Pavement	29.773/26%	
	Other Surface	5,349/5%	
	Grass	17,276/15%	
	Total	**116,054/100%**	
Area 7	Building Roofs	18,687/68%	**0.74**
	Grass	8,818/32%	
	Total	**27,505/100%**	
CSO Subcatchment Area BB-033			
Area 2	Building Roofs	28,805/45%	**0.86**
	Pavement	29,773/46%	
	Grass	6,139/9%	
	Total	**64,676/100%**	
Area 3	Building Roofs	27,216/47%	**0.78**
	Pavement	18,351/31%	
	Grass	12,744/22%	
	Total	**58,311/100%**	
Area 4	Building Roofs	45,339/68%	**0.90**
	Pavement	16,158/24%	
	Grass	5,346/8%	
	Total	**66,843/100%**	
Area 5	Building Roofs	17,340/41%	**0.82**
	Pavement	19,093/45%	
	Grass	5,806/14%	
	Total	**42,238/100%**	
Area 6	Building Roofs	25,363/41%	**0.89**
	Pavement	16,099/56%	
	Grass	868/3%	
	Total	**28,920/100%**	

Table 12-7
DEP Flow Volume Matrix:
Existing and Build Condition Volume Comparison

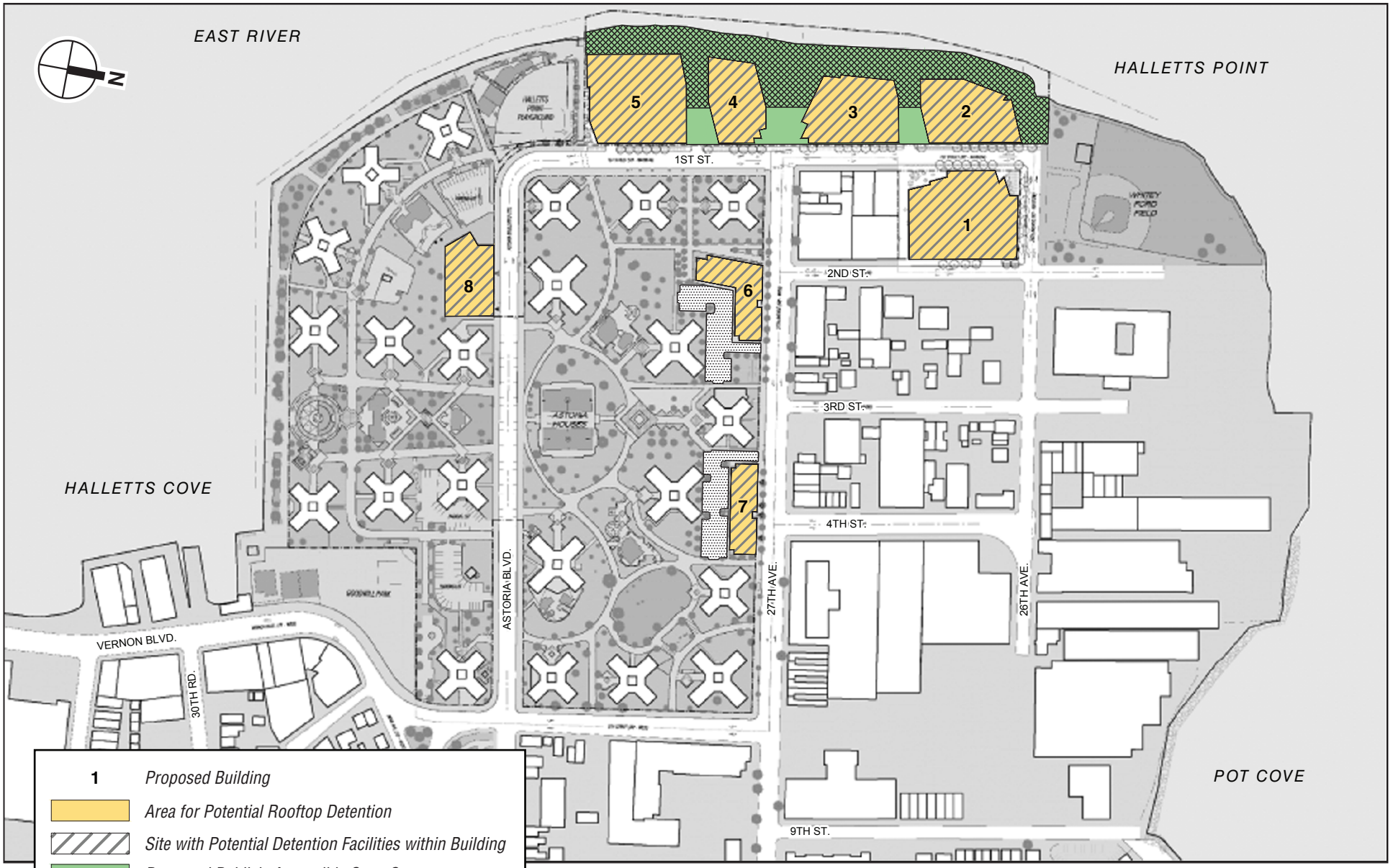
Rainfall Volume (in.)	Rainfall Duration (hr.)	Runoff Volume Direct Drainage (MG)	Runoff Volume To CSS (MG)	Sanitary Volume To CSS (MG)	Total Volume To CSS (MG)	Runoff Volume Direct Drainage (MG)	Runoff Volume To CSS (MG)	Sanitary Volume To CSS (MG)	Total Volume To CSS (MG)	Increased Total Volume to CSS (MG)
BB-032		Existing (Areas 1 and 7)				Build (Areas 1 and 7)				**BB-032 Increment***
		1.91 Acres				3.30 Acres				
0.00	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04
0.40	3.80	0.02	0.00	0.00	0.00	0.03	0.00	0.04	0.04	0.04
1.20	11.30	0.05	0.00	0.00	0.00	0.09	0.00	0.12	0.12	0.12
2.50	19.50	0.09	0.00	0.00	0.00	0.18	0.00	0.20	0.20	0.20
BB-033		Existing (Areas 2,3,4,5,6)				Build (Areas 2,3,4,5,6)				**BB-033 Increment***
		7.38 Acres				5.99 Acres				
0.00	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.06
0.40	3.80	0.07	0.00	0.00	0.00	0.06	0.00	0.06	0.06	0.06
1.20	11.30	0.20	0.00	0.00	0.00	0.17	0.00	0.18	0.18	0.18
2.50	19.50	0.43	0.00	0.01	0.01	0.35	0.00	0.32	0.32	0.31

Notes:
* Sanitary discharge from Areas 3, 4 and 7 discharge directly to an interceptor sewer and would not contribute to CSO.
CSS = Combined sewer system
MG = million gallons

STORMWATER BMP CONCEPT PLAN

As part of the proposed project, coverage under a NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001) would be required. 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. Water quality treatment would be designed to meet the NYSDEC design criteria and treat stormwater runoff from the proposed project via the existing and new storm outfalls into the East River. Post-construction stormwater management measures that would be integrated into the proposed project as part of the project's SWPPP could include measures such as underground detention, infiltration practices and vegetated areas. In addition, stormwater management from the landward sites would be implemented through the use of BMPs including on-site detention facilities (rooftop detention, underground storage tanks or tanks within the buildings), as shown in **Figure 12-5**, which would be required as a part of the DEP site connection approval process.

With the inclusion of sanitary and storm sewer improvements, water conserving fixtures to reduce water demand and sanitary flows, and stormwater BMPs to improve water quality and reduce peak storm flows, the project would not result in any significant adverse impacts to wastewater treatment or sanitary or stormwater conveyance infrastructure. ✷



Stormwater Best Management Practices Concept Plan

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Figure 12-5