

A. INTRODUCTION

This chapter considers the potential for the proposed actions to result in a significant adverse impact on the City’s water supply and wastewater and stormwater conveyance and treatment system. As described in Chapter 1, “Project Description,” the proposed actions would facilitate the construction of five new high-rise buildings and ground level retail space (the “proposed project”) on the proposed development site. The new buildings would be constructed on portions of the property that are currently vacant or contain one-story retail structures. In addition, one site not owned by the applicant but located within the rezoning area is being analyzed as a projected future development site: Block 1730, Lot 65.

According to the 2014 *City Environmental Quality Review (CEQR) Technical Manual*, projects that increase density or change drainage conditions on a large site require a water and sewer infrastructure analysis. Developments that would result in an exceptionally large demand for water (more than one million gallons per day [gpd]) or that are in an area that experiences low water pressure require an analysis of potential impacts on the water supply system. As described in more detail below, the rezoning area is not in an area that experiences low water pressure, and would not result in a demand for water of more than one million gpd; therefore, the proposed actions do not warrant an analysis of water supply.

Developments in a combined sewer area in Manhattan exceeding incremental development thresholds of 1,000 dwelling units (DUs) or 250,000 square feet (sf) of commercial, public facility, institutional and/or community facility space require an analysis of potential impacts on the wastewater and stormwater conveyance and treatment system. The rezoning area is in an area of Manhattan that is served by a combined sewer system, and the proposed actions would result in the development of approximately 1,711 DUs, approximately 135,500 gross square feet (gsf) of retail, and 15,055 gsf of community facility use within the rezoning area. Therefore, following the guidelines of the *CEQR Technical Manual*, an analysis of the proposed actions’ potential impacts on the wastewater and stormwater conveyance and treatment system was performed.

PRINCIPAL CONCLUSIONS

The analysis finds that the proposed actions are not anticipated to result in a significant adverse impact on the City’s water supply or wastewater and stormwater conveyance and treatment infrastructure. The proposed actions would result in an increase in water consumption and sewage generation within the rezoning area as compared with the No Action condition. While the proposed actions would result in an incremental water demand of 564,360 gpd, this would not represent a significant increase in demand on the New York City water supply system. An analysis of water supply is not warranted since it is expected that there would be adequate water service to meet the incremental demand, and there would be no significant adverse impacts on the City’s water supply.

While the proposed project would generate 619,896 gpd of sanitary sewage, an increase of 301,938 gpd above the No Action condition, this incremental increase in sewage generation would be approximately 0.3 percent of the average daily flow at the Wards Island Wastewater Treatment Plant (WWTP) and would not result in an exceedance of the plant's permitted capacity.

The overall volume of stormwater runoff and the peak stormwater runoff rate from the rezoning area is expected to decrease due to the replacement of impervious surface parking with approximately 3.6 acres of landscaped green space. In addition, with the incorporation of selected stormwater source control best management practices (BMPs) that would be required as part of the site connection approval process, subject to the review and approval by DEP, the peak stormwater runoff rates would be further reduced.

B. METHODOLOGY

WATER SUPPLY

The *CEQR Technical Manual* recommends a preliminary water analysis if a project would result in an exceptionally large demand for water (over one million gpd), or is located in an area that experiences low water pressure (i.e., in an area at the end of the water supply distribution system such as the Rockaway Peninsula or Coney Island). The rezoning area is not in an area that experiences low water pressure. While the proposed actions would result in an incremental water demand of 564,360 gpd, this would not represent a significant increase in demand on the New York City water supply system. Therefore, an analysis of water supply is not warranted since it is expected that there would be adequate water service to meet the incremental demand, and there would be no significant adverse impacts on the City's water supply.

WASTEWATER AND STORMWATER CONVEYANCE AND TREATMENT

As described above, the rezoning area is in a combined sewer area in Manhattan, and the development facilitated by the proposed actions would exceed the *CEQR Technical Manual* threshold of 1,000 residential units. Therefore, this chapter includes an analysis of the potential impacts on the wastewater and stormwater conveyance and treatment system from the proposed actions. Existing and future water demand and sanitary sewage generation are calculated based on use rates set by the *CEQR Technical Manual*.¹ The DEP Flow Volume Calculation Matrix is used to calculate the overall combined sanitary sewage and stormwater runoff volume discharged to the combined sewer system for four rainfall volume scenarios with varying durations. The ability of the City's sewer infrastructure to handle the anticipated demand from the proposed actions is assessed by estimating existing sewage generation rates and comparing these existing rates with the With Action condition, per *CEQR Technical Manual* methodology.

C. EXISTING CONDITIONS

CONVEYANCE SYSTEM

The rezoning area is in a part of New York City served by a combined sewer system that collects both sanitary sewage and stormwater. The rezoning area is served by sewer lines running along Lenox Avenue, Fifth Avenue, 132nd Street, and 135th Street. Sewer lines run under Lenox

¹ *CEQR Technical Manual*, March 2014, Table 13-2.

Avenue north to East 142nd Street into Regulator WI-041, and from 135th and 132nd Streets into a line running east along East 135th Street into Regulator WI-038. Regulators are structures that control the flow of sewage to interceptors, i.e., larger sewers that connect the combined sewer system to the City's sewage treatment system. From Regulators WI-041 and WI-038, flow is conveyed to an interceptor that connects to the Wards Island WWTP, one of the city's 14 WWTPs, during high flow volumes sewage from the rezoning area would be conveyed to the regulators and then through outfalls into the Harlem River.

At the Wards Island WWTP, wastewater is treated by physical and biological processes before it is discharged into the East River. The quality of the treated wastewater (effluent) is regulated by a State Pollutant Discharge Elimination System (SPDES) permit issued by the New York State Department of Environmental Conservation (DEC), which establishes limits for effluent parameters (i.e., suspended solids, fecal coliform bacteria, and other pollutants). Since the volume of flow to a WWTP affects the level of treatment a plant can provide, the maximum permitted capacity for the Wards Island WWTP is 275 million gallons per day (mgd). The average monthly flow to the WWTP is 202 mgd², which is well below the maximum permitted capacity.

In periods of dry weather, the combined sewers (sized to convey an amount of sanitary sewage that is based on density levels according to zoning regulations) in the adjacent streets convey only sanitary sewage. During and immediately after wet weather, combined sewers can experience a much larger flow due to stormwater runoff collection. To control flooding at the Wards Island WWTP, the regulators built into the system allow only approximately two times the amount of design dry weather flow into the interceptors. The interceptor then takes the allowable flow to the WWTP, while the excess flow is discharged to the nearest waterbody as combined sewer overflow (CSO). The rezoning area is located within two CSO drainage areas: in wet weather, sanitary flow and stormwater runoff is conveyed to CSO outfalls WI-038 and WI-041, located along the Harlem River bulkhead.

SANITARY FLOWS

As described in Chapter 1, “Project Description,” the rezoning area currently contains the Lenox Terrace apartment complex, which comprises six, 16-story residential towers with a total of 1,716 DUs (approximately 1,447,500 gsf); five one-story buildings with approximately 77,835 gsf of retail use, and approximately 457 at-grade accessory parking spaces. In addition to the uses that comprise the Lenox Terrace complex, the rezoning area contains three buildings with approximately 32,806 gsf of community facility space. For purposes of analysis, the amount of sanitary sewage is estimated as all water demand generated by the occupied portions of the rezoning area, excepting water used by air conditioning, which is typically not discharged to the sewer system. As shown on **Table 10-1**, the rezoning area currently generates an estimated 313,681 gpd of sanitary sewage with a total water demand of 578,565 gpd.

STORMWATER FLOWS

The rezoning area has a total surface area of approximately 626,600 sf (14.38 acres). **Table 10-2** summarizes the existing surface coverage of the rezoning area, as well as the weighted runoff coefficient (the fraction of precipitation that becomes surface runoff).

² 12-month period through March 2017, the most recent available data.

Table 10-1
Existing Water Consumption and Sewage Generation

Use	Square Feet / Persons	Rate*	Consumption (gpd)
Residential			
Domestic	2,917 persons	100 gpd/ person	291,720
Air Conditioning	1,447,500	0.17 gpd/ psf	246,075
Retail (UG 6)			
Domestic	77,835 gsf	0.24 gpd/sf	18,680
Air Conditioning	77,835 gsf	0.17 gpd/sf	13,232
Community Facility			
Domestic	32,806	0.10 gpd/ sf	3,281
Air Conditioning	32,806	0.17 gpd/ sf	5,577
Total Water Supply Demand			578,565
Total Sewage Generation			313,681

Notes: * Rates are from the *CEQR Technical Manual*, Table 13-2.

Table 10-2
Existing Surface Coverage

Affected CSO Outfall	Surface Type	Roof	Pavement and Walkways	Other	Grass and Soft Scape	Total
WI-041	Area (percent)	64.8%	20.8%	0.0%	14.5%	100%
	Surface Area (acres)	1.44	0.46	0.00	0.32	2.22
	Runoff Coefficient*	1	0.85	0.85	0.20	0.85
WI-038	Area (percent)	22.4%	64.5%	0.0%	13.1%	100%
	Surface Area (acres)	2.73	7.84	0.0	1.59	12.16
	Runoff Coefficient*	1.00	0.85	0.85	0.20	0.81

Notes: * Weighted Runoff Coefficient calculations based on the DEP Flow Volume Calculation Matrix provided in the *CEQR Technical Manual*

D. FUTURE WITHOUT THE PROPOSED PROJECT

As described in Chapter 1, “Project Description,” it is assumed that the rezoning area would continue in its current condition in the No Action condition, with the exception that currently vacant retail space on the proposed development site would likely be re-tenanted depending upon market conditions. Re-tenanting of existing retail, including storefronts vacant in the existing condition, would increase the total retail on site by 17,820 sf to 95,655 sf. As detailed in **Table 10-3**, this increase in occupied retail would increase domestic water demand by 4,277 gpd and air conditioning water demand by 3,029 gpd. While it has been reported that the Metropolitan AME Church on the projected future development site could be redeveloped independent of the proposed actions, the No Action condition assumes that this site would continue in its current condition.

CONVEYANCE SYSTEM

In the No Action condition, there would be no changes to the wastewater conveyance system serving the rezoning area. Wastewater would continue to be conveyed to Regulators WI-041 and WI-038 and the Wards Island WWTP, and CSO would continue to be discharged to the Harlem River through outfalls WI-038 and WI-041.

Table 10-3
No Action Water Consumption and Sewage Generation

Use	Square Feet / Persons	Rate*	Consumption (gpd)
Residential			
Domestic	2,917 persons	100 gpd/ person	291,720
Air Conditioning	1,447,500	0.17 gpd/ psf	246,075
Retail (UG 6)			
Domestic	95,655 gsf	0.24 gpd/sf	22,957
Air Conditioning	95,655 gsf	0.17 gpd/sf	16,261
Community Facility			
Domestic	32,806	0.10 gpd/ sf	3,281
Air Conditioning	32,806	0.17 gpd/ sf	5,577
Total Water Supply Demand			585,871
Total Sewage Generation			317,958

Notes: * Rates are from the CEQR Technical Manual, Table 13-2.

SANITARY FLOWS

Table 10-3 above summarizes the water demand and sewage generation for the No Action condition. In the No Action condition, the rezoning area is expected to generate an estimated 317,958 gpd of daily sanitary sewage with a total water demand of 585,871 gpd.

STORMWATER FLOWS

As no changes to the rezoning area are anticipated in the No Action condition, impervious surface coverage and stormwater flows are expected to be the same as those found in the existing condition. As a result, the weighted runoff coefficient of the rezoning area is expected to remain 0.85 for WI-041, and 0.81 for WI-038 as calculated in the existing condition.

E. FUTURE WITH THE PROPOSED PROJECT

In the future with the proposed actions, the proposed development site would be redeveloped with a mix of uses including approximately 1,430,258 gsf of new residential use (approximately 1,642 new DUs); approximately 135,500 gsf of commercial space; approximately 15,055 gsf of community facility space; and approximately 5.59 acres of private open space. In addition, it is anticipated that the projected future development site would be redeveloped with approximately 58,550 gsf of new residential use (approximately 69 new DUs) and approximately 6,968 gsf of replacement community facility space. The other site within the rezoning area the Hansborough Recreational Center would remain as in the existing/No Action condition.

CONVEYANCE SYSTEM

In the With Action condition, the proposed development sites would utilize the existing combined sewers along West 135th and West 132nd Streets. If needed, the proposed development sites could also utilize the existing combined sewer along Fifth Avenue. Wastewater would be conveyed to WI-038, and ultimately to the Wards Island WWTP, and CSO would continue to be discharged to the Harlem River. Regulator WI-041 does not have the capacity for additional flow.

SANITARY FLOWS

Table 10-4 summarizes the water demand and sewage generation of the proposed actions, which includes residential, retail, and community facility space. The proposed actions are expected to generate an estimated 619,896 gpd of daily sanitary sewage with a total water demand of 1,150,231 gpd.

Table 10-4
With Action Water Consumption and Sewage Generation

Use	Floor Area/Units/Persons	Rate ¹	Consumption (gpd)
Residential			
Domestic	5,826 persons ²	100 gpd/person	582,590
Air Conditioning	2,936,258 gsf	0.17 gpd/sf	499,164
Retail			
Domestic	135,500	0.24 gpd/sf	32,520
Air Conditioning	135,500	0.17 gpd/sf	23,035
Community Facility			
Domestic	47,816	0.10 gpd/sf	4,786
Air Conditioning	47,816	0.17 gpd/sf	8,136
Total Water Supply Demand			1,150,231
Total Sewage Generation			619,938

Notes:

¹ Rates are from the *CEQR Technical Manual*, Table 13-2.

² Residential population based on Census Tract 212 average household size of 1.7 persons per household, applied to the total number of DUs in the 2026 With Action condition (3,427 units).

The incremental sanitary sewage generated by the proposed actions, as compared with the No Action condition, would be 301,938 gpd. This incremental increase in sewage generation would be approximately 0.3 percent of the average daily flow at the Wards Island WWTP (202 mgd) and would not result in an exceedance of the plant's permitted capacity of 275 mgd. In accordance with the New York City Plumbing Code (Local Law 33 of 2007), the development facilitated by the proposed actions would be required to utilize low-flow plumbing fixtures, which would reduce sanitary flows to the plant. Therefore, the proposed actions would not result in a significant adverse impact to the City's sanitary sewage conveyance and treatment system.

A hydraulic analysis of the existing sewer system will be needed at the time of the submittal of the site connection proposal application to determine whether the existing sewer system is capable of supporting higher density development and related increase in wastewater flow. If it is determined at that time that the existing sewer system is incapable of supporting the increase in wastewater flow the existing sewer system will need to be upgraded. In addition, the existing drainage plan will need to be amended.

STORMWATER FLOWS

As described above, the proposed actions would facilitate the development of five new mixed-use buildings on the proposed development site and the potential development of a new mixed-use building on the projected future development site. These buildings would increase the impervious surface coverage within the rezoning area. In addition, the proposed project would introduce landscaped privately accessible open spaces within the proposed development site, replacing paved surface parking areas. Other impervious surfaces within the rezoning area are expected to remain as described in the existing and No Action condition. With the overall increase in landscaped surface areas, the weighted runoff coefficient would decrease. The runoff

Chapter 10: Water and Sewer Infrastructure

coefficient for regulator WI-041 would decrease from 0.85 to 0.72 in the With Action condition, and the runoff coefficient for Regulator WI-038 would decrease from 0.81 to 0.64 in the With Action condition. **Table 10-5** summarizes the proposed actions' surface coverage and the weighted runoff coefficient.

Table 10-5
Surface Coverage in With Action Condition

Affected CSO Outfall	Surface Type	Roof	Pavement and Walkways	Grass and Soft Scape	Total
WI-041	Area (percent)	49.7%	18.5%	31.8%	100%
	Surface Area (acres)	1.10	0.41	0.71	2.22
	Runoff Coefficient*	1.00	0.85	0.20	0.72
WI-038	Area (percent)	35.5%	24.4%	40.1%	100%
	Surface Area (acres)	4.31	2.97	4.88	12.16
	Runoff Coefficient*	1.00	0.85	0.20	0.64
Notes: * Weighted Runoff Coefficient calculations based on the DEP Flow Volume Calculation Matrix provided in the 2014 CEQR Technical Manual. Totals may not sum due to rounding.					

Using these sanitary and stormwater flow calculations, the DEP Flow Volume Calculation Matrix was completed for the existing conditions and the With Action condition. The calculations from the Flow Volume Calculation Matrix help to determine the change in wastewater flow volumes to the combined sewer system from existing to With Action conditions, and include four rainfall volume scenarios with varying durations. The summary tables of the Flow Volume Calculation Matrix are included in **Table 10-6**.

Table 10-6
DEP Flow Volume Matrix: No Action and With Action Volume Comparison

Rainfall Volume (in.)	Rainfall Duration (hr.)	Runoff Volume to Direct Drainage (MG)	Runoff Volume to CSS (MG)*	Sanitary Volume to CSS (MG)	Total Volume to CSS (MG)	Runoff Volume to River (MG)	Runoff Volume to CSS (MG)*	Sanitary Volume to CSS (MG)	Total Volume to CSS (MG)	Increased Total Volume to CSS (MG)*
WI-041		Existing				With Action				WI-041 Increment
0.00	3.80	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	
0.40	3.80	0.00	0.02	0.01	0.03	0.00	0.02	0.01	0.03	0.00
1.20	11.30	0.00	0.06	0.02	0.09	0.00	0.05	0.04	0.10	0.01
2.50	19.50	0.00	0.13	0.04	0.18	0.00	0.11	0.08	0.18	0.02
WI-038		Existing				With Action				WI-038 Increment
0.00	3.80	0.00	0.00	0.04	0.04	0.00	0.00	0.08	0.08	
0.40	3.80	0.00	0.11	0.04	0.15	0.00	0.08	0.08	0.17	0.02
1.20	11.30	0.00	0.32	0.13	0.45	0.00	0.25	0.24	0.50	0.05
2.50	19.50	0.00	0.67	0.22	0.89	0.00	0.53	0.42	0.95	0.06
Notes: * Assumes no on-site detention or BMPs for purposes of calculations. CSS = Combined Sewer System; MG = Million Gallons. Totals may not sum due to rounding.										

As shown in **Table 10-6**, in all rainfall volume scenarios flow to CSO outfalls would increase. The increase in flow is attributable to the increase in sanitary flow resulting from the proposed actions. As described above, due to the increase in landscaped areas on the proposed development site, the proposed actions would result in a reduction in fully impervious surface area, despite the increase in total rooftop area.

Lenox Terrace

The Flow Volume Matrix calculations do not reflect the use of any sanitary and stormwater source control BMPs to reduce sanitary flow and stormwater runoff volumes to the combined sewer system. As noted above, the development facilitated by the proposed actions would incorporate low-flow plumbing fixtures to reduce sanitary flow in accordance with the New York City Plumbing Code. In addition, stormwater BMPs would be required as part of the DEP site connection approval process in order to comply with the required stormwater release rate. Specific BMP methods would be determined with further refinement of the building design and in consultation with DEP, but may include on-site stormwater detention systems such as planted rooftop spaces (“green roofs”) and/or vaults.

The incorporation of sanitary flow and stormwater source control BMPs that would be required as part of the site connection approval process, with the review and approval of DEP, would reduce the overall volume of sanitary sewer discharge as well as the peak stormwater runoff rate from the rezoning area. Sewer conveyance near the rezoning area and the treatment capacity at the Wards Island WWTP is sufficient to handle wastewater flow resulting from the proposed actions. Therefore, it is anticipated that the proposed actions would not result in any significant adverse impact on wastewater treatment or stormwater conveyance infrastructure. *