Chapter 10: Water and Sewer Infrastructure

A. INTRODUCTION

This chapter evaluates the potential for the proposed actions to result in significant adverse impacts on the City's water supply, as well as its wastewater and stormwater conveyance and treatment infrastructure.

The proposed actions would result in the redevelopment of the parcels controlled by the applicant—Block 1104, Lots 31, 40, 44 and 55 (the "proposed project site" or "development site 1")—with a mixed-use, primarily residential building with three basement levels containing, utility space, amenity space, and parking and other potential auto-related uses. The proposed actions may also result in redevelopment of one additional site that is not applicant-controlled (Block 1104, Lots 25 and 29—"development site 2") with a hotel. No changes as a result of the proposed action are anticipated for a third parcel located within the rezoning area (Block 1104, Lot 36), which is not controlled by the applicant.

As discussed in Chapter 1, "Project Description," each technical area in this EIS considers either RWCDS 1 or RWCDS 2 as the option that has the greatest potential to result in significant adverse impacts. Preliminary calculations for this analysis have shown that RWCDS 2 would generate a larger demand for water supply and sewer services than RWCDS 1, and therefore that scenario is analyzed throughout this chapter in terms of its potential to result in significant adverse impacts on water supply and sewer systems. For analysis purposes, RWCDS 2 is assumed to include on development site 1 approximately 848 residential units, up to 500 parking spaces, 185,000 gsf of hotel (285 rooms), 35,000 gsf of local retail, 75,000 gsf of destination retail, and 30,000 gsf of medical office space. In addition, RWCDS 2 is assumed to include the 117,612 gsf hotel (with approximately 181 rooms) on development site 2.

PRINCIPAL CONCLUSIONS

The uses under RWCDS 2 would increase the project site's water consumption, sewage generation, and stormwater runoff as compared to conditions in the future without the proposed actions. However, the analysis finds that the proposed actions would not result in any significant adverse impacts on the City's water supply, wastewater or stormwater conveyance and treatment infrastructure.

SANITARY SEWAGE

By the 2017 analysis year, RWCDS 2 would generate an incremental 281,160 gpd of sanitary sewage over the future without the proposed actions. This incremental increase in the volume of sanitary flow to the combined sewer system would represent approximately 0.23 percent of the average daily flow to the North River Wastewater Treatment Plant (North River WWTP). This volume would not result in an exceedance of the North River WWTP's capacity, as per the plant's State Pollutant Discharge Elimination System (SPDES) permit, and therefore would not create a significant adverse impact on the City's sewage conveyance or treatment systems.

STORMWATER

The overall volume of stormwater runoff and the peak stormwater runoff rate from the project site is anticipated to increase slightly, due to the replacement of a paved portion of Block 1104, Lot 31 (approximately 8,000 sf) with more impervious building rooftop. With the incorporation of selected best management practices (BMPs) that would be required as a part of the site connection approval process and reviewed and approved by DEP and included as part of a Restrictive Declaration to be recorded, the peak stormwater runoff rates would be reduced compared to the future without the proposed actions. Overall, the proposed actions would not have a significant impact on the City's sewage conveyance or treatment systems.

B. METHODOLOGY

This analysis follows the methodologies set forth in the *City Environmental Quality Review* (*CEQR) Technical Manual* (June 2012). According to the *CEQR Technical Manual,* a preliminary water analysis is needed if a project would result in an exceptionally large demand of water (over 1,000,000 gpd), 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 project site is not located in an area that experiences low water pressure and RWCDS 2 would generate an incremental water demand of 427,919 gallons per day (gpd) as compared to the future without the proposed actions. While this would represent an increase in demand on the New York City water supply system, it does not meet the *CEQR Technical Manual* threshold requiring a detailed analysis. Therefore, an analysis of water supply is not warranted. It is expected that there would be adequate water service to meet the incremental water demand, and that there would be no significant adverse impacts on the City's water supply.

The *CEQR Technical Manual* indicates that a preliminary sewer analysis is warranted if a project site is over 5 acres and would result in an increase of impervious surface; or if a project is located in a combined sewer area in Manhattan and would result in the incremental development of 1,000 residential units or 250,000 sf of commercial, public facility and institution and/or community facility space. RWCDS 2 would result in a development of 848 residential units, which is technically below the preliminary analysis threshold. However, because RWCDS 2 would also result in the development of a total of 466 hotel rooms (with hotel rooms generating equal or greater demand for water and sewer services than residential units), a preliminary sewer analysis was conducted as a conservative measure to ensure that sufficient sewer capacity exists.

Existing and future water demands and sanitary sewage generation are calculated based on use generation rates set by the *CEQR Technical Manual*.[1] The New York City Department of Environmental Protection (DEP) Flow Volume Calculation Matrix is then 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 RWCDS 2 is assessed by estimating existing sewage generation rates, and then comparing these existing rates to the future with and without the proposed actions, per *CEQR Technical Manual* methodology.

[1] *CEQR Technical Manual*, June 2012, p.13-12.

C. EXISTING CONDITIONS

SEWER SYSTEM

The proposed rezoning area is located in a part of New York City served by a combined sewer system that collects both sanitary sewage and stormwater. In periods of dry weather, the combined sewers in the adjacent streets (which are sized to convey an amount of sanitary sewage that is based on zoning regulations) convey only sanitary sewage. Sanitary sewage from the proposed rezoning area is conveyed via combined sewers in the abutting West 56th and 57th Streets to Regulators NR-N30 and NR-N31. Regulators are structures that control the flow of sewage to interceptors, larger sewers that connects the combined sewer system to the city's sewage treatment system; the nearest interceptor runs under Eleventh Avenue.

From there, flow is conveyed to the North River WWTP. At the WWTP, wastewater is fully treated by physical and biological processes before it is discharged into the Hudson River. The quality of the treated wastewater (effluent) is regulated by a SPDES permit issued by the New York State Department of Environmental Conservation (DEC). The SPDES permit establishes limits for effluent parameters (i.e. suspended solids, fecal coliform bacteria, 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 North River WWTP is 170 mgd. The average monthly flow over the past 12 months is 113 mgd, well below the maximum permitted level.

During and immediately after wet weather, combined sewers can experience a much larger flow due to stormwater runoff collection. To control flooding at the North River WWTP the regulators built into the system to allow only approximately two times the amount of design dry weather flow into the interceptors. The interceptor then takes the allowable flow to the North River WWTP, while the excess flow is discharged to the nearest waterbody as combined sewer overflow (CSO). The rezoning area lies within one CSO drainage area: in wet weather, sanitary flow and stormwater runoff is conveyed to CSO outfall NR-035, located at the foot of West 58th Street.

SANITARY FLOWS (DRY WEATHER)

For purposes of this analysis, the amount of sanitary sewage is conservatively estimated as all water demand generated by existing uses on development sites 1 and 2 (see **Table 10-1**), except that used by air conditioning, which is typically not discharged to the sewer system. The estimated amount of daily sanitary sewage currently generated is approximately 23,254 gpd.

STORMWATER FLOWS (WET WEATHER)

Development sites 1 and 2 total approximately 96,688 sf (2.22 acres), with surface area comprising largely building rooftops. **Table 10-2** describes the surfaces and surface areas; the weighted runoff coefficient (the fraction of precipitation that becomes surface runoff) for each surface type is also listed in **Table 10-2**.

Table 10-1
Existing Water Consumption and Sewage Generation

Use	Unit	Size (GSF)	Rate	Consumption (gallons per day)
Residential				
Domestic	-	-	100 gpd/person	-
Air Conditioning	-	-	0.17 gpd/sf	-
Retail				
Domestic	-	60,800	0.24 gpd/sf	14,592
Air Conditioning	-	60,800	0.17 gpd/sf	10,336
Commercial/Office				
Domestic	-	86,624[1]	0.10 gpd/sf	8,662
Air Conditioning	-	86,624[1]	0.17 gpd/sf	14,726
Hotel				
Domestic	-	-	120 gpd/person/room	-
Air Conditioning	-	-	0.17 gpd/sf	-
School				
Domestic	-	-	10 gpd/person	-
Air Conditioning	-	-	0.17 gpd/sf	-
			Total water supply demand	**48,316**
			Total sewage generation	**23,254**

Notes: (1) Assumes some office space associated with the parking garage on Block 1104 Lot 44.
Source: Rates from *CEQR Technical Manual* (June 2012 edition).

Table 10-2
Existing Surface Coverage

Affected CSO Outfall	Surface Type	Roof	Pavement	Other	Grass	TOTAL
NR-035	**Area**	92%	8%	0%	0%	**100%**
	Surface Area (sq. ft.)[1]	88,778	7,910	0	0	**96,688**
	Runoff Coefficient	1.00	0.85	0.70	0.20	**0.99**

Notes: Weighted Runoff Coefficient calculations based on the DEP Flow Volume Calculation Matrix provided in the 2012 *CEQR Technical Manual*.
Sources: AKRF, 2012

D. THE FUTURE WITHOUT THE PROPOSED ACTIONS

In the future without the proposed actions, the project site and rezoning area are assumed to continue in active use as under existing conditions.

E. PROBABLE IMPACTS OF THE PROPOSED ACTIONS

SEWER SYSTEM AND WWTP TREATMENT CAPACITY DEMAND

Table 10-3 shows the estimated water consumption and sewage generation under RWCDS 2. For purposes of analysis, the amount of sanitary sewage resulting from these uses is conservatively estimated as all water demand, except water used by air conditioning, since this water is typically not discharged to the sewer system.

The estimated amount of sanitary sewage generated by RWCDS 2 would be 281,160 gpd of sanitary flow generated from domestic water use (i.e., regular tap water use). The incremental sanitary sewage generated (compared to conditions in the future without the proposed actions) would be 257,906 gpd. This amount would represent approximately 0.23 percent of the average

Table 10-3
Water Consumption and Sewage Generation under RWCDS 2

Use	Unit	Size (Square feet)	Rate	Consumption (gallons per day)
Residential				
Domestic	848 apartments	-	100 gpd/person	139,920[1]
Air Conditioning	-	704,250	0.17 gpd/sf	119,723
Retail				
Domestic	-	110,000	0.24 gpd/sf	26,400
Air Conditioning	-	110,000	0.17 gpd/sf	18,700
Commercial/Office				
Domestic	-	30,000	0.10 gpd/sf	3,000
Air Conditioning	-	30,000	0.17 gpd/sf	5,100
Hotel				
Domestic	466 rooms	-	120 gpd/person/room	111,840
Air Conditioning	-	303,250	0.17 gpd/sf	51,553[2]
School				
Domestic	-	-	10 gpd/person	-
Air Conditioning	-	-	0.17 gpd/sf	-
			Total water supply demand	**476,235**
			Total sewage generation	**281,160**

Note: (1) Calculation uses 1.65 as the average household size in Manhattan's Community District 4
(2) Per *CEQR*, assumes average occupancy of 2 people per room.
Source: Rates from *CEQR* Technical Manual (June 2012 edition).

daily flow of 113 mgd at the North River WWTP, and would not result in an exceedance of the plant's permitted capacity, which is 170 mgd. Therefore, the proposed actions would not create a significant adverse impact on the City's sanitary sewage conveyance and 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 any new buildings.

STORMWATER FLOWS

As a result of the proposed actions, the weighted runoff coefficient of CSO outfall subcatchment areas NR-035 would increase slightly, since the project site would be completely covered with impervious building rooftops, including the portion of Block 1104, Lot 31 that is currently paved with asphalt (see **Table 10-4** for incremental changes to the weighted runoff coefficients**)**.

Table 10-4
Existing Surface Coverage

Affected CSO Outfall	Surface Type	Roof	Pavement	Other	Grass	TOTAL
NR-035	**Area**	100%	0%	0%	0%	**100%**
	Surface Area (sq. ft.)[1]	96,688	0	0	0	**96,688**
	Runoff Coefficient	1.00	0.85	0.70	0.20	**1.00**

Notes: Weighted Runoff Coefficient calculations based on the DEP Flow Volume Calculation Matrix provided in the 2012 *CEQR Technical Manual*.
Sources: AKRF, 2012

Using these sanitary and stormwater flow calculations, the DEP Flow Volume Calculation Matrix was completed for the existing conditions and conditions with the proposed actions (the "Build" 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 Build conditions. The Flow Volume Calculation Matrix includes four rainfall volume

scenarios with varying durations. The summary tables, taken from the DEP Flow Volume Calculation Matrix, are included in **Table 10-5**.

Table 10-5
DEP Flow Volume Matrix:
Existing and Build Volume Comparison

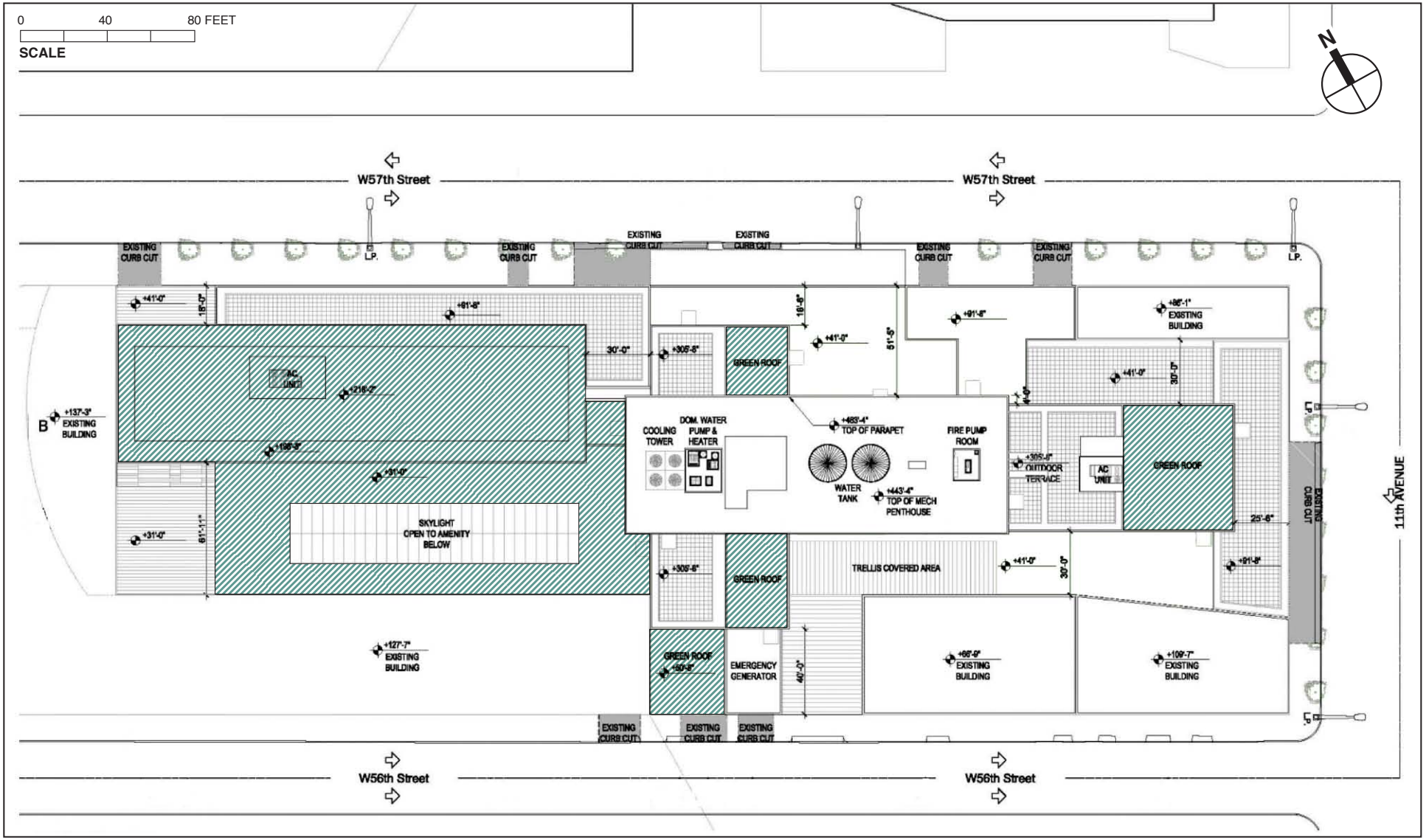
Rainfall Volume (in.)	Rainfall Duration (hr.)	Runoff Volume Direct Drainage (MG)	Runoff Volume To CSS** (MG)	Sanitary Volume To CSS (MG)	Total Volume To CSS (MG)	Runoff Volume To River (MG)	Runoff Volume To CSS** (MG)	Sanitary Volume To CSS (MG)	Total Volume To CSS (MG)	Increased Total Volume to CSS** (MG)	Percent Increase From Existing Conditions (%)
NR-035		Existing				Build				NR-035 Increment	
		96,688 / 2.22 Acres				96,688 / 2.22 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	0.00	0.02	0.00	**0.03**	0.00	0.02	0.04	**0.07**	0.04	150%
1.20	11.30	0.00	0.07	0.01	**0.08**	0.00	0.07	0.13	**0.20**	0.12	148%
2.50	19.50	0.00	0.15	0.02	**0.17**	0.00	0.15	0.23	**0.38**	0.21	126%

Notes:
* Percent increase computed for rainfall events only.
** Assumes no on-site detention/BMPs for purposes of calculations
CSS = Combined Sewer System; MG = Million Gallons

As shown in **Table 10-5**, the percent increase for each subcatchment area is more than double the amount shown under the existing conditions. The majority of this increase in flow is due to the addition of sanitary flow, since RWCDS 2 would add sanitary flow to a site where little flow is currently generated; in the future with the proposed actions, the amount of completely impervious surface on the site will also increase slightly.

However, the Flow Volume Matrix calculations do not reflect the use of any sanitary and stormwater source control best management practices (BMPs) to reduce sanitary and stormwater runoff volumes to the combined sewer system. BMPs would be required as a part of the DEP site connection approval process; for example, low-flow fixtures would be used to reduce water consumption and sanitary sewer discharges. The proposed project would incorporate onsite stormwater source controls, which would retain and release stormwater with a slowed discharge rate to control peak runoff rates. As an illustrative example, **Figure 10-1** shows portions of the project's roof that would be suitable for the installation of green roof. Other portions of the roof would be used for standard controlled-flow drainage. The design of the green roof, and other chosen stormwater control BMPs, would achieve an overall release rate of 0.25 cfs or 10 percent of DEPs allowable flow rate (whichever is greater) from the proposed project site. Based upon the approximately 80,000 square feet of area available for controlled flow roof drainage, retention tanks are not anticipated to be required.

Therefore, with the incorporation of appropriate BMPs that would be required as a part of the site connection approval process and reviewed and approved by DEP and may be included as part of a Restrictive Declaration, the overall volume of sanitary sewer discharge and stormwater runoff, and the peak stormwater runoff rate would be reduced. As sewer conveyance near the project site and wastewater treatment capacity at the North River WWTP is sufficient to handle wastewater flow that would result from the proposed actions, there would not be any significant adverse impacts on wastewater treatment or stormwater conveyance infrastructure. ✷



Area of Project Roof with Complete or Partial Green Roof Coverage

Note: For Illustrative Purposes Only

NOTE:
The selected BMPs will be designed to achieve 0.25 cubic feet per second (cfs) or 10% allowable flow discharge rate, whichever is greater. Other BMPs not identified in this plan could be implemented to achieve the required discharge rate, as approved by DEP.

Stormwater Best Management Practices Concept Plan

606 WEST 57TH STREET

Figure 10-1