Chapter 13: Infrastructure

A. INTRODUCTION

This chapter evaluates the potential impacts of the Proposed Project on New York City's infrastructure, including its water supply, sanitary sewage treatment, and stormwater discharge systems. The project site discharges into a combined sanitary and stormwater sewer system that conveys sanitary and stormwater flows to the North River Water Pollution Control Plant (WPCP). The North River WPCP is owned, operated, and maintained by the New York City Department of Environmental Protection (DEP), and is located along the Hudson River in Manhattan, north of the project site.

The Proposed Project would generate new demand on infrastructure services, including water supply and sanitary sewage. The Proposed Project's stormwater management system would redirect runoff from the site away from the combined sewer system and into a new, separate storm sewer system.

The Reasonable Worst Case Development Scenario (RWCDS) for the infrastructure analysis assumes a mix of uses that maximizes hotel uses. Therefore, the analysis is based on RWCDS 2 (see Chapter 1, "Project Description"), which assumes 2,100 residential units, 1,159 hotel rooms, 151,598 gross square feet (gsf) of community facility (public school), 244,036 gsf of retail, 52,209 gsf of office, and 276,011 gsf of auto showroom, 1,800 below-grade parking spaces, and 2.75 acres of privately owned, publicly accessible open space.

PRINCIPAL CONCLUSIONS

The Proposed Project would not result in any significant adverse impacts related to infrastructure in terms of water supply, sanitary sewage, or stormwater runoff.

WATER SUPPLY

Water demands of the Proposed Project would not overburden the city's water supply system. Based on the *New York City Environmental Quality Review (CEQR) Technical Manual*, the 1,341,172 gallons per day (gpd) of total water demand from the Proposed Project (which represents about 0.13 percent of the city's water demand) would not adversely affect the capacity of the city's water supply system in providing water to the Proposed Project site; nor would it impact water pressure for local users.

SANITARY SEWAGE AND STORMWATER

The North River WPCP is designed to treat a dry weather flow of 170 million gallons per day (mgd). Conservatively assuming an average flow of approximately 136 mgd to the North River WPCP in the year 2018 without the Proposed Project, the additional contribution of 810,811 gpd (0.81 mgd) with the Proposed Project (which is equivalent to approximately 0.5 percent of the current sewage flow handled by the North River WPCP) would be negligible and the average

flow to the North River WPCP would remain well within its New York State Pollution Discharge Elimination System (SPDES) permit limit of 170 mgd. In addition, the North River WPCP would continue to be able to meet the pollutant removal parameters of its SPDES permit.

Currently, runoff from the project site is discharged into the combined sewer. With the Proposed Project, all of the stormwater runoff would be discharged into the new separate stormwater system, which would discharge into the existing DEP outfall at the street end of West 66th street.

Due to the increase of sanitary sewage generaged on the project site, the volume of sanitary sewage discharged into the combined sewer system from the project site would increase. This would not adversely impact the North River WPCP, as there is sufficient capacity at regulator NR-N29A to accommodate the increase in sanitary flows from the Proposed Project. In addition, with new separate storm sewers, additional water conservation and stormwater management measures, and the considerable assimilative capacity of the Hudson River to quickly disperse pollutants, no significant adverse water quality impacts would be expected from the Proposed Project.

B. SUMMARY OF 1992 FEIS FINDINGS

The 1992 Final Environmental Impact Statement (FEIS) concluded that the Riverside South project would not result in any significant adverse impacts related to water supply, sanitary sewege or stormwater. It was determined that the increase in water demand from the Riverside South project would not significantly affect the city's ability to supply water reliably. To serve the water demand of the project, watermains would be constructed on the site of a size sufficient to meet the capacity needs of the project. With the proposed improvements, the projected demand would not produce any significant change in water pressure in the neighborhood. It was also concluded that both with and without the Riverside South project, the North River WPCP would meet the 170 mgd SPDES permit flow limit. The 1992 FEIS also noted that the Riverside South project would extend the city sewer system onto the project site, and that the sewers would be designed to accommodate the project's peak flows as well as any off-site flows passing through the site. There would be no impacts from these extensions of the system on the existing sewers serving the neighborhood, as the design of the sewers would account for all users. The Riverside South project also proposed a separate stormwater system. The stormwater collected by the separate storm lines would be discharged from an existing combined sewer outfall at West 66th Street (NR-N046) downstream of the regulator (NR-N29A) into the Hudson River. The stormwater from the site would not pass through the regulators and thus would not increase the stormwater flows to the regulators. All inlets to the stormwater collection system would contain catch basins equipped with hoods to prevent floatable material from discharging into the sewer. They would also contain drop sections to collect heavy material prior to discharge.

C. METHODOLOGY

The infrastructure assessment provided in this chapter describes existing infrastructure conditions, describes future conditions through 2018 under two No Build scenarios, and then presents the impacts of the Proposed Project. As discussed in Chapter 1 “Project Description,” this Supplemental EIS (SEIS) considers two different scenarios for developing the project site absent the proposed discretionary actions. Under No Build Scenario 1, Parcels L, M, and N would be developed according to the original 1992 FEIS program. Parcels L and M would be developed with residential buildings with office space and public parking. Parcel N would be

developed with a mix of retail, office, entertainment studio production, cinema, and parking uses. Under No Build Scenario 2, the original 1992 FEIS program would be completed for Parcels L and M, but Parcel N would remain in its current use.

The water supply assessment discusses current and future water demand from the project site based on rates from the *CEQR Technical Manual.* The water demand is compared to the total water demand on the New York City water supply system to determine if the water supply system would be adversely affected.

The sanitary sewage analysis focuses on the effects of increased sanitary flows to the North River WPCP. The areas of analysis include demonstrating that the flows do not exceed the permitted and design capacity of the WPCP or its ability to properly treat the sewage. In addition, total suspended solids (TSS) were analyzed to determine if the WPCP would remain within its permit limits for that parameter.

Current stormwater flows were determined based on the calculation methodology in the New York City DEP Rules and Regulations. In addition, as part of the 1992 FEIS, an Amended Drainage Plan was reviewed and approved by DEP. The Amended Drainage Plan established a separate stormwater system serving Parcels L, M, and N, except for 100 feet of street frontage along West End Avenue and West 59th Street. Based on the Amended Drainage Plan, the allowable flow into the stormwater system would be approximately 28 cubic feet per second (cfs). In accordance with the Amended Drainage Plan, the new storm sewer will be constructed in the street bed of 61st Street, to serve the parcels north of 61st Street (Parcels K1 and K2) and the development on Parcels L, M and N, south of 61st Street. An additional new storm sewer will be extended south along Riverside Boulevard (to approximately the location of the West 60th Street extension to the east) once development occurs on the northwest portion of the project site. These new storm sewers will connect to the separate stormwater system that is currently in place, which discharges into the Hudson River through the existing DEP outfall at the street end of 66th Street, downstream of Regulator NR-N29A (which is in the street bed of West 66th Street at Freedom Place).

The analysis assumes that in 2018, with and without the Proposed Project, Parcels L, M, and N would be served by this separate stromwater system. However, in 2018 with the Proposed Project, additional on-site stormwater detention would be in place on the Project Site. This would allow for the additional 100 feet of street frontage along West End Avenue and West 59th Street (which would otherwise drain to the combined sewers under West end Avenue and 59th Street) to be drained to the separate stormwater system.

The volumes of stormwater runoff and sanitary sewage discharged into the combined sewer system and the Hudson River were calculated for various storm events, using the Rational Formula. The areas served by the combined sewer system for Existing Conditions, for the two No Build Scenarios (see the "*Future Analysis Year and Baseline Conditions"* section of Chapter 1 "*Project Description*"), and for the Proposed Project were determined. Composite runoff coefficients were developed, and the volumes of runoff discharged into the combined sewer system from the Proposed Project and the Hudson River were compared to the No Build Scenarios.

D. EXISTING CONDITIONS

WATER SUPPLY

The New York City water supply system is composed of three watersheds—the Croton, the Delaware, and the Catskill—and extends as far north as the Catskill Mountains. During 2007, the system delivered just less than 1.1 billion gallons of water per day to its customers in the five boroughs and Westchester County. From these watersheds, water is carried to the city via a conveyance system composed of reservoirs, aqueducts, and tunnels extending as far as 125 miles north of the city. Within the city, a grid of water pipes distributes water to customers.

The Delaware and Catskill systems collect water from the Catskill Mountains and deliver it to the Hillview Reservoir in Yonkers. From there, it is distributed to the rest of the city through one of two tunnels: city Tunnel No. 1, which goes through the Bronx and Manhattan to Brooklyn, and city Tunnel No. 2, which goes through the Bronx, Queens, and Brooklyn (and from there through the Richmond Tunnel to Staten Island). A third tunnel, city Tunnel No. 3, is under construction, and the first portion became operational in August 1999 and serves Manhattan.

The Croton system collects water from Westchester and Putnam Counties and delivers it to the Jerome Park Reservoir in the Bronx. From there, it is distributed to the Bronx and Manhattan through the New Croton Aqueduct, which travels beneath the Bronx and Manhattan.

Water consumption in the city averages approximately 1.0 to 1.1 billion gallons per day. Average consumption in Manhattan is estimated at 400 mgd; peak consumption is approximately 500 mgd. The Croton system has a lower pressure than the Delaware and Catskill systems and supplies primarily to domestic users in the areas of lower elevation. The Delaware and Catskill systems serve the fire hydrants and domestic uses in areas where both systems exist.

Currently, the project site is served by 12-inch diameter water lines in West 59th Street. A 36-inch diameter water main is located under West End Avenue. According to DEP, there are no operational problems with the water distribution or pressure in the project site area. However, DEP has acknowledged that the existing 36 inch water main in West End Avenue is over 100 years old, and to improve the reliability of the water distribution system, the 36 inch water main in West End Avenue should be replaced at some time in the future. At present, there are no DEP capital replacement projects for West End Avenue.

As discussed in Chapter 1, "Project Description," the project site currently comprises an automobile and truck surface parking lot and a parking garage. The existing water demand at the site is therefore limited. Based on an estimate of approximately 15 employees currently working on Parcels L, M, and N, and using the water demand rate of 25 gallons per day per person from the *CEQR Technical Manual*, the current water demand for the project site is approximately 375 gpd.

WASTEWATER SYSTEM

Almost all sewers within the North River WPCP service area collect wastewater (both sanitary sewage and stormwater runoff) that comes from roof and street drainage. In dry weather, the collection lines convey sanitary sewage to the North River WPCP. However, during and immediately after precipitation events, such as rainfalls and snow melts, the combined sewers carry both sanitary sewage and stormwater.

In New York City, combined sewers were originally built to convey both sewage and stormwater to the nearest waterbody, and the sewer lines were sized to handle storm events. When the public health consequences of discharging untreated sanitary sewage to ambient waters were realized in the early 1900s, a system of regional WPCPs was constructed. Because construction of a new system of separate sanitary sewers was considered to be too disruptive and costly, a simpler system of "interceptors" was built to convey sanitary sewage from the existing combined sewer network to the WPCPs. Since it was prohibitively expensive to design the interceptors and WPCPs to handle the large storm events that the combined sewers could deliver, these facilities were sized to handle two times the design dry weather (sanitary) flow associated with each area. To limit the amount of flow that reaches the interceptors and WPCPs, a system of "regulators." allows excessive wet weather flows to bypass treatment and overflow to the receiving waters. When the combined sewer flow exceeds two times the design dry weather flow at the regulator, the flow goes over a weir in the diversion chamber and this overflow is discharged to the receiving water body as a combined sewer overflow (CSO). By diverting excess flows to the receiving waters as CSO, the regulators protect the city's WPCPs from flooding and process disruptions, and also prevent upstream flooding from sewage backups into homes and streets. These CSO discharges, however, are untreated.

NORTH RIVER WPCP

Sanitary sewage and stormwater runoff on the West Side of Manhattan north of Bank Street is conveyed to the North River WPCP, located on the Hudson River between West 137th and West 145th Streets. This plant began operation with primary treatment (i.e., settling) in March 1986. Prior to that time, wastewater from the West Side of Manhattan was discharged untreated into the Hudson and Harlem Rivers.

Beginning in April 1991, the plant began operation of full secondary treatment. Secondary treatment removes biochemical oxygen demand (BOD) through an oxidation process that depends on biological growth. BOD is defined as the quantity of dissolved oxygen required by bacteria to oxidize organic matter. It is the most widely used measurement of pollution from wastewater effluent. The plant is designed to have a BOD removal rate of 85 percent or better and has consistently achieved that removal rate since the start of operations.

The volume of effluent from this WPCP is regulated by a SPDES permit issued by the New York State Department of Environmental Conservation (NYSDEC). The North River WPCP is permitted to treat a dry weather flow of 170 mgd. The primary treatment capacity of the WPCP is twice the design dry weather flow or 340 mgd. This allows the plant to treat a certain volume of combined sanitary and storm flows during wet weather events. Certain storms generate large volumes of stormwater that exceed the capacity of the North River WPCP. In those situations, the North River WPCP provides primary treatment to a maximum volume of 340 mgd. Sanitary and storm flow in excess of two times the design dry weather flow is diverted into the Hudson River in a CSO.

The average flow rate at the plant for the latest 12 months of available DEP records is 123 mgd (see **Table 13-1**). Consequently, the North River WPCP currently receives flow at approximately 72 percent of its permitted 170 mgd dry weather capacity.

SANITARY SEWAGE AND STORMWATER

As discussed above, sanitary sewage generation is conservatively assumed to be equal to the water demand. Therefore the sanitary sewage generation for the project site is approximately 375 gpd.

Table 13-1
Monthly Average Actual Flows to the North River WPCP

Year	Actual Flow (mgd)	Year	Actual Flow (mgd)
April 2009	121	October 2008	125
March 2009	111	September 2008	134
February 2009	113	August 2008	125
January 2009	119	July 2008	126
December 2008	129	June 2008	126
November 2008	122	May 2008	123
Source: DEP			

Stormwater runoff is generated by rainwater and other precipitation that collects on the surfaces of land or built structures. The volume of runoff generated by these surfaces varies depending upon the type of land cover, which can be pervious (soil or landscaped surfaces that allow more percolation to the ground below, generating less runoff) or impervious (surfaces such as roads and buildings that impede percolation and generate greater runoff). For example, runoff from a suburban yard will percolate into the ground with less runoff to a local street, and the runoff coefficient from this type of land surface is typically about 0.20 (20 percent runoff). In contrast, a building roof has no percolation and, therefore, has a runoff coefficient of 1.00 (100 percent runoff). Paved areas (e.g., streets and sidewalks) primarily generate runoff, with some percolation to the ground below (a runoff coefficient of 0.85).

The majority of the 8.18 acre project site is currently covered with impervious surfaces comprising paved parking areas and roof surfaces, which have a high runoff coefficient. All runoff from the project site is assumed to be conveyed into the combined sewer system. Stormwater flows at the project site were estimated based on DEP Design Guidelines which use the Rational Formula for calculating runoff, which is:

$$Q = C \times I \times A$$

where, with respect to this project,

Q is runoff in cubic feet per second (cfs),
C is the runoff coefficient (1.0 for roof surfaces, 0.85 for paved areas),
I is the rainfall intensity (5.95 inches per hour; based on a 6 minute time of concentration for the 5-year storm), and
A is the area in acres (1.093 acres of roof, and approximately 7.087 acres of paved areas).

Based on these inputs, approximately 42.35 cfs (using DEP's design storm intensity of 5.95 inches of precipitation per hour with a time of concentration of 6 minutes) is composed of runoff from existing buildings and paved surfaces on the project site that currently drain to the combined sewer.

As part of the development proposed in the 1992 FEIS, a new system of separate sanitary and stormwater sewers was proposed. This system was approved in 2000 by DEP as part of an Amended Drainage Plan. The Amended Drainage Plan took into account the size and condition of existing downstream sewers to ensure that they would be adequate to accommodate the sanitary flows from the Riverside South Project. Parcels L, M, and N are part of the Amended Drainage Plan, and based on the plan, runoff from the site would flow into the separate stormwater system, except for 100 feet of street frontage along West End Avenue and West 59th Street. Because the parcels have not yet been developed, the new separate system has not been

extended to the project site, so the runoff either evaporates or is discharged into the existing combined sewer system.

The existing sanitary and stormwater runoff discharge volumes from the project site (in gallons) were calculated for various rainfall events using the Rational Formula. These events included an average event (0.4 inches) expected in a typical year, and two larger storms (1.20 and 2.50 inches). The volume of sanitary flow was calculated by dividing the daily sanitary flow of 375 gpd (see section "Water Demand and Sewage Generation" above) by the duration of the rainfall event. The volumes of the discharges are presented in **Table 13-2**. As shown in the table, the stormwater runoff volume to the combined sewer from the project site greatly exceeds the sanitary sewage volume generated on-site.

Table 13-2
Existing Stormwater and Sanitary Sewage Discharge Volumes from Project Site

Rainfall (inches)	Duration (hours)	Runoff to Combined Sewers (gallons)	Sanitary Sewage to Combined Sewers (gallons)	Total Volume to Combined Sewers (gallons)
0.40*	3.8	77,297	59	77,356
1.20	11.3	231,890	177	232,067
2.50	19.5	483,104	305	483,409

Notes: Rainfall characteristics from DEP.
* Average rainfall event

E. THE FUTURE WITHOUT THE PROPOSED PROJECT

In the Future Without the Proposed Project, the overall water supply system in New York City is not expected to change in any substantial way. However, certain changes are expected to the water supply system within the city. The city has initiated a comprehensive water conservation program that seeks to reduce water use by implementing a metering program and requiring that all new plumbing fixtures in the city, including those in existing and new structures, be of low-flow design (Local Law No. 29, 1989). Other measures—including leak detection programs, water meters, and locking fire hydrant caps—are aimed at further reducing the city's water needs and will serve to reduce water demand and flows to sewage facilities. In addition, Stage 2 of water supply Tunnel No. 3 is now under construction in Manhattan, Queens, and Brooklyn. The Brooklyn/Queens leg is expected to open in 2009, with the Manhattan leg following in 2012. When Tunnel No. 3 is completed, it will enhance and improve the adequacy and dependability of the entire water supply system and improve service and pressure to outlying areas of the city. It will also allow DEP to inspect and repair Tunnel No. 1 for the first time since it was activated.

DEP projects that the dry weather flows to the North River WPCP would be approximately 128 mgd in the year 2020. These flow projections are based on New York City Department of City Planning (DCP) population and business projections for the entire North River service area. The average actual flow to the WPCP, which includes wet weather, is projected to be approximately 136 mgd, which would be within its SPDES permit limit of 170 mgd.[1] Based on the projected flow of 136 mgd, the expected solids removal would be about 14,818 pounds per month.

[1] As presented the *Proposed Manhattanville in West Harlem Rezoning and Academic Mixed-Use Development Final EIS (FEIS)* (2007), the wet weather contribution within the North River service area was calculated to be approximately 8 mgd.

As described above, the SEIS considers two No Build Scenarios. Under No Build Scenario 1, Parcels L, M, and N would be developed according to the original 1992 FEIS program. Parcels L and M would be developed with residential buildings with office space and public parking. Parcel N would be developed with a mix of retail, office, entertainment studio production, cinema, and parking uses.

Under No Build Scenario 2, the original 1992 FEIS program would be completed for Parcels L and M, but Parcel N would remain in its current use.

For both No Build Scenarios and for the Proposed Project, the original Restrictive Declaration associated with the development proposed in the 1992 FEIS required approval from the Commissioner of DEP and DCP prior to the issuance of a sewer hook-up permit for each new building, certifying that the projected flows from the buildings would not cause the North River WPCP to exceed its SPDES permitted capacity. As part of the analysis for this SEIS, DEP and DCP have confirmed that there is capacity to accommodate the increase in sanitary flows from the Proposed Project and the average flow to the North River WPCP would remain well within its SPDES permit limit. Therefore, that provision is no longer necessary and will be eliminated as part of the modified Restirictive Declaration for the Proposed Project.

The incremental water demand, sewage generation, and runoff volumes of the Proposed Project is compared to these two No Build scenarios.

NO BUILD SCENARIO 1

WATER SUPPLY

No Build Scenario 1 assumes that the previously approved project in the 1992 FEIS would be built and in place. The development proposed for Parcels L, M, and N in the 1992 FEIS comprised commercial office and studio space, residential space, and retail and cinema space totaling approximately 2,985,279 gsf plus 743 parking places.

Table 13-3 presents the projected water demand associated with No Build Scenario 1.

SANITARY SEWAGE AND STORMWATER

As shown on **Table 13-3**, the uses for No Build Scenario 1 would create a total water demand of approximately 819,069 gpd. The consumptive water demand would be approximately 328,447 gpd, which is equivalent to the sewage generation. With this volume of sewage generation, the solids removed at the North River WPCP would be about 36 pounds per month. As described above, the average actual flow to the North River WPCP in 2020 is projected to be approximately 136 mgd. Conservatively assuming this flow in the year 2018, the additional contribution of 328,447 gpd under No Build Scenario 1 would be negligible and the average flow to the North River WPCP would remain well within its SPDES permit limit of 170 mgd. Air conditioning also uses water, but the water evaporates and does not enter the sewer system.

Table 13-3
Water Consumption/Sewage Generation
Future Without the Proposed Project For No Build Scenario 1

Use	Unit	Size (gsf)	Water Usage Rate (gpd)	Air Conditioning Rate (gpd)	Water Consumption/ Sewage Generation (gpd)	Air Conditioning (gpd)	Total Demand (gpd)
Residential	1,067 (persons)	598,290	112 (per person)	0.17 (per sf)	119,554	101,709	221,264
Retail	N/A	82,065	0.17 (per sf)	0.17 (per sf)	13,951	13,951	27,902
Office	205 (employees)	350,370	25 (per employee)	0.1 (per sf)	43,796	35,037	78,833
Cinema	5,400 (seatings/day)	37,000	5 (per seating)	0.17 (per sf)	27,000	6,290	33,290
Studio	4,906 (employees)	1,962,554	25 (per employee)	0.17 (per sf)	122,660	333,634	456,294
Parking	59 (employees)	297,200	25 (per employee)	N/A	1,486	N/A	1,486
				TOTAL	**328,447**	**490,622**	**819,069**

Notes: [1] 2001 *CEQR Technical Manual*[1], Table 3L-2 "Water Usage and Sewage Generation Rates for Use in Impact Assessment"
Residential: 1.85 persons per unit; Retail: 400 square feet per worker; Office: 200 square feet per worker; Cinema: three patrons per seat per day; Studio: 400 square feet per employee; Parking: 5,000 square feet per worker

Under No Build Scenario 1, approximately 84 percent of the site would be covered with impervious roof area, with the remainder being other impervious paved surfaces areas such as sidewalks, driveways or walkways. The new separate sanitary and stormwater systems would be extended into all three parcels. However, it is likely that the exception to the new separate systems would remain, and the 100-foot deep area fronting along West End Avenue and West 59th Street would continue to flow into the combined system.

[1] In May 2010, shortly prior to the completion of the Draft SEIS, a substantive update to the 2001 *CEQR Technical Manual* was released. Prior to the public hearing for Proposed Project, a Technical Memorandum was prepared (published on DCP's website in September 2010) that considered whether one or more analyses contained in the Draft SEIS should be revised in the Final SEIS in light of the updated guidance set forth in the 2010 *CEQR Technical Manual.* The evaluation of the Proposed Project under the 2010 *CEQR Technical Manual* focused on technical areas where changes in methodology would have the potential to affect the analyses and/or conclusions of the Draft SEIS for the Proposed Project. With respect to infrastructure, the DSEIS anticipated the possible issuance of the 2010 *CEQR Technical Manual* and already employed the methodologies in that document. Therefore, the infrastructure analysis in the DSEIS and FSEIS is consistent with the methodologies of the 2010 *CEQR Technical Manual.*

Table 13-4 shows the volumes of (1) stormwater runoff expected to be discharged into the Hudson River by the new separate stormwater system, (2) stormwater runoff expected to be discharged into the combined sewer system from the areas not connected to the new separate stormwater system, (3) sanitary sewage discharged into the combined sewer system from No Build Scenario 1, and (4) the total volume discharged into the combined sewer system.

Table 13-4
No Build Scenario 1 Stormwater and Sanitary Sewage Discharge Volumes

Rainfall (inches)	Duration (hours)	Runoff to Hudson River (gallons)	Runoff to combined sewers (gallons)	Sanitary sewage to combined sewers (gallons)	Total volume to combined sewers (gallons)
0.40*	3.8	58,546	28,152	52,004	80,156
1.20	11.3	175,639	84,455	154,644	239,099
2.50	19.5	365,915	175,947	266,863	442,811

Notes: Rainfall characteristics from DEP.
* Average rainfall event

NO BUILD SCENARIO 2

WATER SUPPLY

Under No Build Scenario 2, the original 1992 FEIS approved program would be completed on parcels L and M, but Parcel N would continue to be used for parking.

Table 13-5 presents the projected water demand associated with No Build Scenario 2.

Table 13-5
Water Consumption/Sewage Generation
Future Without the Proposed Project For No Build Scenario 2

Use	Unit	Size (gsf)	Water Usage Rate (gpd)	Air Conditioning Rate (gpd)	Water Usage/ Sewage Generation (gpd)	Air Conditioning (gpd)	Total Demand (gpd)
Residential	1,067 (persons)	598,290	112 (per person)	0.17 (per sf)	119,554	101,709	221,264
Retail	0	0	0.17 (per sf)	0.17 (per sf)	0	0	0
Office	102 (employees)	20,370	25 (per employee)	0.1 (per sf)	2,546	2,037	4,583
Cinema	0	0	5 (per seating)	0.17 (per sf)	0	0	0
Studio	0	0	25 (per employee)	0.17 (per sf)	0	0	0
Parking	24 (employees)	120,400	25 (per employee)	N/A	752	N/A	752
				TOTAL	**122,853**	**103,747**	**226,599**

Notes: [1] 2001 *CEQR Technical Manual*, Table 3L-2 "Water Usage and Sewage Generation Rates for Use in Impact Assessment"
Residential: 1.85 persons per unit; Retail: 400 square feet per worker; Office: 200 square feet per worker; Cinema: three patrons per seat per day; Studio: 400 square feet per employee; Parking: 5,000 square feet per worker

SANITARY SEWAGE AND STORMWATER

As shown in **Table 13-5**, the uses for No Build Scenario 2 would create a total water demand of approximately 226,599 gpd with a consumptive water demand of approximately 122,853 gpd, which is equivalent to sewage generation. With this volume of sewage generation, the solids removed at the North River WPCP would be about 13 pounds per month. As described above, the average actual flow to the North River WPCP in 2020 is projected to be approximately 136 mgd. Conservatively assuming this flow in the year 2018, the additional contribution of 122,853 gpd under No Build Scenario 2 would be negligible and the average flow to the North River WPCP would remain well within its SPDES permit limit of 170 mgd.

Under No Build Scenario 2, approximately 15 percent of the site would be covered with impervious roof area on Parcels L and M. Parcel N would continue to be used for parking. Therefore, the remainder of Parcels L, M and N would be covered with impervious paved areas. Under this scenario, the new separate sanitary and stormwater systems would be extended to Parcels L and M. However, the new separate sanitary and stormwater systems would likely not be extended to Parcel N, and runoff from that parcel would continue to flow into the combined system. Parcel N includes that portion of the site that would continue to flow into the combined system under the Amended Drainage Plan.

Table 13-6 shows the volumes of (1) stormwater runoff expected to be discharged into the Hudson River by the new separate stormwater system, (2) stormwater runoff expected to be discharged into the combined sewer system from the areas not connected to the new separate stormwater system, (3) sanitary sewage discharged into the combined sewer system from No Build Scenario 2, and (4) the total volume discharged into the combined sewer system.

Table 13-6
No Build Scenario 2 Stormwater and Sanitary Sewage Discharge Volumes

Rainfall (inches)	Duration (hours)	Runoff to Hudson River (gallons)	Runoff to combined sewers (gallons)	Sanitary volume to combined sewers (gallons)	Total volume to combined sewers (gallons)
0.40	3.8	17,037	60,475	19,452	79,927
1.20	11.3	51,112	181,425	57,843	239,268
2.50	19.5	106,484	377,969	99,818	477,787

Notes: Rainfall characteristics from DEP.

F. THE FUTURE WITH THE PROPOSED PROJECT

As described in Chapter 1, "Project Description," the Proposed Project would include a mix of uses on Parcels L, M, and N that would differ from those proposed in the 1992 FEIS (which could be developed either as No Build Scenario 1 or No Build Scenario 2). These uses would place different demands on the city's infrastructure than those expected under either No Build Scenario. As described in detail above, the RWCDS for this analysis assumes a mix of uses that maximizes hotel uses.

WATER SUPPLY

Table 13-7 presents the projected water consumption by use for the Proposed Project.

Table 13-7
Water Consumption/Sewage Generation
Future With the Proposed Project For Build RWCDS 2

Use	Unit	Size (gsf)	Water Usage Rate (gpd)	Air Conditioning Rate (gpd)	Water Consumption/ Sewage Generation (gpd)	Air Conditioning (gpd)	Total Demand (gpd)
Residential	4,087 (persons)	2,032,888	112 (per person)	0.17 (per sf)	457,699	345,591	803,290
Hotel	1,159 (rooms), 1,739 (occupants)	759,814	150 (per rm/occupant)	0.1 (per sf)	260,775	75,981	336,756
Retail	N/A	244,036	0.17 (per sf)	0.17 (per sf)	41,486	41,486	82,972
Office	261 (persons)	52,209	25 (per employee)	0.1 (per sf)	6,526	5,221	11,747
School	1,332	151,598	30 (per seat)	0.1 (per sf)	39,960	15,160	55,120
Automotive Showroom/ Service	92 (employees)	276,011	25 (per employee)	0.17 (per sf)	2,300	46,922	49,222
Parking	83 (employees)	412,900	25 (per employee)	N/A	2,065	N/A	2,065
				TOTAL	**810,811**	**530,361**	**1,341,172**

Notes: [1] 2001 *CEQR Technical Manual*, Table 3L-2 "Water Usage and Sewage Generation Rates for Use in Impact Assessment"
Residential: 2.65 persons per unit (affordable); 1.85 persons per unit (market rate); Hotel: 1.5 occupants per room; Retail: 400 square feet per worker; Office: 200 square feet per worker; Automotive service: 3,000 square feet per worker; Parking: 5,000 square feet per worker

Table 13-8 compares the incremental increase in total water demand and sewage generation from the Proposed Project to No Build Scenarios 1 and 2.

Table 13-8
Incremental Total Water Demand and Sewage Generation (gpd)

	Proposed Project	No Build Scenario 1	Increment over No Build Scenario 1	No Build Scenario 2	Increment over No Build Scenario 2
Total Water Demand	1,341,172	819,069	522,103	226,599	1,114,573
Sewage Generation	810,811	328,447	482,364	122,853	687,958

As shown in the **Table 13-7**, in the future with the Proposed Project, it is estimated that there would be a total water demand of approximately 1,341,172 gpd. As mentioned above, water consumption in the city averages approximately 1.0 to 1.1 billion gallons per day. The increased demand from the Proposed Project represents about 0.13 percent of the city's demand and would not be large enough to significantly affect the New York City water supply system.

As shown in **Table 13-8**, the increment of the Proposed Project over No Build Scenario 1 would be approximately 522,103 gpd, and the increment over No Build Scenario 2 would be approximately 1,114,573 gpd. These are negligible compared to the overall city system, and

given the capacity of the existing water lines in the vicinity of the project site these increases would not require upgrades to the system. As mentioned previously, the project site would be served by a 12-inch diameter water lines in West 59th Street, and a 36-inch diameter water main located under West End Avenue (no new water mains are proposed within the project site). The Proposed Project would not impede access to these existing mains, required for normal DEP repair and maintenance activity. The system would be able to deliver water reliably, and demand for water is not expected to affect local water pressure. Therefore, the Proposed Project would not result in any significant adverse impacts on the city's water supply system.

The analysis above, which uses CEQR water usage rates, provides a conservative estimate of the water demand for the Proposed Project. The actual water demand from the Proposed Project would likely be much less than that projected under CEQR, with the implementation of the various water conservation measures that are currently under consideration by the project sponsor. These include, but are not limited to, flow restriction on all bath faucets and shower heads, and dual-flush water closets.

SANITARY SEWAGE AND STORMWATER

As shown in **Tables 13-7 and 13-8**, the Proposed Project would discharge approximately 810,811 gpd of sanitary flow to the North River WPCP. Based on a permitted treatment capacity of 170 mgd, this is the equivalent of about 0.5 percent of the current sewage handled by the WPCP.Conservatively assuming an average flow of approximately 136 mgd to the North River WPCP in the year 2018 without the Proposed Project, the additional contribution of 810,811gpd (0.81 mgd) with the Proposed Project would be negligible and the average flow to the North River WPCP would remain well within its SPDES permit limit of 170 mgd. The Proposed Project would not adversely affect the treatment efficiencies of the North River WPCP or cause the plant to not properly treat wastewater prior to discharge to the Hudson River. Therefore, the sanitary flows from the Proposed Project would not result in any significant adverse impacts on the sanitary sewer system.

With the Proposed Project, no stormwater from the project site would be discharged to the combined sewer system. In addition, unlike under exisiting conditions or the No Build scenarios, the Proposed Project would introduce landscaped open space areas that would allow for infiltration and water quality treatment. The project site would consist of approximately 58 percent impervious roof area, 29 percent paved areas, and 12 percent landscaped open space. With the Proposed Project, the new separate sanitary and stormwater systems would be extended to all three parcels. Based on the Amended Drainage Plan, the allowable flow to the new stormwater system from the site is about 28 cfs with any additional flow being discharged into the combined system. However, as mentioned above, with the Proposed Project, additional on-site stormwater detention would be provided on the Project Site, as set forth in the Restrictive Declaration that will be recorded as part of the Proposed Project. This additional detention would allow the runoff from the 100-foot deep area fronting along West End Avenue and West 59th Street (that under the Amended Drainage Plan would enter the combined system), to instead be detained and discharged into the separate stormwater system, while maintaining the allowable flow of 28 cfs into the separate stormwater system. In order to maintain the DEP allowable flow of 28 cfs, approximately 17,600 cubic feet of storage for the stormwater detention would be required (based on DEP's design storm intensity). The stormwater detention tanks would be built incrementally as each of the proposed buildings are constructed, to collect

stormwater from the roofs of the buildings, the on-site public access easements[1] (Freedom Place South and the extention of West 60th Street) and the on-site open space. The flow rate out of each storage tank would be controlled by the size of the outlet. Hydrodynamic devices, which separate oils, grease, solids, particulates, and other pollutants from stormwater would be installed to treat stormwater being discharged from the project site into the separate stormwater system. In accordance with the Amended Drainage Plan, the new separate stormwater system, which will discharge to the existing DEP outfall on 66th Street, will be extended to the entire project site. As mentioned above, no runoff from the project site would be discharged into the combined sewer system.

Activities associated with construction and operation of the Proposed Project would comply with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity Permit No. GP-0-10-001. A stormwater pollution prevention plan (SWPPP) would be prepared, and a Notice of Intent (NOI) would be submitted to NYSDEC. The SWPPP would conform to all of the requirements of GP-0-10-001, NYSDEC's technical standard for erosion and sediment control presented in "New York Standards and Specifications for Erosion and Sediment Control," and NYSDEC's technical standard for the design of water quantity and water quality controls (post-construction stormwater control practices) presented in the *New York State Stormwater Management Design Manual*. The SWPPP would include Best Management Practices (BMPs) to be implemented on-site during and after construction such as erosion and sediment control measures. Stormwater management measures identified in the SWPPP would minimize potential impacts on littoral zone tidal wetlands within the Hudson River associated with discharge of stormwater runoff generated within the project site during the construction and operation of the Proposed Project. The project sponsor will, at the time of its submission to NYSDEC, provide DEP a copy of the SWPPP.

PlaNYC, the city's long-term sustainability plan, and the Sustainable Stormwater Management Plan (November 2008) have identified a number of strategies for meeting water quality goals. These focus on promoting cost-effective source controls for stormwater management. The diversion of all stormwater from the project site into a separate stormwater system and the provision of on-site stormwater detention that may be required as per the sewer connection permit process, are part of those strategies. Another BMP that would be utilized would be infiltration in the landscaped areas, which would reduce stormwater runoff volumes and peak flows, improve water quality, and promote groundwater recharge. Infiltration practices temporarily store stormwater and enable slow percolation into the underlying soil, physically filtering runoff in the process and enabling soil particles to absorb and biodegrade pollutants. There would also be evapotranspiration through plant uptake.

During the detailed design, additional measures to minimize water consumption, reduce sanitary sewage generation, and lessen stormwater runoff would be considered.

[1] A public access easement (PAE) is an easement given by a property owner granting the city and the public (as opposed to a neighboring landowner) the right to use the owner's property for specified purposes. In the case of Riverside Center, the public and the city will be given the right to use the PAE area in a manner comparable to the way in which a street would be used. The PAE would be owned and, subject to the easement, controlled by the landowner. In the case of Riverside Center, the project sponsor would be responsible for construction and maintenance of the PAE, including the sidewalks and the street furniture within the PAE.

Table 13-9 shows the volumes of (1) stormwater runoff expected to be discharged into the Hudson River by the new separate stormwater system, (2) stormwater runoff expected to be discharged into the combined sewer system from the areas not connected to the new separate stormwater system, (3) sanitary sewage discharged into the combined sewer system from the Proposed Project and (4) the total volume discharged into the combined sewer system.

Table 13-9
Stormwater and Sanitary Sewage Discharge Volumes for the Proposed Project

Rainfall (inches)	Duration (hours)	Runoff to Hudson River (gallons)	Runoff to combined sewers (gallons)	Sanitary volume to combined sewers (gallons)	Total volume to combined sewers (gallons)
0.40	3.8	76,134	0	128,378	128,378
1.20	11.3	228,402	0	381,757	381,757
2.50	19.5	475,838	0	658,784	658,784

Notes: Rainfall characteristics from DEP.
The Existing total volumes to the combined sewers for the 0.40, 1.20 and 2.50 rainfall events were estimated at 77,356 gallons, 232,067 gallons and 483,409 gallons, respectively (see Table 13-2).

As shown in the table, no runoff from within the project site would be discharged into the combined sewer. During all three rain events, the Proposed Project would direct more runoff to the separate stormwater system (which would discharge directly to the Hudson River) than either No Build Scenario 1 or 2. However, the Proposed Project would produce more sanitary sewage than either No Build scenario, which would be discharged into the combined sewer. The sanitary volumes generated by the Proposed Project could displace flows coming from areas upstream of the Proposed Project in the combined sewer system. The displacement could lead to additional CSO events in the Hudson River. By discharging stormwater through the existing 66th Street outfall, downstream of Regulator NR-N29A, no stormwater would be sent to that regulator and its capacity for sanitary sewage from upstream flows and the Proposed Project would be preserved. As shown in **Table 13-9**, the total volume to the combined sewers from the Proposed Project is expected to be greater than the estimated current volume to the combined sewers under Existing Conditions. Therefore, volumes to the combined sewer system are expected to increase due to the projected sanitary volumes; during certain storm events this may exacerbate CSO volumes into the Hudson River. However, with new separate storm sewers, additional water conservation and stormwater management measures, and the considerable assimilative capacity of the Hudson River to quickly disperse pollutants, no significant adverse impacts to infrastructure or related impacts to water quality are expected to occur from the Proposed Project. ✷