9. Water and Sewer Infrastructure

9.1 INTRODUCTION

This chapter assesses the potential effect of the Proposed Action on the City's water supply, wastewater treatment, and stormwater management infrastructure. As described in Chapter 1, "Project Description," the Proposed Action would establish the East Midtown Subdistrict within the Midtown Special District. Under the reasonable worst-case development scenario (RWCDS), the Proposed Action would result in approximately 10,340,972 gross square feet (gsf) of office floor area, 648,990 gsf of retail floor area, 2,134,234 gsf of hotel floor area, 207,029 gsf of residential floor area, as well as 140,200 gsf of parking floor area, distributed throughout the approximately 70-block area of the new subdistrict.

9.2 PRINCIPAL CONCLUSIONS

Based on the methodology set forth in the *CEQR Technical Manual*, the Proposed Action would not result in a significant adverse impact on the City's water and sewer infrastructure.

9.2.1 Water Supply

The incremental additional water usage as a result of the Proposed Action is expected to total 1.06 million gallons per day (mgd), compared to anticipated demand in the future without the Proposed Action. This incremental demand would represent 0.0002 percent of the City's overall water supply and would be distributed over a 70-block area. As changes of this magnitude would not be large enough to have a significant adverse impact on the City's water system, the incremental demand with the Proposed Action would not adversely affect the City's water supply or system water pressure.

9.2.2 Sanitary Sewage

The Newtown Creek water pollution control plant (WPCP), which is designed to treat a dry weather flow of 310 mgd, handled an average of 228.08 mgd of sewage flow between July 2011 and June 2012. Based on rates in the *CEQR Technical Manual*, the Proposed Action has the potential to result in an incremental sanitary sewage discharge of just under 0.37 mgd (or 22.3 percent) over the No-Action condition. This incremental increase in sanitary flow would represent approximately 0.1 percent of the Newtown Creek WPCP's designated State Pollution Discharge Elimination System (SPDES) capacity. Pursuant to CEQR methodology, as the projected increase in sanitary sewage would not cause the Newtown Creek WPCP to exceed its operational capacity or its SPDES-permitted capacity, the Proposed Action would not result in significant adverse impacts to sanitary sewage conveyance and treatment.

9.2.3 Stormwater Drainage and Management

As the proposed rezoning area is served by a combined sewer system, the Proposed Action would result in increases of combined sewer volumes, compared to existing conditions. However, due to the New York City Department of Environmental Protection's (DEP) new stormwater management requirements established in July 2012, stormwater runoff from new developments is expected to substantially decrease as compared to existing conditions. Based on the analysis pursuant to the *CEQR Technical Manual*, with Best Management Practices (described in Section 9.5.4) implemented on each projected development site by their respective developer, it is concluded that the Proposed Action would not result in significant adverse impacts on stormwater conveyance and treatment infrastructure.

9.3 METHODOLOGY

According to the *CEQR Technical Manual,* a preliminary water supply infrastructure analysis is needed if the project would result in an exceptionally large demand for water (e.g., more than 1 mgd), or is located in an area that experiences low water pressure (e.g., areas at the end of the water supply distribution system). Although the rezoning area is not located in an area that experiences low water pressure, the Proposed Action would result in water demand of 1.06 mgd, and therefore an assessment of water supply is warranted.

A preliminary sewer analysis is warranted if a project site is over five acres and would result in an increase of impervious surfaces on the site, or if a project is located in a combined sewer area in Manhattan and would result in incremental development in excess of 1,000 residential units or 250,000 sf of commercial, public facility and institution and/or community facility space. As the Proposed Action and the development that would result from it meet both of these CEQR thresholds, a sewer analysis is provided.

As analyses of water demand and sewage generation are density-based technical analyses, only the anticipated development on the projected development sites form the basis for this assessment.

To assess the Proposed Action's potential impacts on water and sewer infrastructure, this chapter:

- Describes the existing water and sewer infrastructure on the projected development sites and estimates water demand and sewage and stormwater generation under existing conditions and in the No-Action condition (for the 2033 analysis year). Existing and future water demands and sewage generation are calculated based on use generation rates provided in the *CEQR Technical Manual.* Stormwater runoff and sanitary flows are calculated using the DEP Flow Volume Calculation Matrix.
- Forecasts water demand and sewage and stormwater generation by the projected developments induced by the Proposed Action based on CEQR guidelines.
- Assesses the effects of the Proposed Action's water demand and sewage and stormwater generation on the City's water and sewer infrastructure, pursuant to *CEQR Technical Manual* guidelines.

9.4 EXISTING CONDITIONS

9.4.1 Water Supply

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

Once in the City, the three aqueducts distribute water into a network of water mains. Water mains up to 96 inches in diameter feed the smaller mains, which deliver water to their final destination. These are the same mains that provide water to fire hydrants. Nearly all of the water reaches its consumers by gravity alone, although some 4 percent (generally located at the outer limits of the system where in-line pressure is lowest, at high elevations, or at a pressure extremity such as Far Rockaway) is pumped to its final destination. Pressure regulators throughout the City monitor and control the water pressure.

As indicated in Chapter 1, "Project Description," an RWCDS has been developed in conjunction with the Proposed Action. Table 9-1 shows the applicable RWCDS water consumption and wastewater generation rates utilized in the analysis. Table 9-2 shows existing uses on the 19 projected development sites, including 22 residential units (comprising approximately 10,725 gsf), 469,964 gsf of retail space, 6,617,617 gsf of commercial/office space, and 1,750,258 gsf of hotel uses (approximately 2,693 rooms[1]).

Based on these consumption rates, it is estimated that the existing uses on the 19 projected development sites within the rezoning area currently consume approximately 1,424,371 gallons per day (gpd) of water for domestic uses and 1,502,433 gpd of water for air conditioning, for a total of 2,926,804 gpd (2.93 mgd) of water (Table 9-2).

[1] Assumed 650 sf per hotel room.

TABLE 9-1: WATER CONSUMPTION AND WASTEWATER GENERATION RATES

Land Use	Rate[1]	
	Domestic	Air Conditioning
Residential	100 gpd/person[2]	0 gpd/sf
Retail[3]	0.24 gpd/sf	0.17 gpd/sf
Commercial/Office	0.10 gpd/sf	0.17 gpd/sf
Hotel[4]	120 gpd/room/occupant	0.17 gpd/sf
Community Facility[6]	0.10 gpd/sf	0.17 gpd/sf

Notes:
[1] Consumption rates obtained from the 2012 *CEQR Technical Manual* Table 13-2 "Water Usage and Sewage Generation Rates for Use in Impact Assessment," unless otherwise indicated.
[2] The average household size for the proposed rezoning area is 1.59 persons per dwelling unit (2010 Census). This equates to 159 gpd/dwelling unit.
[3] Use group comprises retail and restaurant space.
[4] Assumes an average of 2.0 occupants per room.

TABLE 9-2: EXISTING WATER CONSUMPTION AND WASTEWATER GENERATION DUE TO LAND USES ON THE PROJECTED DEVELOPMENT SITES

Land Use	Area (sf)	Dwelling Units / Hotel Rooms	Domestic Water/Wastewater Generation (gpd)	Air Conditioning (gpd)
Residential	10,725	22	3,498	0
Commercial—Retail	469,964		112,791	79,894
Commercial—Office	6,617,617		661,762	1,124,995
Hotel	1,750,258	2,693	646,320	297,544
Water Consumption Subtotals			1,424,371	1,502,433
Sewage Generation Subtotal			1,424,371	
Total Water Consumption			2,926,804	
Total Wastewater Consumption			1,424,371	

Notes:
Refer to Table 9-1 for rate assumptions.
gpd = gallons per day

9.4.2 Wastewater Treatment

According to the *CEQR Technical Manual*, wastewater is considered to include sanitary sewage, wastewater generated by industries, and stormwater. Water used for air conditioning generates a negligible amount of wastewater as it recirculates or evaporates in the cooling and heating process.

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

During dry weather, the WPCP primarily treats sanitary sewage. The average daily flow during dry weather is known as the average "dry-weather flow." WPCPs have treatment capacities set at twice their dry weather design flow for a limited amount of time. However, because the majority of New York City's sewers are combined sewers, they also receive stormwater and rainwater runoff from impermeable surfaces that generally contain pollutants such as oil and floatable debris. During wet weather, stormwater enters the combined sewer system along with sanitary sewage, and both are treated at a WPCP. During wet weather, rainfall runoff can reach 10 to 50 times the dry weather flow, which is well above the WPCP design capacity. To avoid flooding the WPCPs, built-in regulators act as relief valves to direct the excess water to an outfall. During storm events, sanitary sewage entering or already in the combined sewer system, and stormwater and debris, can be discharged, untreated, into the nearest body of water. This untreated overflow is known as "combined sewer overflow" (CSO).

As noted above, the majority of New York City wastewater is collected by a combined sewer system and treated by WPCPs. However, small areas of Brooklyn, Queens, and Staten Island either have separate sewer systems or use septic systems to dispose of sanitary waste.

The proposed rezoning area is located in Manhattan Community Districts 5 and 6 and is generally bounded by 39th Street to the south, 57th Street to the north, Second Avenue to the east, and Fifth Avenue to the west. The entire rezoning area is served by the Newtown Creek WPCP. Combined, all 14 WPCPs in New York City have an SPDES-permitted total capacity of 1.8 billion gpd. The Newtown Creek WPCP is regulated by SPDES permit to treat and discharge up to 310 mgd of wastewater. As shown in Table 9-3, from July 2011 through June 2012, the Newtown Creek WPCP treated between 197 mgd and 276 mgd, averaging approximately 228.08 mgd with approximately 82 mgd available capacity.

TABLE 9-3: MONTHLY AVERAGE DRY WEATHER FLOWS FROM THE NEWTOWN CREEK WPCP

	Month	Newtown Creek WPCP (mgd)
2011	July	237
	August	276
	September	253
	October	241
	November	221
	December	221
2012	January	215
	February	207
	March	197
	April	205
	May	227
	June	237
	Annual Average	**228.08**

Source: DEP

The RWCDS projected development sites are served by three of the Newtown Creek WPCP subcatchment areas: NCM-017, NCM-036, and NCM-037. As shown in Figure 9-1, the majority of the 19 projected development sites are located in the NCM-036 and NCM-037 subcatchment areas; only one projected development site is located in NCM-017. The DEP's operational bureaus report that regulator NCM45A (located at East 42nd Street) corresponds with subcatchment area NCM-017, regulator NCM47 (located at East 49th Street) corresponds with subcatchment area NCM-036 and regulator NCM45 (located at East 41st Street) corresponds with subcatchment area NCM-037 (refer to Figure 9-1).

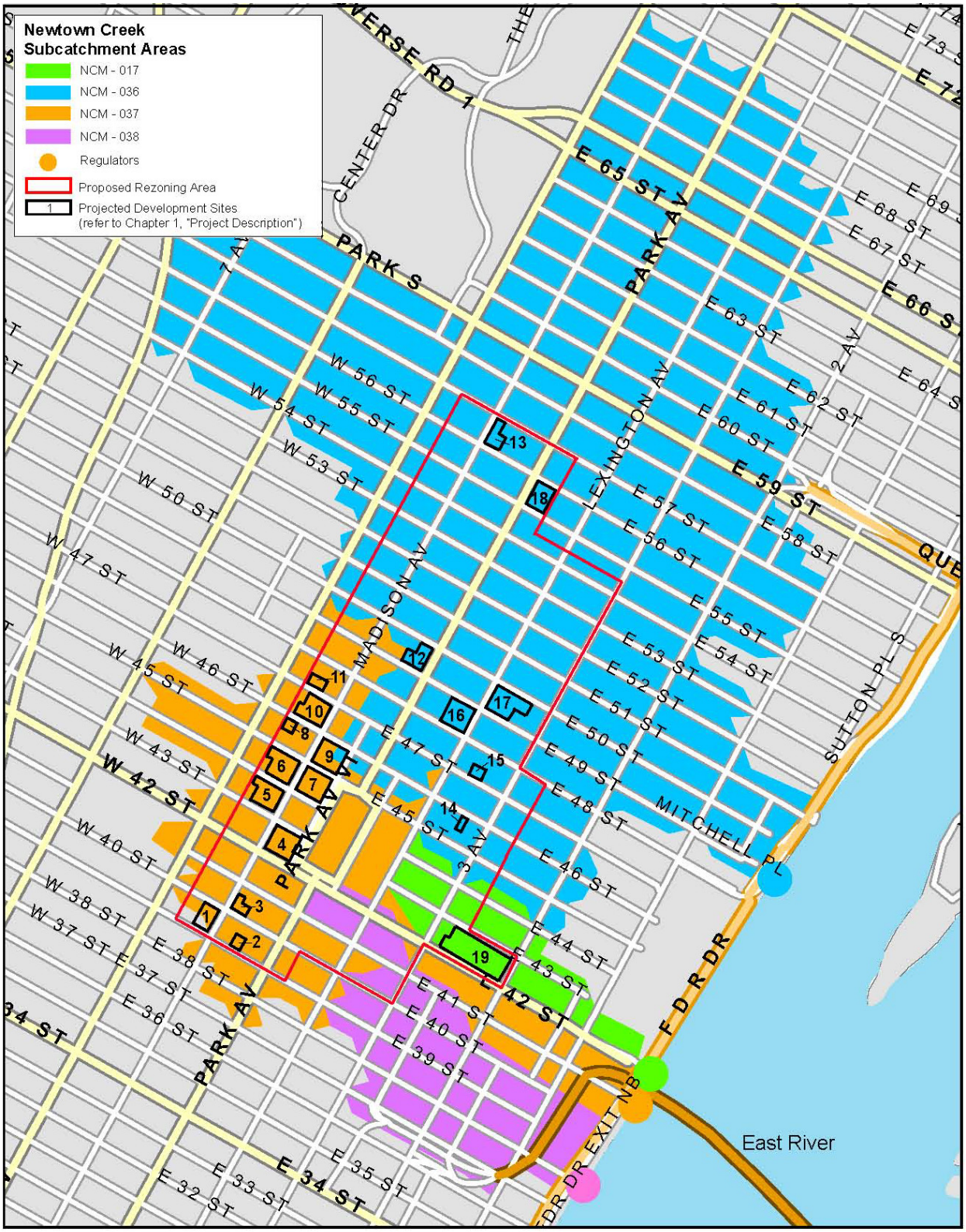
Subcatchment area NCM-038 (shown in purple in Figure 9-1) does not contain any projected development sites and is therefore excluded from this assessment. Subcatchment area NCM-017 (shown in green in Figure 9-1) contains Site 19, for a total land area of approximately 76,318 sf. Subcatchment area NCM-036 (shown in blue in Figure 9-1) contains seven projected development sites (Sites 12 through 18) for a total land area of approximately 196,243 sf.[2] Subcatchment area NCM-037 (shown in orange in Figure 9-1) would contain 11 projected development sites (Site 1 through Site 11[3]) for a total land area of approximately 368,158 sf.

Table 9-4 shows the estimated existing wastewater generated on the 19 projected development sites within each of the affected subcatchment areas.

[2] While a portion of Projected Development Site 9 falls within subcatchment area NCM-036, as this site is comprised of just one tax lot, and the majority of the lot is located in subcatchment area NCM-037, it is assumed that wastewater generated on Projected Development Site 9 would be discharged into subcatchment area NCM-037.

[3] While a small portion of Projected Development Site 1 would lie outside of the Newtown Creek WPCP, since the majority of the combined Projected Development Site 1 lots would be located within subcatchment area NCM-037 of the Newtown Creek WPCP, the wastewater impacts are analyzed assuming that all wastewater generated on Projected Development Site 1 would be served by subcatchment area NCM-037.

FIGURE 9-1: WPCP SUBCATCHMENT AREAS WITHIN THE PROPOSED REZONING AREA



Source: NYCDEP

TABLE 9-4: EXISTING WASTEWATER GENERATION ON 19 PROJECTED DEVELOPMENT SITES BY SUBCATCHMENT AREA

Subcatchment Area	Domestic Water/Wastewater Generated on the Projected Development Sites (mgd)[1]
NCM-017	115,688
NCM-036	511,634
NCM-037	797,049

Note:
[1] Derived using the same methodology used in Table 9-2.

9.4.3 Stormwater and Drainage Management

Stormwater runoff from impermeable surfaces in the proposed rezoning area is collected and conveyed by the City's combined sewer system to the Newtown Creek WPCP. During dry weather, regulators built into the combined sewer system direct flows to interceptor sewers leading to the WPCP. However, during storm events, the regulators are calibrated to allow only twice the dry weather design flow into interceptor sewers and the remaining flow is discharged into the East River (Figure 9-1).

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

In the existing condition, the total lot area of the projected development sites consists of 640,719 sf, comprised predominantly of rooftop. Approximately 76,318 sf (11.9 percent) of the total projected development site lot area is located within Subcatchment Area NCM-017. Subcatchment Area NCM-036 contains approximately 196,243 sf (30.6 percent). The balance of the lot area (approximately 368,158 sf, or 57.5 percent) is located within Subcatchment Area NCM-037. As shown in Table 9-5, the estimated 76,318 sf portion of the projected development sites' lot area within Subcatchment Area NCM-017 entirely comprises rooftop area. The estimated 193,243 sf portion of the projected development sites' lot area within Subcatchment Area NCM-036 comprises approximately 98.9 percent rooftop area (approximately 194,075 sf) and 1.1 percent pavement and walks (approximately 2,168 sf). The portion of the projected development sites' lot area within the NCM-037 subcatchment area comprises approximately 97.0 percent rooftop area (approximately 357,022 sf) and 3.0 percent pavement and walks (approximately 11,136 sf).

TABLE 9-5: EXISTING STORMWATER RUNOFF TO THE NEWTOWN CREEK WPCP

	Surface Type	Roof	Pavement and Walks	Other	Grass and Softscape	Total
Newtown Creek WPCP (NCM-017)	Area (%)	100.0	0.0	0.0	0.0	100%
	Surface Area (sf)	76,318	0.0	0.0	0.0	76,318
	Runoff Coefficient[1]	1.0	0.85	0.85	0.20	1.0
Newtown Creek WPCP (NCM-036)	Area (%)	98.9	1.1	0.0	0.0	100%
	Surface Area (sf)	194,075	2,168	0.0	0.0	196,243
	Runoff Coefficient[1]	1.0	0.85	0.85	0.20	1.0
Newtown Creek WPCP (NCM-037)	Area (%)	97.0	3.0	0.0	0.0	100%
	Surface Area (sf)	357,022	11,136	0.0	0.0	368,158
	Runoff Coefficient[1]	1.0	0.85	0.85	0.20	1.0

Source: DCP Building Footprint and PLUTO data; aerial photographs

Notes:
[1] Runoff coefficients for each surface type as per the DEP.

For this analysis, standard the DEP runoff coefficients were used to calculate the amount of stormwater runoff using the 3-month, 6-month, and 12-month storm events, with rainfall averaging from 0.00 to 2.50 inches over durations of 3.80 to 19.50 hours. Table 9-6 shows the existing combined stormwater runoff and wastewater generation for the existing uses on the projected development sites. As indicated in the table, the projected development sites currently generate between 0.00 and 1.00 mgd of stormwater within the Newtown Creek WPCP subcatchment areas (combined) for different rainfall intensities.

TABLE 9-6: EXISTING COMBINED STORMWATER RUNOFF AND WASTEWATER GENERATION TO THE NEWTOWN CREEK WPCP

	Storm Event Type	Rainfall (inches)	Duration (hours)	Total Area (acres)	Weighted Runoff Coefficient	Stormwater Runoff (MG)	Sanitary to CSS (MG)[1]	Total Volume to CSS (MG)
Newtown Creek WPCP (NCM-017)		0.00	3.80	1.75	1.0	0.00	0.02	0.02
	3-Month	0.40	3.80	1.75	1.0	0.02	0.02	0.04
	6-Month	1.20	11.30	1.75	1.0	0.06	0.05	0.11
	12-Month	2.50	19.50	1.75	1.0	0.12	0.09	0.21
Newtown Creek WPCP (NCM-036)		0.00	3.80	4.51	1.0	0.00	0.08	0.08
	3-Month	0.40	3.80	4.51	1.0	0.05	0.08	0.13
	6-Month	1.20	11.30	4.51	1.0	0.15	0.24	0.39
	12-Month	2.50	19.50	4.51	1.0	0.31	0.42	0.73
Newtown Creek WPCP (NCM-037)		0.00	3.80	8.45	1.0	0.00	0.13	0.13
	3-Month	0.40	3.80	8.45	1.0	0.09	0.13	0.22
	6-Month	1.20	11.30	8.45	1.0	0.28	0.37	0.65
	12-Month	2.50	19.50	8.45	1.0	0.57	0.64	1.21

Notes:
[1] Derived from Table 9-2.
MG = million gallons

Individual development projects are required to manage on-site stormwater runoff in accordance with DEP requirements to ensure that a development properly regulates its stormwater runoff corresponding to the City's 5-year storm. Currently, all of the projected development sites within the proposed rezoning area are covered by impervious surfaces, including buildings and paved areas that have high runoff coefficients. Since many of the buildings in the area most likely pre-date DEP requirements, it is expected that there is little or no on-site detention of stormwater on any of the projected development sites.

9.4.4 Water Conservation and WPCP Load Reduction

During the 1990s, the City instituted a range of water conservation measures in response to excess flow to the City's WPCPs that exceeded the dry weather flow allowed in their respective SPDES permits. Measures included equipping fire hydrants with locks to prevent illegal uses and requiring that all new plumbing fixtures in the City (including replacements in existing structures and new fixtures in new structures) be of a low-flow design (Local Law No. 29, 1989). The City also implemented a metering program, installing water meters at thousands of properties where water fees had previously been based on property frontage rather than usage. This metering provided a new financial incentive to identify and repair leaks in the water distribution system.

These programs have reduced water demand and load in the City's WPCPs. At many WPCPs, this reduction has been in an order of magnitude of several million gallons per day. The DEP projects that savings from the continued implementation of these conservation measures over the next decade would exceed any increases in water demand from consumers.

9.5 THE FUTURE WITHOUT THE PROPOSED ACTION (NO-ACTION)

In the future without the Proposed Action, anticipated growth in the vicinity of Manhattan Community Districts 5 and 6, and development that would occur on the 19 projected development sites without the Proposed Action would result in additional demand for water, wastewater production, and stormwater runoff. As identified in Chapter 1, "Project Description," the future development on the projected development sites without the Proposed Action would consist of 776 dwelling units (approximately 772,705 gsf), 529,328 gsf of retail space, 6,519,633 gsf of commercial/office space, and 2,010,947 gsf of hotel uses (approximately 3,094 rooms[4]). This would represent a net increase of 754 dwelling units (approximately 761,980 sf), 59,364 sf of retail space, and 260,689 sf of hotel uses (approximately 401 rooms) compared to existing conditions. An incremental decrease of 97,984 sf of commercial/office space is expected in the future without the Proposed Action.

[4] Assumed 650 sf per hotel room.

9.5.1 Water Supply

In the future without the Proposed Action (Table 9-7), the water consumption that would occur at the projected development sites would total approximately 3,185,131 gpd (3.19 mgd). This represents an increase from the existing conditions of approximately 258,327 gpd (0.26 mgd) or an approximately 8.8 percent increase over the existing water demand for these sites. As noted previously, New York City consumes approximately 1.3 billion gallons of water per day. Given this level of consumption, this incremental demand of 258,327 gpd would not be large enough to significantly affect the ability of the City's water system to deliver water in the future without the Proposed Action.

TABLE 9-7: NO-ACTION WATER CONSUMPTION AND WASTEWATER GENERATION DUE TO LAND USES ON THE PROJECTED DEVELOPMENT SITES

Land Use	Area (sf)	Dwelling Units / Hotel Rooms	Domestic Water/Wastewater Generation (gpd)	Air Conditioning (gpd)
Residential	772,705	776	123,384	0
Commercial—Retail	529,328		127,039	89,986
Commercial—Office	6,519,633		651,963	1,108,338
Hotel	2,010,947	3,094	742,560	341,861
Water Consumption Subtotals			1,644,946	1,540,185
Sewage Generation Subtotal			1,644,946	
Total Water Consumption			3,185,131	
Total Wastewater Consumption			1,644,946	

Notes:
Refer to Table 9-1 for rate assumptions.
gpd = gallons per day

9.5.2 Wastewater Treatment

In the future without the Proposed Action, additional sanitary discharges to the Newtown Creek WPCP would be well within the 82 mgd average available capacity of the plant. Therefore, it is anticipated that the WPCP would continue to operate within its design capacities.

As indicated in Table 9-7, in the future without the Proposed Action, 1,644,946 gpd (1.64 mgd) of wastewater would be generated by the 19 projected development sites. The incremental wastewater generation over existing conditions is 220,575 gpd (0.22 mgd). There is available capacity at Newtown Creek WPCP for the anticipated new wastewater flows, and therefore the WPCP is expected to continue to operate within its design capacity.

9.5.3 Stormwater and Drainage Management

In the future without the Proposed Action, stormwater runoff would continue to be collected and directed through the existing combined sewer system and then conveyed to the Newtown Creek WPCP for treatment. Without the Proposed Action, the majority of the projected development sites would experience either new construction or conversion of existing uses. This development (described in Chapter 1, "Project Description") would likely include a variety of new residential and commercial uses (refer to Table 9-7). Of the 19 projected development sites, 9 sites would not be developed in the No-Action condition.

As noted previously, the DEP requires stormwater detention in compliance with the applicable drainage plan for new developments if the developed site's storm flow is expected to exceed the allowable flow of the drainage plan. As a result of these requirements, given that the existing development sites are predominantly covered with impervious surfaces and do not provide detention, it is expected that there would be a reduction in uncontrolled runoff in the future without the Proposed Action with the incorporation of the latest detention and retention measures, such as green roofs, blue roofs, or seepage basins to handle stormwater runoff from the developed site. However, no improvements to stormwater detention are expected on the 9 projected development sites that will remain unchanged in the No-Action condition.

9.6 THE FUTURE WITH THE PROPOSED ACTION (WITH-ACTION)

In the future with the Proposed Action, the existing water supply, wastewater treatment and stormwater management systems are expected to support the Proposed Action without incurring significant adverse impacts. The Proposed Action would facilitate more commercial development than would occur in the future without the Proposed Action. As indicated in Chapter 1, "Project Description," an RWCDS for 19 projected development sites has been developed in conjunction with the Proposed Action. This scenario is used for the water and sewer infrastructure analysis. With the Proposed Action, the projected development sites would include 208 dwelling units (approximately 207,029 gsf), 648,990 gsf of retail space, 10,340,972 gsf of commercial/office spaces, and 2,134,234 gsf of hotel uses (or approximately 3,285 hotel rooms[5]).

Compared to the future without the Proposed Action, the future with the Proposed Action would add a net total of 119,662 gsf of retail space, 3,821,339 gsf of commercial/office, and 123,286 gsf of hotel uses (approximately 190 rooms). The Proposed Action would result in a 565,675 gsf decrease in residential uses (approximately 568 DUs) compared to the No-Action condition.

[5] Assumes 650 sf per hotel room.

9.6.1 Water Supply

The Proposed Action would not result in significant adverse impacts on the City's water supply system. As shown in Table 9-8, the projected developments would generate a water supply demand of approximately 4,242,440 gpd (4.24 mgd)—an increase of 1,057,071 gpd (1.06 mgd), or approximately 33.2 percent—compared to demand in the future without the Proposed Action. Future demand from the projected development sites in the With-Action condition would be dispersed throughout the approximately 70-block rezoning area and would represent approximately 0.0002 percent of the City's water supply. In addition, the majority of the increased water consumption (approximately 690,930 gpd, or 65 percent) would be generated by air conditioning uses (Table 9-8). Though not included in this analysis, in the 2033 future condition, it is anticipated that air conditioning technology would improve and would use less water, resulting in decreased future water consumption than the amount predicted in Table 9-8.

Given the anticipated incremental pace of development on the 19 projected development sites, their dispersed locations throughout an area of Manhattan well-served by water infrastructure, and anticipated future improvements in air conditioning technology, the incremental demand with the Proposed Action is not expected to adversely affect the City's water supply or system water pressure.

9.6.2 Wastewater Treatment

In the future with the Proposed Action, wastewater from the study area would continue to be treated by the Newtown Creek WPCP. The capacity of the plant would not change as a result of the Proposed Action, and the facility would continue to operate within its SPDES-permitted capacity of 310 mgd. As shown in Table 9-8, the Proposed Action would generate approximately 2,011,327 gpd of sanitary sewage. This sanitary sewage generation is a 366,141 gpd (0.37 mgd or 22.3 percent) increase from the amount of sanitary sewage that would be generated in the future without the Proposed Action.

With an existing average dry weather flow of 228.08 mgd to the Newtown Creek WPCP (Table 9-3) and the addition of approximately 0.37 mgd of sanitary sewage in the With-Action condition, the Newtown Creek WPCP would continue to have ample reserve capacity with this anticipated new demand. Pursuant to CEQR guidelines, since the demand associated with the Proposed Action would be well within the capacity of the treatment plant, no significant adverse impacts to the City's wastewater treatment services would occur as a result of the proposed rezoning.

TABLE 9-8: WATER CONSUMPTION AND WASTEWATER GENERATION IN THE FUTURE WITHOUT AND WITH THE PROPOSED ACTION

	Future Without the Proposed Action			Future With the Proposed Action			Incremental Changes with the Proposed Action		
Land Use	**Area (sf)**	**Domestic Water/ Wastewater Generation (gpd)**	**A/C (gpd)**	**Area (sf)**	**Domestic Water/ Wastewater Generation (gpd)**	**A/C (gpd)**	**Area (sf)**	**Domestic Water/ Wastewater Generation (gpd)**	**A/C (gpd)**
Residential	772,705 (776 DU)	123,384	0	207,029 (208 DU)	33,072	0	-565,675 (-568 DU)	-90,312	0
Commercial—Retail	529,328	127,039	89,986	648,990	155,758	110,328	119,662	28,719	20,343
Commercial—Office	6,519,633	641,963	1,108,3338	10,340,972	1,034,097	1,757,965	3,821,339	382,134	649,628
Hotel	2,010,947 (3,094 rooms)	742,560	341,861	2,134,234 (3,285 rooms)	788,400	362,820	123,286 (190 rooms)	45,600	20,959
Water Consumption Subtotals		1,644,946	1,540,185		2,011,327	2,231,113		366,141	690,930
Sewage Generation Subtotal		1,644,946			2,011,327			366,141	
Total Water Consumption		3,185,131			4,242,440			1,057,071	
Total Wastewater Generation		1,644,946			2,011,327			366,141	

Notes:
Refer to Table 9-1 for rate assumptions.
DU = dwelling unit

9.6.3 Stormwater and Drainage Management

In the future with the Proposed Action, the projected development sites would total 640,719 sf of lot area. For conservative analysis purposes, it is assumed that all of the projected development sites' surface area would comprise roofs which have the highest stormwater runoff coefficient. As such the future With-Action conditions are expected to result in minor increases in roof area. As there is no pervious surface area on the projected development sites in existing conditions, the only change in surface area would be a reduction in the total pavement and walks surface area. Consequently, the stormwater runoff would be similar to that under existing and No-Action conditions.

Table 9-9 shows the estimated combined flow volumes (stormwater runoff and sanitary flows) to the combined sewer system. As shown in the table, depending on the rainfall volume and duration, the total volume to the combined sewer system from the 19 projected development sites could be between 0.32 and 2.64 MG for all subcatchment areas, combined.

TABLE 9-9: COMBINED STORMWATER RUNOFF AND WASTEWATER GENERATION FLOW VOLUME TO THE COMBINED SEWER SYSTEM IN THE PROPOSED REZONING AREA—FUTURE WITH-ACTION CONDITION

	Storm Event Type	Rainfall (inches)	Duration (hours)	Total Area (acres)	Weighted Runoff Coefficient	Stormwater Runoff (MG)	Sanitary to CSS (MG)[1]	Total Volume to CSS (MG)
Newtown Creek WPCP (NCM-017)		0.00	3.80	1.75	1.0	0.00	0.02	0.02
	3-Month	0.40	3.80	1.75	1.0	0.02	0.02	0.04
	6-Month	1.20	11.30	1.75	1.0	0.06	0.07	0.13
	12-Month	2.50	19.50	1.75	1.0	0.12	0.12	0.24
Newtown Creek WPCP (NCM-036)		0.00	3.80	4.51	1.0	0.00	0.14	0.14
	3-Month	0.40	3.80	4.51	1.0	0.05	0.14	0.19
	6-Month	1.20	11.30	4.51	1.0	0.15	0.42	0.57
	12-Month	2.50	19.50	4.51	1.0	0.31	0.72	1.03
Newtown Creek WPCP (NCM-037)		0.00	3.80	8.45	1.0	0.00	0.16	0.16
	3-Month	0.40	3.80	8.45	1.0	0.09	0.16	0.25
	6-Month	1.20	11.30	8.45	1.0	0.28	0.46	0.74
	12-Month	2.50	19.50	8.45	1.0	0.57	0.80	1.37

Notes:
[1] Derived from Table 9-8.
MG = million gallons

Table 9-10 shows the incremental difference between existing and With-Action conditions. As shown in the table, the Proposed Action would result in an incremental increase of approximately 0.09 to 0.49 MG within the three combined Newtown Creek subcatchment areas, depending on the rainfall volume and duration. The corresponding percent change in flow volumes to the combined sewer system over existing conditions is also shown in the table.

TABLE 9-10: INCREMENTAL INCREASE IN COMBINED STORMWATER RUNOFF AND WASTEWATER GENERATION FLOW VOLUMES TO THE COMBINED SEWER SYSTEM IN THE PROPOSED REZONING AREA

	Rainfall (inches)	Duration (hours)	Total Volume to Combined Sewer System (MG)			Percentage Change (%)
			Existing Conditions	With-Action Condition	Increment	
Newtown Creek WPCP (NCM-017)	0.00	3.80	0.02	0.02	0.00	0.0
	0.40	3.80	0.04	0.04	0.02	50.0
	1.20	11.30	0.11	0.13	0.02	18.2
	2.50	19.50	0.21	0.24	0.03	14.3
Newtown Creek WPCP (NCM-036)	0.00	3.80	0.08	0.14	0.06	75.0
	0.40	3.80	0.13	0.19	0.06	46.2
	1.20	11.30	0.39	0.57	0.18	46.2
	2.50	19.50	0.73	1.03	0.30	41.1
Newtown Creek WPCP (NCM-037)	0.00	3.80	0.13	0.16	0.03	23.1
	0.40	3.80	0.22	0.25	0.03	13.6
	1.20	11.30	0.65	0.74	0.09	13.8
	2.50	19.50	1.21	1.37	0.16	13.2

Note:
MG = million gallons

Increased volumes and flows would be conveyed to the Newtown Creek WPCP, or discharged directly to the East River, dependent on the storm event. As indicated previously, regulator NCM45A corresponds with Subcatchment Area NCM-017, regulator NCM47 corresponds with Subcatchment Area NCM-036, and regulator NCM45 corresponds with Subcatchment Area NCM-037. Any developments resulting from the proposed rezoning in those subcatchment areas would also affect these regulators.

As shown in Table 9-10, new flow volumes would be introduced to the combined sewer system as a result of the Proposed Action. However, the table presents only total volume to the City's combined sewer system and does not account for stormwater flow rate. As described in greater detail below, with the incorporation of stormwater best management practices, such as those included in Section 9.5.4, and adherence to the new DEP regulations governing the flow rate of stormwater, the rate of discharge to the combined sewer system would be improved over existing conditions. As such, the Proposed Action would not result in a significant adverse impacts to stormwater and drainage management.

As noted previously, the DEP requires substantial stormwater detention in compliance with the drainage plan for new developments or building alterations on lots fronting on streets with sewers if the developed site's storm flow exceeds the allowable flow of the drainage plan. As a result of these requirements, given that the existing development sites are mostly covered with impervious surfaces and currently provide limited if any detention, it is expected that there would be substantial reduction in stormwater discharge from private development sites in the future with the Proposed Action, as these new developments would be required to incorporate stormwater detention or retention measures such as green roofs, blue roofs, or seepage basins to handle stormwater runoff from the developed site.

The DEP amended Chapter 31 of Title 15 of the Rules of the City of New York (RCNY), which are the existing rules governing house and site connections to the City's sewer system. The rule amendment modifies the flow rate of stormwater to the City's combined sewer system for new and existing development, as part of sewer availability and connection approvals, and applies to development lots for new buildings or alterations of existing buildings where an expansion of building footprints or impervious surfaces is proposed. The rule was promulgated on January 4, 2012, and went into effect on July 4, 2012. For a new development, the stormwater release rate is now the greater of 0.25 cubic feet per second (cfs), or 10 percent of the allowable flow, unless the allowable flow is less than 0.25 cfs, in which case the stormwater release rate is equal to the allowable flow. For alterations, the stormwater release rate for the altered area will be directly proportional to the ratio of the altered area to the total site area and no new points of discharge are permitted.

Therefore, any developments or alterations under the proposed rezoning requiring a connection to the sewer system would be required to achieve the new flow rate. Flexibility in achieving this rate is provided to the development community through a variety of approvable systems including subsurface and rooftop systems. Joint DEP and New York City Department of Buildings (DOB) guidelines (http://www.nyc.gov/html/dep/html/stormwater/stormwater_management_construction.shtml) are available to ensure the proper design and construction in the early stages of site planning and building design. This performance standard allows for a wide range of management techniques, costs, and space considerations.

With the 2012 RCNY amendment, self-certification of house or site connection proposals is not permitted in connection with any proposed new development or expansions of existing developments as per Title 15, Chapter 31, "Rule Governing House/Site Connections to the Sewer System." Because the City's sewers are sized and designed based on the designated zoning of an area, and related population density and surface coverage characteristics, the proposed rezoning may result in development that is inconsistent with the design of the existing built sewer system. At this time, there are no plans to amend the existing drainage plan for the proposed affected area or upgrade the affected sewer system. To be issued a permit to connect to the City sewer within the proposed rezoning area, an applicant proposing a new development or expansion of an existing development would be required to submit a site-specific hydraulic analysis, sewer improvements and/or incorporation of Best Management Practices (BMPs) may be required of the applicant at the time of the house or site connection proposal.

9.6.4 Stormwater Best Management Practices

A broad range of BMPs could be implemented on the development lots within the proposed rezoning area to facilitate stormwater source controls during site planning and building design phases of the projected developments to limit the stormwater release rate to the required 0.25 cfs, or 10 percent of the allowable flow per the drainage plan, whichever is greater.

The increased flow to the combined sewer system would be a direct result of the increased densities and sanitary flows associated with the Proposed Action. The implementation of low-flow fixtures, as per the New York City Plumbing Code, Local Law 33 of 2007 and the US Environmental Protection Agency's WaterSense Program, would help to control sanitary flows. To further offset these increases, onsite stormwater source controls or BMPs would be implemented to retain or slowly release stormwater runoff with controlled discharge rates to the City's combined sewer system.

Enhanced stormwater management throughout the City is consistent with recent policies, including the NYC Green Infrastructure Plan, and Mayor Bloomberg's PlaNYC 2030 and Sustainable Stormwater Management Plan. The NYC Green Infrastructure Plan, released September 2010, includes a goal of capturing the first inch of rainfall on 10 percent of the impervious areas in combined sewer watersheds through detention or infiltration techniques over 20 years.

The following typical BMP measures would help to avoid an exacerbation of existing CSO discharge to the East River: the implementation of BMPs described in the NYC Green Infrastructure Plan, including blue and green roofs, subsurface detention, porous pavement, enhanced tree pits, and rain cisterns, depending on site conditions.

For each projected development site, developers would be required to incorporate BMPs to limit stormwater from the site to the sewer system to the greater of 0.25 cfs or 10 percent of the allowable flow. To achieve this release rate, stormwater could be managed by utilizing one or a combination of detention or infiltration techniques identified in the NYC Green Infrastructure Plan. Green technologies, such as green and blue roofs, subsurface detention and infiltration, and permeable pavement, would retain or release stormwater with slowed discharge rates to control peak runoff rates. Trees planted per the City's street tree requirements could also be utilized to capture and store water below an enhanced tree pit.

The Proposed Action would increase flows into the City's combined sewer system that may be discharged as CSOs into the East River during rain events. Because of the available assimilative capacity of Newtown Creek WPCP, the projected increased flow to the combined sewer system would not have a significant adverse impact on water quality.

Based on the analysis and with the required BMP measures that would be implemented on each projected development site by their respective developer, it is concluded that the Proposed Action would not result in significant adverse impacts to local water supply or wastewater and stormwater conveyance and treatment infrastructure.