Chapter 9: Water and Sewer Infrastructure

A. INTRODUCTION

As described in Chapter 1, "Project Description," based on projections issued by the national Centers for Disease Control, Memorial Sloan Kettering Cancer Center (MSKCC) expects that new cancer cases in New York City will increase from the current rate of 40,000 annually to 60,000 annually by 2050. While this increase is a projection among all age groups, this rise is being driven by two populations: older patients, whose cases are more acute and require more complex treatment, and younger patients who are being diagnosed with prostate, colon, and breast cancer at alarming rates. To meet this increase in patient volume and the new interventions that are needed to treat the growing number of acute cases, MSKCC will need to supplement its existing capacity with a purpose-built structure with 28 operating rooms (with four dedicated to interventional radiology procedures) and up to 206 patient beds including intensive care unit (ICU) and single rooms for immunocompromised patients, as well as medical support areas.

To fulfill this need, MSKCC is requesting a series of zoning actions to establish a zoning envelope to facilitate the development of a new 31-story (up to 598.3 feet including mechanical bulkhead), approximately 903,065 gross square foot (gsf) inpatient hospital building (the Proposed Project), also referred to as the "MSK Pavilion." It would be located on York Avenue between East 66th and East 67th Streets and would consist of up to 28 operating rooms, including recovery and intensive care facilities, up to 206 single-bedded patient rooms, clinical support, and 5 mechanical floors to house intensive technologies and air exchange systems. A two-story patient bridge across East 67th Street (Patient Bridge) connecting floors 5 and 6 of the Proposed Project with floors 8 and 9 of the Memorial Hospital building would serve as the primary connector for patients in either building to access medical services in the other building.

New York City's water and sewer network is fundamental to the operation, health, safety, and quality of life of the City and its surrounding environment, and it must be sized to fit the City's users and surface conditions in order to function adequately. Ensuring these systems have adequate capacity to accommodate land use or density changes and new development is critical to avoiding environmental and health problems such as sewer back-ups, street flooding, or pressure reductions. This chapter evaluates the potential for the Proposed Project to result in significant adverse impacts on the City's water supply and wastewater and stormwater conveyance, management, and treatment infrastructure in accordance with the guidance of the 2021 *City Environmental Quality Review (CEQR) Technical Manual*.

The Proposed Project would replace the two existing buildings on the Development Site, Scholars and Sloan, which contain contract housing for MSKCC staff as well as administrative offices and below-grade parking which connects with the existing Rockefeller Research Laboratories (RRL) building.

PRINCIPAL CONCLUSIONS

Based on the methodology set forth in the *CEQR Technical Manual,* the Proposed Project would not result in increases in demand for water and treatment of sewage, therefore, it would not result

in a significant adverse impact on the City's water supply, wastewater treatment, or stormwater management and treatment infrastructure.

SEWER SYSTEM AND WASTEWATER TREATMENT

In the future without the Proposed Project (the With Action condition), the Proposed Project would generate approximately 20,136 gallons per day (gpd) of sanitary sewage, which represents an incremental decrease of 40,468 gpd compared to the future without the Proposed Project (the No Action condition). Therefore, the Proposed Project would not result in an increase in flows to the Newtown Creek Wastewater Resource Recovery Facility (WRRF), and the WRRF would continue to operate below its maximum permitted capacity of 275 million gallons per day (mgd). In addition, in accordance with the New York City Plumbing Code (Local Law 33 of 2007), the Proposed Project would be required to utilize low-flow plumbing fixtures, which would help to further reduce sanitary flows to the WRRF. The Proposed Project would be required to file a Site Connection Proposal (SCP) Application for approval from the New York City Department of Environmental Protection (DEP) to tie into the sewer system. In this process, before a building permit can be issued, site connection proposals must be certified for sewer availability by DEP. This analysis and any improvements would be undertaken, as necessary, in coordination with DEP.

STORMWATER FLOWS

The Development Site is within the service area of the Newtown Creek WRRF. As compared to existing conditions, the Proposed Project would result in similar or reduced flows to the City's combined sewer system as under existing conditions, as there would be a decrease in sanitary sewage generation, and no change to stormwater runoff (the Development Site would be fully impervious rooftop space under both existing and With Action conditions). Furthermore, a reduction in stormwater peak flows to the combined sewer system would be achieved with the incorporation of stormwater source control best management practices (BMPs) that would be required as part of the DEP site connection approval process. DEP's detention performance standard is intended to reduce peak discharges to the City's sewer system during rain events by requiring greater onsite storage of stormwater runoff and slower release to the sewer system.

As Proposed Project would result in similar or reduced flows to the City's combined sewer system as under existing conditions, it is not expected to result in an increase in combined sewer overflow (CSO) volumes or frequencies during rain events. Because of the available capacity of the Newtown Creek WRRF, the projected flows to the combined sewer system would not have a significant adverse impact on water quality. In addition, with the incorporation of BMP measures to meet the City site connection requirement, the Proposed Project would not result in a significant increase in stormwater runoff. Therefore, it is concluded that the Proposed Project would not result in significant adverse impacts to local water supply or wastewater and stormwater conveyance and treatment infrastructure.

B. METHODOLOGY

According to the *CEQR Technical Manual*, an analysis of an action's impact on the water supply system should be conducted only for actions that would have exceptionally large demand for water, such as power plants, very large cooling systems, or large developments. In addition, analysis should be conducted if a project is located in an area that experiences low water pressure (e.g., areas at the end of the water supply distribution system such as the Rockaway Peninsula and

Coney Island). The Proposed Project does not meet any of these criteria,[1] and therefore, an analysis of water supply is not warranted.

The *CEQR Technical Manual* indicates that for wastewater and stormwater conveyance and treatment analyses, a preliminary assessment is warranted if a project is located in a combined sewer area and would have an incremental increase above the No Action condition of 1,000 residential units or 250,000 sf of commercial, public facility, and institution and/or community facility space in Manhattan. Since the Development Site is located in a combined sewer area in Manhattan and the Proposed Project would result in a net increase of more than 250,000 sf of hospital space, an assessment of wastewater and stormwater infrastructure is provided.

To assess the potential impacts of the Proposed Project on water and sewer infrastructure, this chapter:

- Describes the existing water and sewer infrastructure serving the Development Site;
- Provides a preliminary analysis which estimates water demand and sewage generation on the Development Site under Existing and No Action conditions based on use generation rates provided in the *CEQR Technical Manual* and information on MSKCC's water demand and sewage generation provided by the Applicant. The preliminary analysis also calculates stormwater runoff and sanitary flows using the DEP Volume Calculation Matrix. The preliminary analysis then forecasts water demand and sewage and stormwater generation by the Proposed Project under the RWCDS based on *CEQR Technical Manual* guidelines; and
- Assesses the effects of the With Action condition water demand and sewage and stormwater generation on the City's water and sewer infrastructure based on the preliminary analyses, pursuant to *CEQR Technical Manual* guidelines.

C. EXISTING CONDITIONS

SEWER SYSTEM AND WASTEWATER TREATMENT

The Development Site is located within a part of Manhattan that is served by a combined sewer system that collects both sanitary sewage and stormwater, as well as direct drainage. In periods of dry weather, the combined sewers located in the adjacent streets convey only sanitary sewage. The Development Site is served by combined sewers within the service area of the Newtown Creek WRRF, the largest of the City's 14 WRRFs.

According to DEP sewer system mapping, the existing system serving the Development Site consists of 15-inch diameter combined sewers along East 66th Street, East 67th Street, and York Avenue, which date to the mid-to-late19th Century. These sewers generally flow to the south and east, where the system connects to Regulator NC-M51, located at the FDR Drive near East 63rd Street. From Regulator NC-M51, flow is conveyed to the interceptor running along the FDR Drive north to the Newtown Creek WRRF.

At the Newtown Creek WRRF, wastewater is treated by physical and biological processes before it is discharged into the Newtown Creek. The WRRF operates under a Stormwater Pollution Discharge Elimination System (SPDES) permit issued by the New York State Department of Environmental Conservation (DEC), which establishes limits for effluent parameters (i.e., suspended solids, fecal coliform bacteria, and other pollutants), and regulates the quality of the

[1] As shown in **Table 9-3**, the Proposed Project would result in a total water demand of 31,540 gpd and would not exceed 1 million gpd.

treated wastewater (effluent). Since the volume of flow to a WRRF affects the level of treatment a plant can provide, the maximum permitted capacity for the Newtown Creek WRRF is 310 million gallons per day (mgd). The average monthly flow over the latest 12-month period for which data are available is 212 mgd,[2] which is well below the maximum permitted capacity.

Most of New York City's sewers are combined sewers that collect both sanitary sewage and stormwater. In periods of dry weather, the combined sewers (sized to convey an amount of sanitary sewage that is based on density levels according to zoning regulations) convey only sanitary sewage. During and immediately after wet weather, combined sewers can experience a much larger flow due to stormwater runoff collection. To control flooding at the WRRFs, regulators built into the system serve as relief valves, allowing only approximately two times the amount of design dry weather flow into the interceptors (larger sewers that convey wastewater to the WRRFs). The interceptors then take the allowable flow to the WRRFs, while the excess flow is discharged untreated to the nearest waterbody as CSO. As described above, the Development Site is located within the drainage area of Regulator NC-M51; the Regulator connects to outfall NCM-005, located near East 63rd Street, which discharges CSO to the East River.

SANITARY FLOWS

As discussed in Chapter 1, "Project Description," the Development Site is currently improved with two adjoining buildings owned by MSKCC, known as the Scholars and Sloan buildings; together, they total approximately 292,837 gsf. They contain a total of 355 contract housing units (for professional staff and students during their terms of service or academic affiliation with the Applicant) and approximately 45,039 gsf of hospital administrative office space. The estimated daily sanitary sewage on Development Site under existing conditions is estimated using the rates for residential and office space provided by the *CEQR Technical Manual*. As shown on **Table 9-1**, the total estimated sanitary sewage generated on the Development Site under existing conditions is 60,604 gpd.

Table 9-1
Existing Water Consumption and Wastewater Generation

Land Use	Water Consumption and Wastewater Generation Rates[1]	Area/Units	Domestic Water/Wastewater Generation (gpd)	Air Conditioning (gpd)
Residential	Domestic: 100 gpd/person A/C: 0.17 gpd/sf	224,291 sf (561 residents)	56,100	38,129
Office	Domestic: 0.10 gpd/sf A/C: 0.17 gpd/sf	45,039 sf	4,504	7,657
Total Water Demand				**106,390**
Total Wastewater Generation				**60,604**

Notes:
Totals may not sum due to rounding.
gpd = gallons per day; DU = dwelling unit
[1] Consumption rates from *CEQR Technical Manual* Table 13-2, "Water Usage and Sewage Generation Rates for Use in Impact Assessment," unless otherwise noted.

STORMWATER FLOWS

The Development Site has a lot area of approximately 29,700 sf (0.68 acres) and is currently developed with buildings with below-grade parking areas, therefore the site is fully covered by rooftop area. **Table 9-2** summarizes the surfaces and surface areas on the Development Site, as

[2] Twelve-month period through March 2017.

well as the weighted runoff coefficient (the fraction of precipitation that becomes surface runoff for each surface type).

Table 9-2
Existing Surface Coverage

Affected CSO Outfall	Surface Type	Roof	Pavement and Walkways	Other	Grass and Soft Scape	Total
NCM-005	Area (percent)	100%	0%	0%	0%	**100%**
	Surface Area (sf)	29,700	-	–	–	**29,700**
	Runoff Coefficient	1.00	0.85	–	0.20	**1.00**

Notes:
* The Runoff Coefficient is a weighted average. The calculations are based on the DEP Volume Calculation Matrix provided in the *CEQR Technical Manual*, retrieved January 2022.
Totals may not sum due to rounding.

UNIFIED STORMWATER RULE

In February 2022, DEP adopted the Unified Stormwater Rule, which amended on-site stormwater management requirements for new and redevelopment projects in combined sewer areas. The Unified Stormwater Rule was an update to the previous regulations (2012 Stormwater Rule), which reduce peak discharges to the City's sewer system during rain events by requiring greater on-site storage of stormwater runoff and slower release to the sewer system. Specifically, DEP adopted amendments to Chapters 31 and 19.1 of Title 15 of the Rules of the City of New York (RCNY) as part of a Unified Stormwater Rule.

Under the Chapter 31 amendments, the Unified Stormwater Rule increases the amount of stormwater required to be managed on-site and further restricts the release rates for all new and redevelopment projects that require a DEP House or Site Connection Proposal. Additionally, under the Chapter 19.1 amendments, sites that disturb 20,000 square feet or more of soil or increase impervious surfaces by 5,000 square feet or more will also be required to manage the Water Quality Volume (WQv), currently defined as 1.5" over the lot area, using stormwater management practices (SMPs) dictated by DEP SMP hierarchies. DEP has developed hierarchies for both combined and separate sewer areas. The SMP hierarchies prioritize vegetated retention SMPs for both drainage areas with stormwater volume control and stormwater treatment communicated as the underlying goals for combined and separate sewer areas, respectively. For sites that trigger the Chapter 19.1 component of the Unified Stormwater Rule, the hierarchy is mandatory, meaning that developers must start with the most preferred SMP and provide documentation of site constraints that prevent implementation in order to move to the next SMP.

The Unified Stormwater Rule is expected to result in substantial improvements to the way that individual new and redeveloped properties manage stormwater compared to the 2012 Stormwater Rule it replaced. In some cases, stormwater will be entirely prevented from entering the sewer system through retention and, in most cases, stormwater that does enter the system will be reduced and/or treated and released at a much lower rate, allowing the system to operate more efficiently during peak wet weather events. In combined sewersheds, such as the portion of Manhattan that contains the Development Site, the Unified Stormwater Rule is expected to lead to a reduction in CSO volume as more lots redevelop over time. The analyses of stormwater flows presented in this chapter conservatively do not account for the recommendations of the Unified Stormwater Rule, and design guidance included within.

D. THE FUTURE WITHOUT THE PROPOSED PROJECT (NO ACTION CONDITION)

In the No Action condition, the Development Site would remain in its existing condition. Absent the Proposed Project, the Sloan and Scholars buildings would remain on the Development Site and would continue to operate 355 contract housing units for medical students, interns, and professional staff for their terms of service or academic affiliation with MSKCC. The units would be fully occupied under the No Action condition. In addition, the buildings would continue to house approximately 45,039 gsf of hospital administrative office space.

Total sanitary sewage generation and surface coverage conditions (including the weighted runoff coefficient) on the Development Site in the No Action condition would be the same as under the existing condition, as outlined above.

E. THE FUTURE WITH THE PROPOSED PROJECT (WITH ACTION CONDITION)

In the With Action condition, the Proposed Project would replace the Scholars and Sloan buildings on the Development Site with a new 31-story, approximately 903,065-gsf, state-of-the-art inpatient cancer treatment facility containing 28 operating rooms and up to 206 beds and the necessary support space. Entirely devoted to patient care, the Proposed Project would provide 28 operating rooms, including recovery and intensive care facilities, and up to 206 in-patient beds for acutely ill patients. There would also be clinical support and five mechanical floors distributed throughout the building.

With the Proposed Project, the daily non-residential population on the Development Site would increase by 657 workers, 240 patients, and 480 visitors under the With Action condition as compared to the No Action condition, while the residential population would decrease by 487 residents.

SANITARY FLOWS

As shown in **Table 9-3**, in the With Action condition, wastewater generated on the Development Site would total 20,136 gpd, which represents an incremental decrease of 40,468 gpd compared to the No Action condition. The incremental decrease in sewage generation is largely the result of the lower projected generation from the With Action inpatient treatment facility use as compared to the existing residential and office uses on the Development Site. Therefore, the Proposed Project would not result in an increase in flows to the Newtown Creek WRRF, and the WRRF would continue to operate below its maximum permitted capacity of 275 mgd. In addition, in accordance with the New York City Plumbing Code (Local Law 33 of 2007), the Proposed Project would be required to utilize low-flow plumbing fixtures, which would help to further reduce sanitary flows to the WRRF.

Table 9-3
With Action Water Consumption and Wastewater Generation

Land Use	Water Consumption and Wastewater Generation Rates	Area	Domestic Water/Wastewater Generation (gpd)	Water Demand (gpd)
Hospital (inpatient cancer treatment facility)	N/A[1]	852,159 sf	20,136	31,540
Total			**20,136**	**31,540**
No Action to With Action Increment			**-40,468**	**-74,850**

Notes:
Totals may not sum due to rounding.
gpd = gallons per day; DU = dwelling unit
[1] With Action condition water consumption and sanitary generation for the MSK Pavilion facility provided by the Applicant based on water usage rates for projected With Action population.

Connecting to the City's sewer system requires certification from DEP as part of the building permit process, which is not a discretionary approval. The Applicant would be required to file a SCP Application for approval from DEP to tie into the sewer system. In this process, before a building permit can be issued, site connection proposals must be certified for sewer availability by DEP. The Applicant would be required to demonstrate that the existing sanitary system could handle the site-specific sanitary flows from the Proposed Project. 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 Project may result in development that is inconsistent with the design of the existing built sewer system. A site-specific hydraulic analysis of the existing sewer system may be required to determine whether the existing sewer system is capable of supporting the new development and related increases in wastewater flows. Sewer upgrades may be required, including upgrades to the existing regulators, at the time of the SCP Application to accommodate the projected flows from the new development. In addition, there may be a need to amend the existing drainage plan based on the hydraulic analysis calculations.

As the Proposed Project is not expected to result in an increase in dry weather flows to the combined sewer system and the Newtown Creek WRRF, there would be no significant adverse impacts to sanitary sewage conveyance and treatment infrastructure.

STORMWATER FLOWS

In the With Action condition, the new building footprint on the Development Site is expected to fully occupy the site; therefore, as with the existing buildings, the surface area of the Development Site would remain fully rooftop space. Surface coverage and the weighted runoff coefficients of the Development Site would remain as in existing conditions, discussed above and shown in **Table 9-2**.

Using the With Action condition sanitary and stormwater flow calculations, the DEP Volume Calculation Matrix was utilized to determine flows for the With Action condition. The calculations from the Volume Calculation Matrix help to determine the change in wastewater volumes to the combined sewer system from existing conditions to With Action condition and include four rainfall runoff volume scenarios with varying durations.[3] The drainage analysis assumes that all stormwater runoff from the Development Site would flow via the existing combined sewer infrastructure serving the area. The summary tables of the Volume Calculation Matrix are included in **Table 9-4**.

[3] Consistent with the guidance of the *CEQR Technical Manual* and the DEP Volume Calculation Matrix, With Action condition flows are compared to existing conditions rather than No Action conditions.

Table 9-4
DEP Volume Calculation Matrix:
Existing and With Action Condition Volume Comparison

Rainfall Volume (in)	Rainfall Duration (hr)	Runoff Volume to SS (MG)	Runoff Volume to CSS (MG)*	Sanitary Volume to CSS (MG)	Total Volume to CSS (MG)	Runoff Volume to SS (MG)	Runoff Volume to CSS (MG)*	Sanitary Volume to CSS (MG)	Total Volume to CSS (MG)	Increased Total Volume to CSS (MG)*
NC-M51		Existing				With Action				NC-M51 Increment
		29,400 sf (0.67 acres)				29,400 sf (0.67 acres)				
0.00	3.80	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	-0.01
0.40	3.80	0.00	0.01	0.01	0.02	0.00	0.01	0.00	0.01	-0.01
1.20	11.30	0.00	0.02	0.03	0.05	0.00	0.02	0.01	0.03	-0.02
2.50	19.50	0.00	0.05	0.05	0.09	0.00	0.05	0.02	0.06	-0.03

Notes:
Totals may not sum due to rounding.
*Assumes no on-site detention or Best Management Practices (BMPs) for purposes of calculations.
SS = Storm Sewer; CSS = Combined Sewer System; MG = Million Gallons

As shown in **Table 9-4**, in all rainfall scenarios there would be a minor decrease in flows to the combined sewer system under the With Action condition as compared to the existing condition volumes, as there would be a decrease in sanitary sewage generation, and no change to stormwater runoff (the Development Site would be fully impervious rooftop space under both existing and With Action conditions).

The volume matrix calculations presented above do not reflect the use of any sanitary and stormwater source control BMPs to reduce sanitary volume and stormwater runoff volumes to the combined sewer system. As noted above, the Proposed Project would incorporate low-flow plumbing fixtures to reduce sanitary flow as required by the New York City Plumbing Code. In addition, stormwater detention would be required as part of the DEP SCP application process for new buildings connecting to the City's sewer system. As part of the SCP permit approval processes, developments must be in compliance with the required on-site stormwater volume requirements and stormwater release rate as detailed in the Unified Stormwater Rule. The performance standard is intended to reduce peak discharges to the City's sewer system during rain events by requiring greater onsite storage of stormwater runoff and slower release to the sewer system. The implementation of DEP's stormwater performance standard over time is expected to provide additional capacity to the existing sewer system, thereby improving its performance. The performance standard is a key element of the New York City Green Infrastructure Plan to promote green infrastructure and improve water quality in the City's surrounding waterbodies.

Specific BMP measures for the Proposed Project would be confirmed in the future in consultation with DEP when specific designs are advanced. However, the Proposed Project is expected to include a complete storm drainage system that would collect stormwater and store it in a stormwater reclamation tank located within the proposed building. The reclamation tank would be equipped with filtration system (duplex filter pumps, filters, media filters, UV, etc.), and would allow for stormwater to be re-used in building systems (e.g., for the cooling tower or irrigation of planted areas). During periods of dry weather, the reclamation tanks would be supplemented with water from the domestic water system, in order to maintain a minimum volume of water. The system's treatment of re-use water would be in compliance with the NYC Building Code and NYC Department of Health and Mental Hygiene (DOHMH) requirements.

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. If necessary,

subject to additional consultation with DEP, an Amended Drainage Plan (ADP) would be prepared. In addition, a hydraulic analysis of the existing sewer system may be required as part of the SCP permit approval process. The hydraulic analysis calculations would inform the ADP process as necessary. Sewer improvements and/or incorporation of BMPs may also be required of the Applicant at the time of the site connection proposal.

The Proposed Project would result in similar or reduced flows to the City's combined sewer system as under existing conditions, and therefore is not expected to result in an increase in CSO volumes or frequencies during rain events. Because of the available capacity of the Newtown Creek WRRF, the projected flows to the combined sewer system would not have a significant adverse impact on water quality. In addition, with the incorporation of BMP measures to meet the City site connection requirement, the Proposed Project would not result in a significant increase in stormwater runoff. Therefore, it is concluded that the Proposed Project would not result in significant adverse impacts to local water supply or wastewater and stormwater conveyance and treatment infrastructure. ✷